PROCEEDINGS

ONE HUNDRED AND EIGHTH
ANNUAL MEETING

of the

UNITED STATES ANIMAL HEALTH ASSOCIATION

P. O. Box K227
Richmond, Virginia 23288
804/285-3210
FAX 804/285-3367
E-mail: usaha@usaha.org
www.usaha.org

Sheraton Greensboro Hotel
Greensboro, North Carolina
The United States Animal Health Association appreciates the United States Department of Human Health Services, Food and Drug Administration’s financial support for the publication of these Proceedings.

Copyright 2005 by United States Animal Health Association

Library of Congress Catalog Card Number 17-12842

Pat Campbell & Associates
Richmond, Virginia
and
Skinner Printing Company
Montgomery, Alabama
The United States Animal Health Association, the nation’s animal health forum for over a century, is a science-based, voluntary organization of official state and federal animal health agencies, national allied organizations, regional representatives and individual members founded in 1897 to protect animal and public health.

USAHA’s mission is to:
- Serve as a forum for communication and coordination among state and federal governments, universities, industry and other groups on issues of animal health and disease control, animal welfare, food safety and public health.
- Serve as a clearing house for new information and methods and the ability to develop a consensus for changing laws, regulations, policies and programs.
- Act to develop solutions to animal-health related issues based on science, new information and methods and the ability to develop a consensus for changing laws, regulations, policies and programs.

The Association’s mission is implemented through deliberations of its science-based committees and the adoption of resolutions and recommendations aimed at solving problems. Committee size varies from 11 to 135 members.

USAHA is administered and its policy determined by the Executive Committee and Board of Directors. The Association maintains an office in Richmond, Virginia (www.usaha.org).

USAHA has met annually since its founding in 1897 and produces a printed proceedings of each meeting. The proceedings represent the most complete history of the nation’s animal health endeavors over the past century.

The 108th Annual Meeting of the USAHA will be held October 21-28, 2004, at the Sheraton Greensboro Hotel, Greensboro, North Carolina.

<table>
<thead>
<tr>
<th>Official State Animal Health Agency (50)</th>
<th>National Allied Organization (31)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alabama</td>
<td>Alpaca Owners &amp; Breeders Association</td>
</tr>
<tr>
<td>Alaska</td>
<td>American Association Of Avian Pathologists</td>
</tr>
<tr>
<td>Arizona</td>
<td>American Association Of Bovine Veterinarians</td>
</tr>
<tr>
<td>Arkansas</td>
<td>American Association Of Swine Veterinarians</td>
</tr>
<tr>
<td>California</td>
<td>American Association Of Veterinary Laboratory Diagnosticians</td>
</tr>
<tr>
<td>Connecticut</td>
<td>American Association Of Wildlife Veterinarians</td>
</tr>
<tr>
<td>Delaware</td>
<td>American Association Of Zoo Veterinarians</td>
</tr>
<tr>
<td>Florida</td>
<td>American Farm Bureau Federation</td>
</tr>
<tr>
<td>Georgia</td>
<td>American Quarter Horse Association &amp; American Horse Council</td>
</tr>
<tr>
<td>Hawaii</td>
<td>American Sheep Industry Association</td>
</tr>
<tr>
<td>Idaho</td>
<td>American Veterinary Medical Association</td>
</tr>
<tr>
<td>Illinois</td>
<td>Association of American Veterinary Medical Colleges</td>
</tr>
<tr>
<td>Indiana</td>
<td>Exotic Wildlife Association</td>
</tr>
<tr>
<td>Iowa</td>
<td>Holstein Friesian Association</td>
</tr>
<tr>
<td>Kansas</td>
<td>International Association Of Fish &amp; Wildlife Agencies</td>
</tr>
<tr>
<td>Kentucky</td>
<td>International Llama Registry</td>
</tr>
<tr>
<td>Louisiana</td>
<td>Livestock Exporters Association, U.S.A.</td>
</tr>
<tr>
<td>Maine</td>
<td>Livestock Marketing Association</td>
</tr>
<tr>
<td>Maryland</td>
<td>National Bison Association</td>
</tr>
<tr>
<td>Massachusetts</td>
<td>National Cattlemen’s Beef Association</td>
</tr>
<tr>
<td>Michigan</td>
<td>National Dairy Herd Improvement Association</td>
</tr>
<tr>
<td>Minnesota</td>
<td>National Institute For Animal Agriculture</td>
</tr>
<tr>
<td>Mississippi</td>
<td>National Milk Producers Federation</td>
</tr>
<tr>
<td>Missouri</td>
<td>National Pork Board</td>
</tr>
<tr>
<td>Montana</td>
<td>National Pork Producers Council</td>
</tr>
<tr>
<td>Nebraska</td>
<td>National Renderers Association</td>
</tr>
<tr>
<td>Nevada</td>
<td>National Turkey Federation</td>
</tr>
<tr>
<td>New Hampshire</td>
<td>North American Deer Farmers Association</td>
</tr>
<tr>
<td>New Jersey</td>
<td>North American Elk Breeders Association</td>
</tr>
<tr>
<td>New Mexico</td>
<td>U.S. Poultry and Egg Association</td>
</tr>
<tr>
<td>North Carolina</td>
<td>USAHA Membership (1)</td>
</tr>
<tr>
<td>North Carolina</td>
<td>USDA-APHIS-Veterinary Services</td>
</tr>
<tr>
<td>North Dakota</td>
<td>USDA Cooperative State Research, Education &amp; Extension Service</td>
</tr>
<tr>
<td>Ohio</td>
<td>USDA-APHIS-Wildlife Service</td>
</tr>
<tr>
<td>Oklahoma</td>
<td>USDHHS-Center for Disease Control and Prevention</td>
</tr>
<tr>
<td>Oregon</td>
<td>USDHHS-Food &amp; Drug Administration</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>U.S. Department of Homeland Security</td>
</tr>
<tr>
<td>Rhode Island</td>
<td>USD-I.U.S. Fish &amp; Wildlife Service</td>
</tr>
<tr>
<td>South Carolina</td>
<td>USD-APUSGS-National Wildlife Health Center</td>
</tr>
<tr>
<td>South Dakota</td>
<td>USD-OE-Lawrence Livermore National Laboratory</td>
</tr>
</tbody>
</table>

Official Federal Agency (10) | Other Federal Agency (10) | Elected Regional Delegates (8)

Guam, Puerto Rico, Virgin Islands | USDA-Agriculture Research Service | Northeastern (2) Southern (2)

Australia, Canada, Mexico, New Zealand | USDA-Cooperative State Research, Education & Extension Service | North Central (2) Western (2)

Official Foreign Animal Health Agency (4) | USDA-APHIS-Wildlife Service | Individual Member (1,111)

Argentina, Brazil, France, Japan | USDHHS-Center for Disease Control and Prevention | Official Foreign Animal Health Agency (4)
## CONTENTS – 2004

### SYNOPSIS OF TABLE OF CONTENTS

I. 2005 Officers and Committees  
   A. Officers  
   B. Committees  
II. 2004 Annual Meeting Proceedings  
   A. USAHA/AAVLD President’s Reception and Dinner  
   B. USAHA Membership Meetings  
   C. USAHA/AAVLD Plenary Session  
   D. USAHA Scientific Papers (Presented in an AAVLD Scientific or Poster Session)  
   E. Committee Business  
      1. Committee Reports  
      2. Time-Specific Scientific Papers  
      3. Related Papers  
   F. Other Reports  
      1. What is USAHA? Short Version for U. S. Veterinary 2005  
      2. USAHA – Accomplishments in Service to the Animal Agriculture Industries and the Nation’s Security  
III. Organizational Matters  
   A. Bylaws  
   B. Proposed Bylaw Changes  
   C. Administrative Policies  
   D. Record of Previous Meetings

### TABLE OF CONTENTS

I. 2005 Officers and Committees  
   A. Officers .................................................................14  
   B. Committees ............................................................15  
II. 2004 Annual Meeting Proceedings

#### SUNDAY, OCTOBER 24, 2004

A. USAHA/AAVLD President’s Reception and Dinner  
   Invocation and Memorial Service – David W. Hertha,  
   Christian Veterinary Mission ...........................................33  
   Welcome to Greensboro – N. David Smith, Deputy  
   Commissioner, North Carolina Department of Agriculture .........................................................34  

4
Response to the Welcome – Nan Hanshaw-Roberts, Acting Pennsylvania State Veterinarian .................. 36
Remarks of the USAHA President – Donald Lein .................. 37
Remarks of the AAVLD President – Willie Reed ................. 41
Addressing Emerging Infectious Diseases:
A Partnership Between the Veterinary and Human
Health Communities – Dixie Snider – Acting Deputy Director for Public Health Science –
Centers for Disease Control and Prevention .................. 44
Administrator’s Award – Ron DeHaven, Administrator,
Animal and Plant Health Inspection Service, United States Department of Agriculture .................. 48
E. P. Pope Award – Terry McElwain, Immediate Past President, AAVLD ................................. 50
National Assembly Award – David Thain, President,
National Assembly of State Animal Health Officials ....... 52

B. USAHA General Membership Meetings

MONDAY, OCTOBER 25, 2004

State of the Association – D. H. Lein .................................. 54
Treasurer’s Report – J. W. Bryan ..................................... 56

WEDNESDAY, OCTOBER 27, 2004

Report of the Action of the Committee on Nominations –
R. E. Frost .................................................................. 58
Passing the Presidential Gavel – D. H. Lein ...................... 59
President’s Address – R. D. Willer .................................. 60
Recognition of Immediate Past President – R. E. Frost ........ 64

C. USAHA/AAVLD Plenary Session

MONDAY, OCTOBER 25, 2004

Animal Disease Surveillance in the 21st Century –
Important Tools for Response, Protection of Public Health, and Trade

KEYNOTE ADDRESS: Global Perspective - the World Organisation for Animal Health (OIE) - Alex Thiermann, International Organizations Coordinator and President of the OIE Terrestrial Animal Health Standards
Commission, Animal and Plant Health Inspection Service, United States Department of Agriculture ............65

Importance of Surveillance to North America –
Brian Evans, Executive Director of the Animal Products Directorate of the Canadian Food Inspection Agency and Chief Veterinary Officer .................. 70

Emerging and Re-emerging Zoonotic Diseases –
Importance of Veterinary Surveillance for Protection of Public Health – Lonnie King, Dean, College of Veterinary Medicine, Michigan State University .................77

Surveillance of Disease: Epidemiologic Perspectives -
Wayne Martin, Professor of Epidemiology, Department of Population Medicine, University of Guelph ....................84

Characterization of the Recent United States Bovine Spongiform Encephalopathy Case and Methods for Surveillance – Juergen Richt, Veterinary Medical Officer Virus and Prion Diseases of Livestock Research Unit, National Animal Disease Center, Agriculture Research Service, United States Department of Agriculture .......................................91

Surveillance for Avian Influenza – David Suarez,
Veterinary Medical Officer, Poultry Disease Research Unit, Southeast Poultry Research Laboratory, Agriculture Research Service, United States Department of Agriculture .............................................93

D. USAHA Scientific Papers (Presented in an AAVLD Scientific or Poster Session)


Persistence of Bluetongue Virus in the Insect Vector and its Implications for Disease Control –
J. O. Mecham, D. M. White, B. S. Brolet and W. C. Wilson .................................................................100

Research Challenges for Brucellosis Eradication –
P. H. Elzer ..............................................................................108

Experimental Infection of Reindeer (Rangifer tarandus) with Mycobacterium bovis: Pathological and Immunological Findings – Mitchell V. Palmer, W. Ray Waters, Tuler C. Thacker, William C. Stoffregen, Bruce V. Thomsen, Ralph E. Slaughter, Stephen L. Jones, Josh E. Pitzer and F. Charis Minion ...113
Patterns of Relationship in Emergency Response: An Exotic Newcastle Disease Case Study – R. Werge and C. Cardona .............................................. 121
Diagnostic Lab Connectivity and Electronic Health Certificates for Equids – K. Maher and J. A. Facchiano . 136

E. Committee Business

USAHA/AAVLD ANIMAL HEALTH INFORMATION SYSTEMS

Report of the USAHA/AAVLD Committee on Animal Health Information Systems – B. L. Akey and F. Elvinger ............ 139

ANIMAL WELFARE

Report of the Committee on Animal Welfare – S. L. Halstead ... 145

USAHA/AAVLD AQUACULTURE

Report of the USAHA/AAVLD Committee on Aquaculture – S. E. LaPatra and T. Baldwin ................................................. 151

BIOLOGICS AND BIOTECHNOLOGY

Report of the Committee on Biologics and Biotechnology – R. W. Tully ............................................................................ 154
Development of Plant Cell Produced Vaccines for Animal Health - Charles A. Mihaliak, Dow AgroSciences ................. 158

BLUETONGUE AND BOVINE RETROVIRUSES

Report of the Committee on Bluetongue and Bovine Retroviruses – J. E. Pearson ......................................................... 164
BRUCELLOSIS

Report of the Committee on Brucellosis – S. D. Holland .......... 172
Report of the Education Subcommittee on Brucellosis –
  B. Espe ................................................................................. 180
Report of the Feral Swine Subcommittee on
  Brucellosis and Pseudorabies – C. Black and M. Coates .... 182
A Proposed Feasibility Study of Bison Quarantine-Update –
  K. Aune ................................................................................. 183
Cooperative State-Federal Brucellosis Eradication Program –
  Status Report - Fiscal Year 2004 – D. Donch,
  A. Gertonson and M. Gilsdorf ............................................. 187
Update on Governor of Wyoming’s Brucellosis Coordination
  Team – F. Galey .................................................................... 194
The Greater Yellowstone Interagency Brucellosis Committee –
  2004 Annual Report – T. Linfield ........................................ 194
Implementation of the Interagency Bison Management
  Plan By Yellowstone National Park – R. Wallen and
  G. Plumb ............................................................................... 197
NADC Studies on Bison Brucellosis Vaccines and
  Molecular Techniques for Brucella Epidemiologic
  Tracebacks – S. C. Olsen .................................................... 201

CAPTIVE WILDLIFE AND ALTERNATIVE LIVESTOCK

Report of the Committee on Captive Wildlife and Alternative
  Livestock – R. A. Cook ......................................................... 205

DIAGNOSTIC LABORATORY AND VETERINARY WORKFORCE
  DEVELOPMENT

Report of the Committee on Diagnostic Laboratory and
  Veterinary Workforce Development – B. I. Osburn and
  R. E. Frost ............................................................................. 221

ENVIRONMENT

Report of the Committee on Environment – G. Meerdink ....... 223
ICP-AES (Element Analysis) in the Diagnostic Laboratory:
  Then, Now and Hot off the Press – E. Braselton ............... 225
  Dioxin Levels in Animal Feeds – R. Lovell ......................... 233

FEED SAFETY

Report of the Committee on Feed Safety – K. G. Custer ......... 238
FOOD SAFETY

Report of the Committee on Food Safety – R. D. Glauser ........... 240

FOREIGN AND EMERGING DISEASES

Report of the Committee on Foreign and Emerging Diseases – C. C. Brown ................................................................. 244
Foot-and-Mouth Disease (FMD) Hemispheric Eradication Program – A. Torres, P. Bradshaw ........................................... 250

GOVERNMENT RELATIONS

Report of the Committee on Government Relations — B. D. Marsh ................................................................. 253

IMPORT-EXPORT

Report of the Committee on Import-Export – G. R. Holyoak ...... 262
National Center for Import and Export USDA-APHIS-VS Fiscal Year 2004 – A. Vaquer ..................................................... 263

INFECTIOUS DISEASES OF CATTLE, BISON, AND LAMA

Report of the Committee on Infectious Diseases of Cattle, Bison and Lama – J. J. England .................................................. 289

INFECTIOUS DISEASES OF HORSES

Report of the Committee of Infectious Diseases of Horses – P. J. Timoney ................................................................. 293
Proposed Three Phase Plan for Implementation of a National State-Federal Cooperative Program for the Control of EIA – E. Zirkle ................................................................. 299
EIA and Equine Inventories – 2/18/04 – J. Traub-Dargatz, L. Garber and G. Hill ................................................................. 310
Non-Immune Approaches to the Prevention and Control of Spreptococcus Equi Infections – J. Timoney ........... 313
Equine Infectious Anemia and Control of the Disease: How much is enough? – C. J. Issel and S. J. Cook ...................... 316
USAHA/AAVLD INTERNATIONAL STANDARDS

JOHNE’S DISEASE
Report of the Committee on Johne’s Disease –
W. L. Hartmann .................................................................... 330

LIVESTOCK IDENTIFICATION
Report of the Committee on Livestock Identification –
B. R. Hillman ........................................................................ 342
Report of the Equine Subcommittee of the Committee on Livestock Identification – M. Lea ............................................. 356
Electronic Certificates of Veterinary Inspection – Progress Report – A. Facchiano .......................................................... 358
Draft of The State’s Standards for Implementation of the National Animal Identification System (NAIS) Program – presented by T. Woods .......................................................... 360

NOMINATIONS AND RESOLUTIONS
Report of the Committee on Nominations and Resolutions –
R. E. Frost ............................................................................ 427

PARASITIC DISEASES
Report of the Committee on Parasitic Diseases – J. L. Corn ..... 460

PHARMACEUTICALS
Report of the Committee on Pharmaceuticals – J. S. Gloyd ...... 475

COMMITTEE OF THE PROGRAM
Report of the Program Committee – R. D. Willer ..................... 477

PSEUDORABIES
Report of the Committee on Pseudorabies – P. L. Anderson ..... 480
PUBLIC HEALTH AND RABIES

Report of the Committee on Public Health and Rabies –
M. G. Fearneyhough ............................................................. 490
Status of Oral Vaccination Programs in the United States –
Slate, Rupprecht, Lein.......................................................... 496

PUBLIC RELATIONS

Report of the Committee on Public Relations – L. M. Myers...... 498

SALMONELLA

Report of the Committee on Salmonella – D. M. Castellan ....... 500
Using antibiotic susceptibility patterns and pulse
field gel electrophoresis to compare historic and 
contemporary isolates of multi-drug resistant Salmonella
enterica subspecies enterica serovar Newport–
C. Berge ............................................................................... 512
Airflow at the Litter/Manure Surface – E. T. Mallinson .......... 517

SCRAPIE

Report of the Committee on Scrapie – J. Logan .................... 520
Genotyping Formalin Fixed Tissues and Discrepancies in
Genetic Test Results - M.Hall and F. Ross ......................... 521

SHEEP AND GOATS

Report of the Committee on Sheep and Goats – C. B. Wolf..... 524

TRANSMISSIBLE DISEASES OF POULTRY AND
OTHER AVIAN SPECIES

Report of the Committee on Transmissible Diseases of Poultry
and Other Avian Species – J. A. Smith ............................... 529
Symposium on Avian Influenza – B. Smith ............................. 558

TRANSMISSIBLE DISEASES OF SWINE

Report of the Committee on Transmissible Diseases of
Swine – T. J. Burkgren ......................................................... 571
Emerging Animal Disease Recognition and Response –
M. J. Engle ........................................................................... 575

**TUBERCULOSIS**

Report of the Committee on Tuberculosis – C. E. Massengill .... 581
Bovine Tuberculosis Eradication Program in Canada –
September 30, 2004 – C. Inch ........................................... 606
Report of the Scientific Advisory Subcommittee – D. Whipple... 611
The Comprehensive Strategic Plan for the Eradication of Bovine Tuberculosis – 2004 -B. Johnson......................... 613

**WILDLIFE DISEASES**

Report of the Committee on Wildlife Diseases - J. R. Fischer .. 648
Wildlife Disease Research at the National Wildlife Research Center – R. McLean .......................................................... 123

F. Other Reports

What Is USAHA? Short Version for *U.S. Veterinary* 2005-
R. Willer ................................................................................ 674
USAHA – Accomplishments in Service to the Animal Agriculture Industries and the Nation's Security- R. Willer .. 676

III. Organizational Matters
   A. Bylaws ............................................................................... 686
   B. Proposed Bylaw Changes .................................................... 697
   C. Administrative Policies.......................................................... 698
   D. Record of Previous Meetings .............................................. 699
I. 2005 Officers and Committees
   A. Officers
   B. Committees
2005 USAHA OFFICERS

Second row, left to right: Third Vice-President, D. E. Hoenig, Augusta, ME; Treasurer, J. W. Bryan, Clemson, SC; Secretary, J. L. Alley, Montgomery, AL.

First row, left to right: First Vice-President, L. M. Myers, Atlanta, GA; President, R. D. Willer, Phoenix, AZ; President-Elect, B. D. Marsh, Indianapolis, IN; Second Vice-President, J. W. Leafstedt, Alcester, SD.
USAHA/AAVLD Committee On Animal Health Information Systems

Co-Chairs: Dr. Bruce L. Akey, Albany, NY
Dr. Francois C. Elvinger, Blacksburg, VA

Mr. John B. Adams, VA          Dr. Donald H. Lein, NY
Dr. J. Lee Alley, AL            Ms. Jodi A. Luttropp, VT
Dr. Charles W. Beard, GA        Ms. Janet A. Maass, CO
Dr. Stan D. Bruntz, Co          Mr. Kevin D. Maher, IA
Dr. James T. Case, CA           Mr. Larry D. Mark, VA
Dr. Max E. Coats, Jr., TX       Dr. Charles E. Massengill, MO
Dr. Robert J. Eckroade, PA      Ms. Phyllis Menden, WI
Dr. Mark Engle, KY              Dr. John R. Ragan, MD
Dr. Peter J. Fernandez, DC      Dr. Leon H. Russell, Jr., TX
Dr. Robert Fourdraine, WI       Dr. Mo D. Salmann, CO
Dr. Jerome E. Freier, CO        Dr. Jack L. Schlater, IA
Mr. Bob Frost, CA               Dr. John A. Schmitz, NE
Dr. Jorge Hernandez, FL         Dr. David Thain, NV
Dr. John P. Honstead, CO        Dr. Mark C. Thurmond, CA
Dr. Richard D. Hull, IL         Dr. Jon C. Van Berkom, ND
Dr. Robert F. Kahrs, FL         Dr. Stephen E. Weber, CO
Dr. David R. Kinker, IA         Dr. Saul T. Wilson, Jr., AL
Dr. Stanley H. Kleven, GA       Dr. Nora E. Wineland, CO
Dr. Elizabeth A. Lautner, NY    

Committee On Animal Welfare

Chair: Dr. Steven L. Halstead, Lansing, MI
Vice Chair: Ms. Ria de Grassi, Sacramento, CA

Dr. Wilbur B. Amand, PA          Dr. Charles E. Massengill, MO
Dr. Joan M. Arnoldi, WI          Dr. Terry R. Menlove, UT
Dr. Chris D. Ashworth, AR       Dr. Sandra K. Norman, IN
Ms. Rita Baca, TX               Dr. Roger E. Olson, MD
Ms. Teri N. Baird, CO           Dr. John R. Ragan, MD
Dr. Dale D. Boyle, VA           Mr. Steven Roach, IA
Mr. Matt Brockman, TX           Ms. Nancy J. Robinson, MO
Dr. Beth Carlson, ND            Dr. Keith Roehr, CO
Dr. Tim Cordes, MD              Dr. Andy Schwartz, TX
Dr. W. Ron DeHaven, DC          Dr. Dale F. Schwimandam, MD
Mr. Sean Dolan, IA              Dr. Bruce N. Stewart-Brown, MD
Dr. Paul R. DuBois, KS          Dr. Carolyn L. Stull, CA
Ms. Debra S. Duncan, KS         Dr. Paul L. Sundberg, IA
Dr. Rita Dyess, TX              Mr. George Teagarden, KS
Ms. J. Amelia Facchiano, KS     Dr. Robert M. S. Temple, OH
Dr. Nancy A. Frank, MI          Ms. Mary Kay Thatcher, DC
Dr. Chester A. Gipson, MD       Dr. Kenneth L. Thomazin, CA
Dr. Gail C. Golab, IL           Dr. Peter H. Tran, WA
Dr. Nancy E. Halpern, NJ        Dr. Charles D. Vail, CO
Dr. Jeffrey J. Hamer, PA        Mr. Max Waldo, NE
Mr. Del E. Hensel, CO           Dr. Gary M. Weber, DC
Dr. Richard D. Hull, IL         Mr. Dave Whittlesey, CO
Dr. Pam J. Hullingar, CA        Ms. Mary Kay Thatcher, DC
Ms. Kathleen D. Kaufman, NY     Dr. Norman G. Willis, CAN
Dr. Terry Klick, OH             Mr. Ross Wilson, TX
Dr. Anthony P. Knight, CO       Dr. Nora E. Wineland, CO
Ms. Cathy A. Liss, DC           Mr. Richard W. Winters, Jr., TX
Dr. Martha A. Littlefield, LA   Dr. Michael Wood, VT
Dr. Calvin W. S. Lum, HI        Dr. Ernest W. Zirkle, NJ
Ms. Amy W. Mann, DC            

15
### USAHA/AAVLD Committee on Aquaculture

Co-Chairs: Dr. Thomas Baldwin, Logan, UT  
Dr. Scott E. LaPatra, Buhl, ID

| Dr. Deborah L. Brennan, MS | Dr. Donald E. Hoenig, ME |
| Dr. Gary L. Brickler, WA | Dr. Kelly Homb, WI |
| Dr. Jones W. Bryan, SC | Dr. Robert F. Kahrs, FL |
| Dr. William W. Buisch, NC | Mr. Larry D. Mark, VA |
| Dr. John A. Caver, SC | Dr. Robert B. Miller, VA |
| Mr. Fred Cunningham, MS | Dr. Lanny W. Pace, MS |
| Dr. Robert G. Eilenfeldt, WI | Dr. Charles Palmer, CA |
| Dr. James M. Foppoli, HI | Mr. Richard P. Peterson, CA |
| Dr. Anthony M. Gallina, FL | Dr. John P. Sanders, Jr., WV |
| Dr. Joe S. Gloyd, DE | Dr. A. David Scarfe, IL |
| Mr. Robert E. Good, FL | Dr. Roy A. Schultz, IA |
| Dr. Larry M. Granger, MD | Dr. Sang J. Shin, NY |
| Ms. Betsy Hart, WV | Dr. Norman G. Willis, CAN |
| Dr. Burke L. Healey, OK | Ms. Ria de Grassi, CA |

### Committee On Biologics & Biotechnology

Chair: Mr. Robert W. Tully, Lenexa, KS  
Vice Chair: Dr. Eric J. Neumann, Des Moines, IA

| Mr. J. Bruce Addison, MO | Dr. Robert F. Kahrs, FL |
| Dr. Joan M. Arnoldi, WI | Dr. Terry Klick, OH |
| Dr. Charles A. Baldwin, GA | Dr. Hiram N. Lasher, DE |
| Dr. Karen E. Burns Grogan, GA | Dr. Lloyd H. Lauerman, WA |
| Dr. Yung Fu Chang, NY | Mr. John C. Lawrence, ME |
| Ms. Mary Lou Chapek, NE | Dr. Randall L. Leving, IA |
| Dr. James D. England, ID | Dr. Chuck A. Mihaliak, IN |
| Dr. William H. Fales, MO | Dr. Robert B. Miller, VA |
| Dr. Patricia L. Foley, IA | Mr. Mark J. Owens, IA |
| Dr. Robert W. Fulton, OK | Mr. Bob E. Pitts, GA |
| Dr. Joe S. Gloyd, DE | Dr. Anette Rink, NV |
| Dr. Keith N. Haffner, SD | Dr. Roy A. Schultz, IA |
| Dr. Larry L. Hawkins, MO | Mr. Donald A. Shane, WI |
| Dr. Robert A. Heckert, MD | Dr. Sheila Tan, CAN |
| Dr. Rudolf G. Hein, DE | Dr. Deepanker Tewari, PA |
| Dr. Richard E. Hill, IA | Dr. Deoki N. Tripathy, IL |
| Mr. Joe N. Huff, CO | Ms. Mary Anne Williams, CA |
| Mr. Majon Huff, CO | Mr. Lawrence Williamson, IN |

### Committee On Bluetongue And Bovine Retrovirus

Chair: Dr. James E. Pearson, Ames, IA  
Vice Chair: Dr. William C. Wilson, Laramie, WY

| Dr. T. Lynwood Barber, CO | Dr. Jorge W. Lopez, Brazil |
| Dr. Edward J. Dubovi, NY | Dr. N James MacLachlan, CA |
| Dr. James F. Evermann, WA | Dr. James O. Mecham, WY |
| Dr. Robert W. Fulton, OK | Dr. Bennie I. Osburn, CA |
| Dr. Bob Gerlach, AK | Dr. Eileen N. Ostlund, IA |
| Dr. Chester A. Gipson, MD | Ms. Laurie S. Prasnicky, WI |
| Dr. Robert B. Hillman, NY | Dr. David E. Stallknecht, GA |
| Dr. Thomas J. Holt, FL | Ms. Susan W. Tellez, TX |
| Dr. Brian R. Jamieson, CAN | Dr. Mark C. Thurmond, CA |
| Dr. Robert F. Kahrs, FL | Dr. George O. Winegar, MI |
| Mr. Oscar Kennedy, VA | |
Committee On Brucellosis

Chair: Dr. Sam D. Holland, Pierre, SD
Vice Chair: Dr. Claude E. Barton, Nashville, TN

Mr. John B. Adams, VA       Dr. Thomas F. Linfield, MT
Dr. L. Garry Adams, TX       Dr. Jim Logan, WY
Dr. J. Lee Alley, AL         Dr. Phillip M. Mamer, ID
Mr. Keith E. Aune, MT       Dr. Bret D. Marsh, IN
Dr. Terry L. Beals, OK       Ms. Barbara M. Martin, IA
Dr. C. Carter Black, Ga      Dr. Charles E. Massengill, MO
Dr. Carole A. Bolin, MI      Ms. Phyllis Menden, WI
Dr. Richard E. Breitmeyer, CA Dr. Andrea Mikolon, CA
Mr. Wayne Brewster, MT       Mr. Rick S. Nabor, TX
Mr. Marc Bridges, MT         Mr. Richard E. Nelson, VT
Dr. Max E. Coats, Jr., TX    Dr. Don L. Notter, KY
Dr. Thomas F. Conner, OH     Dr. Steven C. Olsen, IA
Dr. Walter E. Cook, WY       Dr. Janet B. Payeur, IA
Dr. Miguel M. Cordoba, MEX   Dr. Angela Pelzel, TX
Mr. Ed Corrigan, WI          Dr. Alejandro Perera, MEX
Dr. Donald S. Davis, TX      Dr. Glenn Plumb, WY
Dr. Debbi A. Donch, MD       Dr. Valerie E. Ragan, MD
Dr. Mark L. Drew, ID         Dr. Jack C. Rhyan, CO
Dr. Anita J. Edmondson, CA   Dr. Thomas J. Roffe, MT
Dr. Philip H. Elzer, LA      Mr. Shawn P. Schafer, ND
Dr. Steven R. England, NM    Dr. John J. Schiltz, IA
Dr. Brian H. Espe, AR        Dr. Heidi A. Schleicher, IA
Dr. Donald E. Evans, KS      Dr. David D. Schmitt, IA
Dr. David E. Fly, NM         Dr. Roy A. Schultz, IA
Dr. James M. Foppoli, HI     Dr. Gerhardt Schurig, VA
Dr. Tony G. Frazier, AL      Dr. Clarence J. Siroky, ID
Mr. Bob Frost, CA            Dr. William C. Stoffregen, IA
Dr. Tam Garland, IN          Dr. Robert Stout, KY
Dr. Arnold A. Gertonson, CO  Dr. David A. Stringfellow, AL
Dr. Michael J. Gilgof, MD    Dr. Paul L. Sundberg, IA
Mr. L. Wayne Godwin, FL      Mr. George Teagarden, KS
Dr. William L. Hartmann, MN  Dr. Kenneth J. Throlden, ND
Dr. Robert A. Heckert, MD    Mr. Rick Wallen, WY
Dr. Steven G. Hennager, IA   Dr. James A. Watson, MS
Dr. Bob R. Himmel, TX        Dr. Gary M. Weber, DC
Dr. E. Ray Hinshaw, AZ       Ms. Diana L. Whipple, IA
Dr. David E. Hopson, NC      Dr. Margaret A. Wild, CO
Mr. Majon Huff, CO           Dr. Richard D. Willer, AZ
Dr. David L. Hunter, MT      Dr. Larry L. Williams, NE
Dr. Luisa Ibarra, MEX        Mr. Steve Wolcott, CO
Mr. Jon G. Johnson, TX       Dr. Taylor Woods, MO
Dr. Terry Klick, OH          Dr. Glen L. Zebarth, MN
Dr. Terry Kreeger, WY        Dr. Ernest W. Zinkle, NJ
Dr. Maxwell A. Lea, Jr., LA  

17
Committee On Captive Wildlife And Alternative Livestock

Chair: Dr. Robert A. Cook, Bronx, NY
Vice Chair: Dr. Michele A. Miller, Lake Buena Vista, FL

Dr. Wilbur B. Amand, PA
Mr. John R. Behrmann, PA
Mr. Alan G. Clark, UT
Dr. Thomas F. Cline, SD
Dr. Wayne E. Cunningham, CO
Dr. Mark L. Drew, ID
Mr. Tim J. Feldner, MT
Dr. John R. Fischer, GA
Dr. Colin M. Gillin, OR
Dr. Michael J. Gilisdorf, MD
Dr. Chester A. Gipson, MD
Dr. Sam D. Holland, SD
Dr. David L. Hunter, MT
Dr. Dave Jessup, CA
Ms. Holly C. Johnson, MN
Dr. Patrice N. Klein, MD
Dr. Terry Klick, OH
Dr. Terry Kreeger, WY
Dr. Jim Logan, WY
Dr. Calvin W. S. Lum, HI
Dr. Phillip M. Mamer, ID
Dr. Candace McCombs, GA
Dr. Robert G. McLean, CO
Dr. Thomas P. Meehan, IL
Ms. Phyllis Menden, WI

Committee on Diagnostic Laboratory & Veterinary Workforce Development

Co-Chairs: Mr. Robert E. Frost, Lincoln, CA
Dr. Bennie I. Osburn, Davis, CA

Dr. J. Lee Alley, AL
Dr. Alex A. Ardans, CA
Dr. Thomas W. Bates, CA
Dr. Judith Bossé, CAN
Dr. John R. Clifford, DC
Dr. W. Ron DeHaven, DC
Dr. Brian R. Evans, CAN
Dr. Peter J. Fernandez, DC
Dr. Bret D. Marsh, IN
Ms. Barbara M. Martin, IA

Committee On Environment

Chair: Dr. Gavin Meerdink, Urbana, IL
Vice Chair: Dr. Randall A. Lovell, Martinsburg, WV

Mr. L. Wayne Godwin, FL
Dr. John P. Honstead, CO
Dr. Gary D. Osweiler, IA
Dr. John C. Reagor, TX
Dr. Jane F. Robens, MD

Committee On Environment

Chair: Dr. Gavin Meerdink, Urbana, IL
Vice Chair: Dr. Randall A. Lovell, Martinsburg, WV

Mr. L. Wayne Godwin, FL
Dr. John P. Honstead, CO
Dr. Gary D. Osweiler, IA
Dr. John C. Reagor, TX
Dr. Jane F. Robens, MD

Committee On Environment

Chair: Dr. Gavin Meerdink, Urbana, IL
Vice Chair: Dr. Randall A. Lovell, Martinsburg, WV

Mr. L. Wayne Godwin, FL
Dr. John P. Honstead, CO
Dr. Gary D. Osweiler, IA
Dr. John C. Reagor, TX
Dr. Jane F. Robens, MD
### Committee On Feed Safety

**Chair:** Mr. Kevin G. Custer, Cumming, GA  
**Vice Chair:** Mr. Richard Sellers, Arlington, VA

<table>
<thead>
<tr>
<th>Name</th>
<th>State</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Roy D. Brister</td>
<td>AR</td>
<td></td>
</tr>
<tr>
<td>Dr. Richard L. Dutton</td>
<td>NE</td>
<td></td>
</tr>
<tr>
<td>Dr. Don A. Franco</td>
<td>FL</td>
<td></td>
</tr>
<tr>
<td>Dr. Eric C. Gonder</td>
<td>NC</td>
<td></td>
</tr>
<tr>
<td>Dr. C. Ross Hamilton</td>
<td>TX</td>
<td></td>
</tr>
<tr>
<td>Dr. Jay Hawley</td>
<td>IN</td>
<td></td>
</tr>
<tr>
<td>Dr. G. Thomas Holder</td>
<td>MD</td>
<td></td>
</tr>
<tr>
<td>Dr. Rex D. Holt</td>
<td>GA</td>
<td></td>
</tr>
<tr>
<td>Dr. David C. Kradel</td>
<td>PA</td>
<td></td>
</tr>
<tr>
<td>Dr. Elizabeth A. Lautner</td>
<td>NY</td>
<td></td>
</tr>
<tr>
<td>Mr. Gerald G. May</td>
<td>OH</td>
<td></td>
</tr>
<tr>
<td>Dr. David L. Meeker</td>
<td>VA</td>
<td></td>
</tr>
<tr>
<td>Dr. Kakambi V. Nagaraja</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dr. Gary D. Osweiler</td>
<td>IA</td>
<td></td>
</tr>
<tr>
<td>Dr. Jane F. Robens</td>
<td>MD</td>
<td></td>
</tr>
<tr>
<td>Mr. James E. Stocker</td>
<td>NC</td>
<td></td>
</tr>
<tr>
<td>Dr. H. Wesley Towers</td>
<td>DE</td>
<td></td>
</tr>
<tr>
<td>Dr. Elizabeth K. Wagstrom</td>
<td>IA</td>
<td></td>
</tr>
<tr>
<td>Dr. W. Douglas Walfman</td>
<td>GA</td>
<td></td>
</tr>
<tr>
<td>Dr. Gary L. Waters</td>
<td>MT</td>
<td></td>
</tr>
</tbody>
</table>

### Committee On Food Safety

**Chair:** Dr. R. David Glauer, Reynoldsburg, OH  
**Vice Chair:** Dr. Bonnie J. Buntain, Washington, DC

<table>
<thead>
<tr>
<th>Name</th>
<th>State</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Robin C. Anderson</td>
<td>TX</td>
<td></td>
</tr>
<tr>
<td>Dr. Marilyn F. Balmer</td>
<td>MD</td>
<td></td>
</tr>
<tr>
<td>Mr. John R. Behrmann</td>
<td>PA</td>
<td></td>
</tr>
<tr>
<td>Dr. Joseph L. Blair</td>
<td>VA</td>
<td></td>
</tr>
<tr>
<td>Dr. Dale D. Boyle</td>
<td>VA</td>
<td></td>
</tr>
<tr>
<td>Dr. Richard E. Breitmeyer</td>
<td>CA</td>
<td></td>
</tr>
<tr>
<td>Mr. Terry L. Burkhardt</td>
<td>WI</td>
<td></td>
</tr>
<tr>
<td>Dr. Donald W. Butts</td>
<td>VA</td>
<td></td>
</tr>
<tr>
<td>Dr. David M. Castellan</td>
<td>CA</td>
<td></td>
</tr>
<tr>
<td>Dr. Jan Charminske</td>
<td>WV</td>
<td></td>
</tr>
<tr>
<td>Dr. Max E. Coats, Jr.</td>
<td>TX</td>
<td></td>
</tr>
<tr>
<td>Mr. Carl W. Cushing</td>
<td>VT</td>
<td></td>
</tr>
<tr>
<td>Mr. Kevin M. Elfering</td>
<td>MN</td>
<td></td>
</tr>
<tr>
<td>Dr. Wyatt Frampton</td>
<td>UT</td>
<td></td>
</tr>
<tr>
<td>Dr. Don A. Franco</td>
<td>FL</td>
<td></td>
</tr>
<tr>
<td>Dr. Bob Gerlach</td>
<td>AK</td>
<td></td>
</tr>
<tr>
<td>Mr. L. Wayne Godwin</td>
<td>FL</td>
<td></td>
</tr>
<tr>
<td>Dr. Eric C. Gonder</td>
<td>NC</td>
<td></td>
</tr>
<tr>
<td>Dr. Larry M. Granger</td>
<td>MD</td>
<td></td>
</tr>
<tr>
<td>Mr. Neil Hammerschmidt</td>
<td>MD</td>
<td></td>
</tr>
<tr>
<td>Dr. Donald E. Hoenig</td>
<td>ME</td>
<td></td>
</tr>
<tr>
<td>Dr. G. Thomas Holder</td>
<td>MD</td>
<td></td>
</tr>
<tr>
<td>Dr. Rex D. Holt</td>
<td>GA</td>
<td></td>
</tr>
<tr>
<td>Dr. David E. Hopson</td>
<td>NC</td>
<td></td>
</tr>
<tr>
<td>Mr. Danny R. Hughes</td>
<td>AR</td>
<td></td>
</tr>
<tr>
<td>Dr. John P. Huntley</td>
<td>NY</td>
<td></td>
</tr>
<tr>
<td>Dr. Lee C. Jan</td>
<td>TX</td>
<td></td>
</tr>
<tr>
<td>Dr. Robert F. Kahrs</td>
<td>FL</td>
<td></td>
</tr>
<tr>
<td>Dr. Susan J. Keller</td>
<td>ND</td>
<td></td>
</tr>
<tr>
<td>Dr. Spangler Klopp</td>
<td>DE</td>
<td></td>
</tr>
<tr>
<td>Dr. Elizabeth A. Krushinskia</td>
<td>GA</td>
<td></td>
</tr>
<tr>
<td>Dr. Daniel E. LaFontaine</td>
<td>SC</td>
<td></td>
</tr>
<tr>
<td>Dr. Elizabeth A. Lautner</td>
<td>NY</td>
<td></td>
</tr>
<tr>
<td>Dr. William F. Leese</td>
<td>DC</td>
<td></td>
</tr>
<tr>
<td>Mr. Michael M. Mamminga</td>
<td>IA</td>
<td></td>
</tr>
<tr>
<td>Mr. Arthur P. Marquez</td>
<td>NM</td>
<td></td>
</tr>
<tr>
<td>Dr. Bret D. Marsh</td>
<td>IN</td>
<td></td>
</tr>
<tr>
<td>Dr. David T. Marshall</td>
<td>NC</td>
<td></td>
</tr>
<tr>
<td>Dr. James D. Mckean</td>
<td>IA</td>
<td></td>
</tr>
<tr>
<td>Ms. Phyllis Menden</td>
<td>WI</td>
<td></td>
</tr>
<tr>
<td>Dr. William Mies</td>
<td>FL</td>
<td></td>
</tr>
<tr>
<td>Dr. Lee M. Myers</td>
<td>GA</td>
<td></td>
</tr>
<tr>
<td>Dr. Jill A. Nezworski</td>
<td>MN</td>
<td></td>
</tr>
<tr>
<td>Mr. Tom Nunes</td>
<td>CA</td>
<td></td>
</tr>
<tr>
<td>Dr. Carol A. Olmstead</td>
<td>MT</td>
<td></td>
</tr>
<tr>
<td>Dr. Kenneth E. Olson</td>
<td>IL</td>
<td></td>
</tr>
<tr>
<td>Dr. Gary D. Osweiler</td>
<td>IA</td>
<td></td>
</tr>
<tr>
<td>Dr. Gerardo Quassadoff</td>
<td>VT</td>
<td></td>
</tr>
<tr>
<td>Dr. John R. Ragin</td>
<td>MD</td>
<td></td>
</tr>
<tr>
<td>Mr. Steven Roach</td>
<td>IA</td>
<td></td>
</tr>
<tr>
<td>Ms. Nancy J. Robinson</td>
<td>MO</td>
<td></td>
</tr>
<tr>
<td>Dr. Kerry Rood</td>
<td>VT</td>
<td></td>
</tr>
<tr>
<td>Dr. Leon H. Russell, Jr.</td>
<td>TX</td>
<td></td>
</tr>
<tr>
<td>Dr. John P. Sanders, Jr.</td>
<td>WV</td>
<td></td>
</tr>
<tr>
<td>Dr. Charles R. Seagren</td>
<td>SD</td>
<td></td>
</tr>
<tr>
<td>Mr. Glenn N. Slack</td>
<td>Ky</td>
<td></td>
</tr>
<tr>
<td>Dr. Harry Snelson</td>
<td>DC</td>
<td></td>
</tr>
<tr>
<td>Dr. Bruce N. Stewart-Brown</td>
<td>MD</td>
<td></td>
</tr>
<tr>
<td>Dr. Manuel A. Thomas, Jr.</td>
<td>TX</td>
<td></td>
</tr>
<tr>
<td>Dr. Kenneth L. Thomazin</td>
<td>CA</td>
<td></td>
</tr>
<tr>
<td>Dr. H. Fred Troutt</td>
<td>IL</td>
<td></td>
</tr>
<tr>
<td>Dr. Lyle P. Vogel</td>
<td>IL</td>
<td></td>
</tr>
<tr>
<td>Mr. David C. Warren</td>
<td>FL</td>
<td></td>
</tr>
<tr>
<td>Dr. Larry L. Williams</td>
<td>NE</td>
<td></td>
</tr>
<tr>
<td>Dr. Terrance M. Wilson</td>
<td>MD</td>
<td></td>
</tr>
<tr>
<td>Dr. Nora E. Wineland</td>
<td>CO</td>
<td></td>
</tr>
<tr>
<td>Dr. Richard R. Wood</td>
<td>IL</td>
<td></td>
</tr>
<tr>
<td>Mr. John F. Wortman, Jr.</td>
<td>NM</td>
<td></td>
</tr>
<tr>
<td>Ms. Ria de Grassi</td>
<td>CA</td>
<td></td>
</tr>
</tbody>
</table>
Committee On Foreign and Emerging Diseases

Chair: Dr. Corrie C. Brown, Athens, GA
Vice Chair: Dr. Alfonso Torres, Ithaca, NY

Dr. Helen M. Acland, PA
Mr. John B. Adams, VA
Dr. Bruce L. Akey, NY
Dr. Wilbur B. Amand, PA
Dr. Alex A. Ardans, CA
Dr. Joan M. Arnoldi, WI
Dr. Marianne Ash, IN
Dr. Charles A. Baldwin, GA
Dr. Thomas W. Bates, CA
Dr. Nathan Bauer, TX
Mr. John R. Behrmann, PA
Dr. Derek J. Belton, NZ
Dr. Bob H. Bokma, MD
Dr. Johnny E. Braddy, MD
Mr. Philip E. Bradshaw, IL
Dr. Richard E. Breitmeyer, CA
Dr. Deborah L. Brennan, MS
Dr. Gary L. Brickler, WA
Dr. Allen C. Bryce, Dr. William W. Buisch, NC
Dr. Eric J. Bush, CO
Dr. Johnny D. Callahan, MD
Dr. Jerry J. Callis, NY
Dr. John A. Caver, SC
Dr. George W. Chambless, NC
Dr. Yung Fu Chang, NY
Dr. Jim Clark, CAN
Dr. Robert A. Cook, NY
Dr. Joseph L. Corn, GA
Dr. Paula L. Cowen, CO
Dr. Robert A. Crandell, TX
Dr. Andrew Cupit, DC
Dr. Linda A. Detwiler, NJ
Dr. Debbi A. Donch, MD
Dr. Edward J. Dubovi, NY
Dr. Dee Ellis, TX
Dr. Roger G. Ellis, NY
Dr. Francois C. Elvinger, VA
Dr. John I. Enck, Jr., PA
Dr. Luis Alberto Espinoza, El Salvador
Dr. Peter J. Fernandez, DC
Dr. Steven Finch, IA
Dr. James M. Foppoli, HI
Ms. Rose Foster, MO
Dr. William K. Fowler, CA
Dr. Wyatt Frampton, UT
Dr. Don A. Franco, FL
Dr. Anthony M. Gallina, Fl
Dr. John E. George, TX
Dr. E. Paul J. Gibbs, FL
Dr. Colin M. Gillin, OR
Dr. Joel Goldman, LA
Mr. Daniel M. Goodyear, PA
Dr. Wendy F. Hall, MD
Dr. Jeffrey J. Hamer, PA

Dr. Amirali N. Hamir, IA
Dr. Robert A. Heckert, MD
Dr. Rudolf G. Hein, DE
Dr. Jorge Hernandez, FL
Dr. David W. Hertha, AL
Dr. Owen W. Hester, AL
Dr. Sharon K. Hietala, CA
Dr. Richard E. Hill, IA
Dr. Donald E. Hoenig, ME
Dr. Sam D. Holland, SD
Dr. Thomas J. Holt, FL
Dr. David E. Hopson, NC
Dr. Floyd P. Horn, MD
Dr. John L. Hyde, NY
Dr. Robert F. Kahrs, FL
Dr. Anthony P. Knight, CO
Dr. Elizabeth A. Lauther, NY
Dr. Hardi Liauw, ME
Dr. Linda L. Logan,
Dr. Jorge W. Lopez, Brazil
Dr. Edward T. Mallinson, MD
Dr. Bret D. Marsh, IN
Ms. Mary J. Marshall, UK
Ms. Barbara M. Martin, IA
Dr. MaryAnn T. McBride, NC
Dr. David L. Meeker, VA
Ms. Phyllis Menden, WI
Dr. Robert B. Miller, VA
Dr. Fonda A. Munroe, CAN
Dr. Thomas J. Myers, DC
Dr. Dana M. Nelson, CA
Dr. Terry L. Nipp, DC
Dr. Bruno Oesch, Switzerland
Dr. Richard E. Pacer, AA
Dr. Charles Palmer, CA
Col. Gerry Parker, DC
Dr. Andres M. Perez, CA
Mr. Richard P. Peterson, CA
Dr. Kelly R. Preston, MD
Dr. Gerardo Quaassdorff, VT
Dr. Anette Rink, NV
Dr. James A. Roth, IA
Dr. Mo D. Salman, CO
Dr. A. David Scarfe, IL
Dr. Jack L. Schlater, I
Dr. Eduardo Serrano, Dr.
Scott R. Severin, VA
Dr. Richard D. Siemons, OH
Dr. Harry Snelson, DC
Dr. David L. Suarez, GA
Dr. David E. Swayne, GA
Dr. Pamela K. Swift, CA
Dr. R. Flint Taylor, NM
Mr. Cleve Tedford, TN
Committee On Foreign and Emerging Diseases (continued)
Dr. David Thain, NV
Dr. Lee Ann Thomas, MD
Dr. Kenneth L. Thomazin, CA
Dr. Mark C. Thurmond, CA
Dr. John B. Thurston, IN
Dr. Jimmy L. Tickel, NC
Dr. Peter H. Timm, CA
Dr. Peter J. Timony, KY
Dr. Peter H. Tran, WA
Dr. Paul O. Ugstad, Ca
Dr. Samuel J. Vainisi, WI
Dr. Jon C. Van Berkem, ND
Dr. Joseph S. Vantien, MD
Dr. Lyle P. Vogel, IL
Dr. G. Gale Wagner, TX
Dr. Thomas E. Walton, CO
Mrs. Marsharee Wilcox, MD
Dr. Margaret A. Wild, CO
Dr. John L. Williams, DC
Dr. Larry L. Williams, NE
Dr. Norman G. Willis, CAN
Dr. Terrance M. Wilson, MD
Dr. William C. Wilson, WY
Dr. Saul T. Wilson, Jr., AL
Mr. Richard W. Winters, Jr., TX
Dr. Paul Yeske, MN

Committee On Government Relations
Chair: Dr. Lee M. Myers, Atlanta, GA
Vice Chair: Mr. James W. Leafstedt, Alcester, SD
Dr. J. Lee Alley, AL
Dr. Wilbur B. Amand, PA
Dr. Jones W. Bryan, SC
Dr. Wayne E. Cunningham, CO
Dr. Nancy E. Halpern, NJ
Dr. William L. Hartmann, MN
Dr. Donald E. Hoenig, ME
Dr. Maxwell A. Lea, Jr., LA
Dr. Donald H. Lein, NY
Dr. Bret D. Marsh, IN
Dr. R. Tracy Rhodes, WY
Dr. Richard D. Willer, AZ

Committee On Import-Export
Chair: Dr. G. Reed Holyoak, Stillwater, OK
Vice Chair: Dr. George O. Winegar, Howell, MI
Dr. Bob H. Bekma, MD
Dr. Charles E. Brown, II, WI
Dr. Suzanne L. Burnham, TX
Dr. Linda A. Detwiler, NJ
Dr. Najam Q. Faizi, VA
Dr. William H. Fales, MO
Dr. Adele Faul, SOUTH AFRICA
Dr. Lisa A. Ferguson, MD
Mr. Bob Frost, CA
Dr. Chester A. Gipson, MD
Ms. Amy W. Mann, DC
Dr. Richard D. Mitchell, CT
Dr. Andrea M. Morgan, DC
Mr. Ky Mortensen, KY
Dr. Lee M. Myers, GA
Dr. James E. Pearson, IA
Dr. Kelly R. Preston, MD
Dr. Gerardo Quaassdorff, VT
Mr. Paul E. Rodgers, CO
Ms. Susan W. Tellez, TX
Dr. Lynn Anne Tesar Slotts, SD
Dr. Richard T. Timoney, KY
Dr. Charles D. Vail, CO
Mr. David Winters, TX
Dr. Cindy B. Wolf, MN

Dr. Robert B. Hillman, NY
Dr. Brian R. Jamieson, CAN
Dr. Julie Ann jarviren, IA
Mr. Oscar Kennedy, VA
Dr. Ralph C. Knowles, FL
Dr. Elizabeth A. Lautner, NY
Ms. Amy W. Mann, DC
Dr. Lee Ann Thomas, MD
Dr. Peter J. Timoney, KY
Dr. Charles D. Vail, CO
Dr. James A. Watson, MS
Dr. Gary M. Weber, DC
Mr. David Winters, TX
Dr. Cindy B. Wolf, MN
Committee On Infectious Diseases Of Cattle, Bison And Camelids

Chair: Dr. James J. England, Caldwell, ID
Vice Chair: Dr. Howard D. Lehmkuhl, Ames, IA

Dr. Helen M. Acland, PA
Ms. Teri N. Baird, CO
Dr. Karen Baum, VA
Dr. Bob H. Bokma, MD
Dr. Carole A. Bolin, MI
Dr. Bruce L. Branscomb, NV
Dr. Gary L. Brickler, WA
Dr. Beth Carlson, ND
Dr. Yung Fu Chang, NY
Dr. Thomas F. Conner, OH
Ms. Karen Conyngham, TX
Dr. A. A. Cuthbertson, NV
Dr. Edward J. Dubovi, NY
Dr. James F. Evermann, WA
Mr. Bob Frost, CA
Dr. Robert W. Fulton, OK
Dr. John E. George, TX
Mr. Daniel M. Goodyear, PA
Dr. Renn R. Harrison, KY
Dr. Burke L. Healey, OK
Mr. Del E. Hensel, CO
Dr. David E. Hopson, NC

Dr. David L. Hunter, MT
Dr. Julie Ann Jarvinen, IA
Dr. Robert F. Kahrs, FL
Dr. Donald H. Lein, NY
Ms. Janet Maass, CO
Ms. Mary J. Marshall, UK
Dr. Patrick L. McDonough, NY
Dr. Robert M. Meyer, CO
Mr. Tom Nunes, CA
Dr. Phillip A. O’Berry, IA
Dr. Steven C. Olsen, IA
Dr. John A. Schmitz, NE
Dr. Lynne M. Siegfried, FL
Dr. Susan M. Stehman, NY
Ms. Susan W. Tellez, TX
Dr. Robert B. Hillman, NY
Dr. Susan M. Stehman, NY
Mr. George Teagarden, KS
Ms. Susan W. Tellez, TX
Dr. Robert M. S. Temple, OH
Dr. John U. Thomson, MS
Dr. Cheryll L. Tillman, OR
Mrs. Marsharee Wilcox, MD

Committee On Infectious Diseases Of Horses

Chair: Dr. Peter J. Timoney, Lexington, KY
Vice Chair: Dr. James A. Watson, Jackson, MS

Dr. Helen M. Acland, PA
Dr. Debbie Barr, CAN
Dr. Derek J. Belton, NZ
Dr. C. Carter Black, GA
Dr. Bruce L. Branscomb, NV
Dr. Jones W. Bryan, SC
Dr. Suzanne L. Burnham, TX
Dr. C. L. Campbell, FL
Dr. Craig N. Carter, TX
Dr. John A. Caver, SC
Dr. Max E. Coats, Jr., TX
Dr. Leroy M. Coffman, FL
Dr. Tim Cordes, MD
Mr. Ed Corrigan, WI
Ms. Michelle H. Davidson, CA
Dr. Dee Ellis, TX
Ms. J. Amelita Facchiano, TX
Dr. Tony G. Frazier, AL
Dr. E. Paul J. Gibbs, FL
Dr. Nancy E. Halpern, NJ
Dr. Steven L. Halstead, MI
Dr. Jeffrey J. Hamer, PA
Dr. Nanette Hanshaw-Roberts, PA
Dr. Burke L. Healey, OK
Dr. Carl Heckendorf, CO
Dr. Sharon K. Hietala, CA

Dr. Robert B. Hillman, NY
Dr. G. Reed Holyoak, OK
Dr. Brelaigne Jones, MO
Dr. Ralph C. Knowles, FL
Dr. Maxwell A. Lea, Jr., LA
Dr. Donald H. Lein, NY
Dr. Mary Jane Lis, CT
Dr. Martha A. Littlefield, LA
Ms. Amy W. Mann, DC
Dr. Patrick L. McDonough, NY
Dr. Clifford W. McGinnis, NH
Dr. Andrea M. Morgan, DC
Mr. Ky Mortensen, KY
Dr. Lee M. Myers, GA
Dr. Sandra K. Norman, IN
Dr. Don L. Notter, KY
Dr. Eileen N. Ostlund, IA
Dr. Angela Pelzel, TX
Dr. Robert Stout, KY
Dr. David Thain, NV
Dr. Manuel A. Thomas, Jr., TX
Dr. H. Wesley Towers, DE
Dr. Susan C. Trock, NY
Dr. Charles D. Vail, CO
Dr. Taylor Woods, MO
Dr. Ernest W. Zirkle, NJ
USAHA/AAVLD Committee on International Standards  
Chair: Dr. Joan M. Arnoldi, Brooklyn, WI  
Vice Chair: Dr. Norman G. Willis, Ottawa, Ont., CAN

Dr. Michael J. David, MD   Dr. Jim Logan, WY  
Dr. Peter J. Fernandez, DC   Dr. Bret D. Marsh, IN  
Dr. John R. Fischer, GA   Dr. Alex B. Thiermann, France  
Mr. Bob Frost, CA   Dr. Alfonso Torres, Ny  
Dr. Lonnie J. King, MI   Dr. Gary M. Weber, DC  
Dr. Elizabeth A. Lautner, NY   Dr. Richard D. Willer, AZ

Committee On Johne's Disease  
Chair: Dr. Robert G. Ehlenfeldt, Madison, WI  
Vice Chair: Dr. Scott J. Wells, St Paul, MN

Mr. John B. Adams, VA   Mr. Gordon 'Cobbie' Magness, SD  
Mr. J. Bruce Addison, MO   Dr. Charles E. Massengill, MO  
Dr. Robert D. Angus, ID   Dr. Clifford W. McGinnis, NH  
Dr. Marilyn F. Balmer, MD   Mr. Chris W. Murdock, MO  
Mr. Nathan James Boehm, ND   Mr. Richard E. Nelson, VT  
Dr. William W. Buishch, NC   Dr. Kenneth E. Olson, IL  
Dr. Todd M. Byrem, MI   Dr. James E. Oosterhuis, CA  
Dr. Michael A. Carter, MD   Mr. Mark J. Owens, IA  
Dr. Yung Fu Chang, NY   Dr. Boyd Parr, SC  
Dr. Michael T. Collins, WI   Dr. Elisabeth Patton, WI  
Dr. Thomas F. Conner, OH   Dr. Janet B. Payeur, IA  
Dr. Robert A. Cook, NY   Dr. Kristine R. Petrini, MN  
Mr. Ed Corrigan, WI   Ms. Laurie S. Prasnicki, WI  
Dr. Robert J. Eisner, NJ   Dr. John R. Ragan, MD  
Dr. John L. Enck, Jr., PA   Dr. Suelee Robbe-Austerman, IA  
Dr. Kendal G. Eyre, ID   Mr. Paul E. Rodgers, CO  
Dr. William H. Fales, MO   Dr. John J. Schiltz, IA  
Dr. James M. Foppoli, HI   Dr. Andy Schwartz, TX  
Dr. Keith A. Friendshuh, MN   Dr. Sarah B. S. Shapiro Hurley, WI  
Mr. Bob Frost, CA   Dr. Sang J. Shin, NY  
Mr. L. Wayne Godwin, FL   Dr. William P. Shulaw, OH  
Dr. Jeffrey J. Hamer, PA   Dr. Shri N. Singh, KY  
Dr. William L. Hartmann, MN   Dr. Judith R. Stabel, IA  
Mr. Steven G. Hennager, IA   Dr. Susan M. Stehman, NY  
Dr. Sharon K. Hietala, CA   Dr. William D. Stouder, ID  
Dr. Donald E. Hoenig, ME   Mr. Les C. Stutzman, OH  
Dr. Sam D. Holland, SD   Mr. Cleve Tedford, TN  
Dr. John P. Honstead, CO   Dr. Deepanker Tewari, PA  
Dr. David L. Hunter, MT   Dr. Kenneth L. Thomazin, CA  
Dr. John P. Huntley, NY   Dr. John B. Thurston, IN  
Dr. Bretaigne Jones, MO   Dr. James A. Watson, MS  
Dr. Susan J. Keller, ND   Dr. Gary M. Weber, DC  
Mr. John C. Lawrence, ME   Ms. Diana L. Whipple, IA  
Dr. Pepi F. Leids, NY   Dr. Robert H. Whitlock, PA  
Dr. Donald H. Lein, NY   Dr. Ronald B. Wilson, TN  
Dr. Thomas F. Linfield, MT   Dr. Ching-Ching Wu, IN  
Dr. Mary Jane Lis, CT   Ms. Ria de Grassi, CA  
Ms. Sharon L. Lombardi, NM

23
Committee On Livestock Identification
Chair: Dr. Bob R. Hillman, Austin, TX
Vice Chair: Mr. Kevin D. Maher, Ames, IA

Mr. Jim Akers, KY
Dr. J. Lee Alley, AL
Dr. Joan M. Arnoldi, WI
Ms. Terri N. Baird, CO
Dr. Nathan Bauer, TX
Mr. John R. Behrmann, PA
Mr. Paul Brennan, IN
Mr. Allen Bright, NE
Mr. Matt Brockman, TX
Dr. James T. Case, CA
Ms. Karen Conyngham, TX
Ms. Anita J. Edmondson, CA
Dr. James J. England, ID
Ms. J. Amelita Facchiano, TX
Dr. Robert Foudraine, WI
Dr. Tony G. Frazier, AL
Mr. L. Wayne Godwin, FL
Dr. Larry M. Granger, MD
Mr. Robert R. Green, DC
Dr. Kent Haden, SC
Dr. Steven L. Halstead, MI
Dr. Jeffrey J. Hamer, PA
Mr. Neil Hammerschmidt, MD
Dr. E. Ray Hinshaw, AZ
Mr. Joe N. Huff, CO
Dr. Julie Ann Jarvinen, IA
Mr. Jon G. Johnson, TX
Mr. Dick Jurgens, IL
Dr. Susan J. Keller, ND
Dr. Cleon V. Kimberling, CO
Dr. Terry Klick, OH
Dr. Ralph C. Knowles, FL
Dr. Maxwell A. Lea, Jr., LA
Mr. James W. Leafstetd, SD
Dr. Jim Logan, WY
Ms. Kelli S. Ludlum, DC
Ms. Jodi A. Luttropp, VT
Ms. Amy W. Mann, DC
Ms. Phyllis Menden, WI
Mr. Terry R. Menlove, UT
Dr. William Mies, FL
Mr. Richard E. Nelson, VT
Mr. Tim Niedecken, FL
Mr. Tom Nunes, CA
Dr. Kenneth E. Olson, IL
Dr. Angela Pelzel, TX
Ms. Laurie S. Prasnicki, WI
Dr. John R. Ragan, MD
Dr. Valerie E. Ragan, MD
Mr. Charly Seale, TX
Mr. J. Gary Shoun, CO
Dr. Rick L. Sibbel, IA
Mr. Glenn N. Slack, KY
Dr. Bob Smith, OK
Dr. Mark Spire, KS
Dr. Joe Starcher, WV
Dr. Robert Stout, KY
Mr. Scott Stuart, CO
Mr. Richard C. Taylor, TX
Mr. Victor L. Velez, CA
Dr. Elizabeth K. Wagstrom, IA
Mr. Rick Wahler, CO
Mr. David C. Warren, FL
Dr. Gary M. Weber, DC
Dr. John F. Wiemers, IL
Dr. Gary W. Wilson, OH
Mr. Ross Wilson, TX
Dr. Cindy B. Wolf, MN
Dr. Taylor Woods, MO
Mr. John F. Wortman, Jr., NM

Committee On Nominations And Resolutions
Chair: Dr. Donald H. Lein, Ithaca, NY

Dr. J. Lee Alley, AL
Dr. Wilbur B. Amand, PA
Mr. Philip E. Bradshaw, IL
Dr. Jones W. Bryan, SC
Dr. C. L. Campbell, FL
Dr. Wayne E. Cunningham, CO
Mr. Joe B. Finley, TX
Mr. Bob Frost, CA
Dr. Thomas J. Hagerty, MN
Dr. Nancy E. Halpem, NJ
Dr. William L. Hartmann, MN
Dr. Bob R. Hillman, TX
Dr. John F. Hudelson, CO
Dr. Maxwell A. Lea, Jr., LA
Dr. Michael R. Marshall, UT
Dr. Richard H. McCapes, CA
Dr. John R. Ragan, MD
Dr. Glenn B. Rea, OR
Dr. A. P. Schneider, ID
Dr. J. C. Shock, PA
Dr. H. Wesley Towers, DE
Dr. Max A. Van Buskirk, PA
Dr. Larry L. Williams, NE
Dr. Ernest W. Zirkle, NJ
Committee On Parasitic Diseases

Chair: Dr. Joseph L. Corn, Athens, GA
Vice Chair: Dr. John E. George, Kerrville, TX

Dr. Bob H. Bokma, MD
Dr. Corrie C. Brown, GA
Dr. Leroy M. Coffman, FL
Dr. A. A. Cuthbertson, NV
Dr. Chester A. Gipson, MD
Dr. Larry L. Hawkins, MO
Dr. Thomas J. Holt, FL
Dr. Julie Ann Jarvinen, IA
Dr. Ralph C. Knowles, FL
Dr. Linda L. Logan, APO
Dr. Terry F. McElwain, WA
Dr. Daniel G. Mead, GA
Dr. Dana M. Nelson, CA
Dr. Don L. Notter, KY
Dr. Richard E. Pacer, APO
Dr. Angela Pelzel, TX
Mr. Richard P. Peterson, CA
Dr. J. Matthews Pound, TX
Dr. Kelly R. Preston, MD
Dr. Jack L. Schlater, IA
Dr. Robert Stout, KY
Dr. Susan E. Wade, NY
Dr. G. Gale Wagner, TX
Mr. Kenneth Waldrup, TX
Dr. James A. Watson, MS
Dr. John H. Wyes, MD

Committee On Pharmaceuticals

Chair: Dr. Elizabeth K. Wagstrom, Des Moines, IA
Vice Chair: Dr. Larry L. Hawkins, Carrollton, MO

Dr. Thomas J. Burkgren, IA
Dr. Eric J. Bush, CO
Dr. William H. Fales, MO
Dr. Paula J. Fedorka-Cray, GA
Dr. Joe S. Gloyd, DE
Dr. Richard E. Hill, IA
Dr. Patrick L. McDonough, NY
Mr. Mark J. Owens, IA
Ms. Valerie H. Patten, NY
Mr. Steven Roach, IA
Dr. A. David Scarfe, IL
Dr. Roy A. Schultz, IA
Dr. Paul L. Sundberg, IA
Dr. R. Flint Taylor, NM
Dr. Deepanker Tewari, PA
Dr. Jon C. Van Berkum, ND
Dr. Lyle P. Vogel, IL

Committee On The Program

Chair: Dr. Bret D. Marsh, Indianapolis, IN
Vice Chair: Dr. Lee M. Myers, Atlanta, GA

Dr. Bruce L. Akey, NY
Dr. J. Lee Alley, AL
Dr. Paul L. Anderson, MN
Dr. Joan M. Arnoldi, WI
Dr. Thomas Baldwin, UT
Dr. Corrie C. Brown, GA
Dr. Jones W. Bryan, SC
Dr. Thomas J. Burkgren, IA
Dr. David M. Castellan, CA
Dr. Robert A. Cook, NY
Dr. Joseph L. Corn, GA
Mr. Kevin G. Custer, GA
Dr. Donald E. Hoenig, ME
Dr. Robert G. Ehlenfeldt, WI
Dr. Francois C. Elvinger, VA
Dr. James J. England, ID
Dr. John R. Fischer, GA
Mr. Bob Frost, CA
Dr. John P. Sanders, Jr., WV
Dr. Sam D. Holland, SD
Dr. G. Reed Holyoak, OK
Dr. Scott E. LaPatra, ID
Mr. James W. Leafstedt, SD
Dr. Donald H. Lein, NY
Dr. Jim Logan, WY
Dr. Charles E. Massengill, MO
Dr. Gavin Meerdink, IL
Ms. Phyllis Menden, WI
Dr. Bennie I. Osburn, CA
Dr. James E. Pearson, IA
Dr. John A. Smith, GA
Dr. Peter J. Timoney, KY
Mr. Robert W. Tully, KS
Dr. Richard K. Tull, AZ
Dr. Elizabeth K. Wagstrom, IA
Dr. Cindy B. Wolf, MN

Dr. Robert R. Hillman, TX
### Committee On Pseudorabies

**Chair:** Dr. Paul L. Anderson, St Paul, Mn  
**Vice Chair:** Mr. James W. Leafstedt, Alcester, SD

- Dr. John K. Atwell, NC  
- Dr. C. Carter Black, GA  
- Mr. Philip E. Bradshaw, IL  
- Dr. Max E. Coats, Jr., TX  
- Dr. Paul R. DuBois, KS  
- Dr. Gene A. Erickson, NC  
- Dr. Michael J. Gilksdorf, MD  
- Dr. Larry M. Granger, MD  
- Dr. Thomas J. Hagerty, MN  
- Dr. Edwin C. Hahn, IL  
- Dr. Howard T. Hill, IA  
- Dr. Sam D. Holland, SD  
- Dr. Richard D. Hull, IL  
- Dr. John A. Johnston, IN  
- Dr. Charles F. Kirkland, NC  
- Dr. John A. Korslund, MD  
- Dr. Bret D. Marsh, IN  
- Dr. David T. Marshall, NC  
- Dr. Charles E. Massengill, MO  
- Dr. James D. McKean, IA  
- Dr. John J. Schiltz, IA  
- Mr. Jeff Schnell, IA  
- Mr. James E. Stocker, NC  
- Dr. Paul O. Ugstad, CA  
- Dr. Larry L. Williams, NE

### Committee On Public Health And Rabies

**Chair:** Dr. John P. Sanders, Jr., Kearneysville, WV

- Dr. Helen M. Acland, PA  
- Dr. Dale D. Boyle, VA  
- Mr. William H. Clay, DC  
- Dr. Leroy M. Coffman, FL  
- Dr. Joseph L. Corn, GA  
- Dr. Donald S. Davis, TX  
- Dr. Thomas J. DeLiberto, CO  
- Dr. Malcom G. Farnethough, TX  
- Dr. James M. Foppoli, HI  
- Dr. Wyatt Frampton, UT  
- Dr. Nancy A. Frank, MI  
- Dr. Eric C. Gonder, NC  
- Dr. Keith N. Haffer, SD  
- Dr. Cathleen Hanlon, GA  
- Dr. Richard E. Hill, IA  
- Dr. Donald E. Hoenig, ME  
- Dr. Kristin G. Holt, GA  
- Dr. John P. Honstead, CO  
- Dr. Patricia N. Klein, MD  
- Dr. Spangler Klopp, DE  
- Dr. Donald H. Lein, NY  
- Dr. Martha A. Littlefield, LA  
- Dr. Jorge W. Lopez  
- Dr. Robert G. McLean, CO  
- Dr. David L. Meeker, VA  
- Dr. Robert B. Miller, VA  
- Dr. Lee M. Myers, GA  
- Dr. Sandra K. Norman, IN  
- Dr. Leon H. Russell, Jr., TX  
- Dr. Robert H. Singer, CA  
- Dr. Paul L. Sundberg, IA  
- Dr. H. Leon Thacker, IN  
- Dr. Lewis P. Thomas, NV  
- Dr. Lyle P. Vogel, IL  
- Dr. Susan E. Wade, NY

### Committee On Public Relations And Information Technology

**Chair:** Ms. Phyllis Menden, Appleton, WI  
**Vice Chair:** Dr. Martha A. Littlefield, Baton Rouge, LA

- Dr. J. Lee Alley, AL  
- Dr. Kathleen M. Connell, WA  
- Ms. Karen Conyngham, TX  
- Dr. Thomas J. Holt, FL  
- Mr. Larry D. Mark, VA  
- Dr. Lee M. Myers, GA  
- Dr. James A. Watson, MS  
- Dr. Gary M. Weber, DC  
- Dr. Richard D. Willer, AZ

---

26
Committee On Salmonella
Chair: Dr. David M. Castellan, Sacramento, CA
Vice Chair: Dr. Patrick L. McDonough, Ithaca, NY

Dr. Joan M. Arnoldi, WI  Dr. Hailu Kinde, CA
Ms. Deanna L. Baldwin, MD  Dr. David C. Kradel, PA
Dr. Marilyn F. Balmer, MD  Dr. Elizabeth A. Krushinskii, GA
Dr. Nathan Bauer, TX  Dr. Dale C. Lauer, MN
Dr. Charles W. Beard, GA  Dr. Elizabeth A. Lauther, NY
Dr. Johnny E. Braddy, MD  Dr. Jerry D. Maiers, NC
Dr. Richard E. Breitmeyer, CA  Dr. Edward T. Mallinson, MD
Dr. Max Brugh, GA  Dr. Beth E. Mamer, ID
Dr. Jones W. Bryan, SC  Dr. John Mason, NY
Dr. Karen E. Burns Grogan, GA  Dr. Hugo Medina, MN
Dr. John A. Caver, SC  Dr. David L. Meeker, VA
Dr. Stephen R. Colleltt, GA  Dr. David J. Mills, WI
Mr. Kevin G. Custer, GA  Mr. Donald S. Munro, PA
Dr. Sherrill Davison -Yeakel, PA  Dr. Thomas J. Myers, DC
Dr. Richard L. Dutton, NE  Dr. Kakambi V. Nagaraja, MN
Dr. Robert E. Eckroade, PA  Mr. Steven H. Olson, MN
Mr. Kevin M. Ellering, MN  Dr. Robert L. Owen, PA
Dr. John I. Enck, Jr., PA  Mr. Stephen Pretanik, DC
Dr. Paula J. Fedorka-Cray, GA  Dr. Jo Anna Quinn, NC
Ms. Kathleen E. Ferris, IA  Dr. Nancy Reimers, CA
Dr. James M. Foppoli, HI  Dr. Andrew R. Rhorer, GA
Ms. Rose Foster, MO  Dr. Kurt E. Richardson, GA
Dr. Don A. Franco, FL  Mr. Steven Roach, IA
Dr. Tony G. Frazier, AL  Dr. John P. Sanders, Jr., WV
Dr. John C. Galland, CA  Dr. H. L. Shivaprasad, CA
Dr. Richard K. Gast, GA  Dr. Martin A. Smeltzer, NC
Dr. Hashim M. Ghorai, AR  Dr. Jill A. Snowdon, MD
Dr. Eric N. Gingerich, PA  Dr. Bruce N. Stewart-Brown, MD
Dr. R. David Glauer, OH  Dr. David E. Swayne, GA
Dr. Robert D. Glock, AZ  Dr. Hilary S. Thesmar, DC
Dr. Eric C. Gonder, NC  Dr. H. Fred Troutt, IL
Mr. Robert R. Green, DC  Dr. Elizabeth K. Wagstrom, IA
Dr. Jean Guard-Bouldin, GA  Dr. W. Douglas Waltman, GA
Dr. Carl J. Heeder, MN  Dr. Gary L. Waters, MT
Dr. Rudolf G. Hein, DE  Dr. Scott J. Wells, MN
Dr. William W. Hewat, NC  Dr. David H. Willoughby, CA
Dr. G. Thomas Holder, MD  Dr. Nora E. Wineland, CO
Dr. Keith A. Honegger, IN  Dr. Helen S. Wojcinski, MI
Dr. Carolyn Inch, CAN  Dr. Richard R. Wood, IL
Dr. Heidi D. Kassenborg, MN  Dr. Ching-Ching Wu, IN
Committee on Scrapie

Chair: Dr. Jim Logan, Shoshoni, WY
Vice Chair: Dr. Joe D. Ross, Sonora, TX

Dr. Deborah L. Brennan, MS
Dr. Beth Carlson, ND
Dr. John R. Clifford, DC
Dr. Thomas F. Conner, OH
Dr. Walter E. Cook, WY
Dr. Wayne E. Cunningham, CO
Dr. Jerry W. Diemer, TX
Dr. Anita J. Edmondson, CA
Dr. Dee Ellis, TX
Dr. Lisa A. Ferguson, MD
Dr. Keith R. Forbes, NV
Dr. R. David Glauer, OH
Dr. James R. Grady, CO
Dr. William L. Hartmann, MN
Dr. Carolyn Inch, CAN
Dr. Susan J. Keller, ND
Dr. Allen M. Knowles, TN

Committee On Sheep And Goats

Chair: Dr. Cindy B. Wolf, St. Paul, MN
Vice Chair: Dr. Donald P. Knowles, Jr., Pullman, WA

Dr. Derek J. Belton, NZ
Dr. John R. Clifford, DC
Dr. Max E. Coats, Jr., TX
Dr. Thomas F. Conner, OH
Dr. Wayne E. Cunningham, CO
Dr. Linda A. Detwiler, NJ
Dr. Lisa A. Ferguson, MD
Dr. Anthony M. Gallina, FL
Dr. Chester A. Gibson, MD
Dr. R. David Glauer, OH
Dr. Joe S. Gloyd, DE
Dr. Robert A. Heckert, MD
Dr. David W. Hertha, AL
Mr. Joe N. Huff, CO
Dr. Cleon V. Kimberling, CO
Dr. Anthony R. Knight, CO
Dr. Howard D. Lehmkuhl, IA
Dr. Mary Jane Lis, CT
Dr. Jim Logan, WY
Dr. Linda L. Logan, APO

Mr. Gordon 'Cobbie' Magness, SD
Dr. David T. Marshall, NC
Dr. Michael R. Marshall, UT
Dr. Pamela L. Smith, IA
Dr. Charles Palmer, CA
Dr. Sueliee Robbe-Austerman, IA
Mr. Paul E. Rodgers, CO
Dr. Joe D. Ross, TX
Dr. Joan D. Rowe, CA
Dr. Mo D. Salman, CO
Dr. John A. Schmitz, NE
Dr. William P. Shulaw, OH
Dr. Susan M. Stethman, NY
Dr. Diane L. Sutton, MD
Mr. Cleve Tedford, TN
Dr. David Thain, NV
Dr. Cheryl L. Tillman, OR
Dr. Nora E. Wineland, CO
Mr. David Winters, TX
Committee On Transmissible Diseases Of Swine
Chair: Dr. Thomas J. Burkgren, Perry, IA
Vice Chair: Dr. Mark Engle, Franklin, KY

Dr. Paul L. Anderson, MN  Dr. James D. McKean, IA
Mr. Philip E. Bradshaw, IL  Dr. Eric J. Neumann, IA
Dr. Becky L. Brewster-Walker, OK  Dr. David A. Nolan, KS
Dr. Corrie C. Brown, GA  Dr. Sandra K. Norman, IN
Dr. Eric J. Bush, CO  Dr. Gary D. Osweiler, IA
Dr. James E. Collins, MN  Dr. Richard E. Pacer, APO
Dr. Gene A. Erickson, NC  Dr. Kristine R. Petrini, MN
Dr. James M. Foppoli, HI  Dr. Kurt D. Rosow, MN
Dr. Nancy A. Frank, HI  Dr. Mo D. Salman, CO
Dr. Michael J. Gilisdorf, MD  Dr. Roy A. Schultz, IA
Dr. Larry M. Granger, MD  Dr. Rick L. Sibbel, IA
Dr. Robert M. Harbison, AR  Mr. Dennis Slate, NH
Dr. Howard T. Hill, IA  Dr. Harry Snelson, DC
Dr. John A. Johnston, IN  Mr. James E. Stocker, NC
Dr. John A. Korslund, MD  Dr. Paul L. Sundberg, IA
Dr. Elizabeth A. Lautner, NY  Dr. H. Leon Thacker, IN
Mr. James W. Leafstedt, SD  Dr. Lyle P. Vogel, IL
Dr. Donald H. Lein, NY  Mr. Max Waldo, NE
Dr. Charles E. Massengill, MO  Dr. Margaret A. Wild, CO

Committee On Tuberculosis
Chair: Dr. Charles E. Massengill, Jefferson City, MO
Vice Chair: Dr. Kathleen M. Connell, Olympia, WA

Mr. John B. Adams, VA  Dr. John R. Fischer, GA
Dr. L. Garry Adams, TX  Dr. James M. Foppoli, HI
Dr. Bruce L. Akey, NY  Mr. Bob Frost, CA
Dr. Robert D. Angus, ID  Dr. R. David Glauer, OH
Dr. Joan M. Arnoldi, WI  Dr. Larry M. Granger, MD
Dr. Daniel R. Baca, TX  Dr. Thomas J. Hagerty, MN
Dr. Lowell R. Barnes, IN  Dr. Burke L. Healey, OK
Dr. Nathan Bauer, TX  Mr. Del E. Hensel, CO
Dr. Terry L. Beals, OK  Dr. Jorge Hernandez, FL
Dr. Carole A. Bolin, MI  Dr. Bob R. Hillman, TX
Dr. Richard E. Breitmeyer, CA  Dr. E. Ray Hinshaw, AZ
Dr. Charles E. Brown, IL, WI  Dr. Donald E. Hoenig, ME
Dr. John R. Clifford, DC  Dr. Sam D. Holland, SD
Dr. Thomas F. Conner, OH  Dr. John P. Huntley, NY
Dr. Robert A. Cook, NY  Dr. Luisa Ibarra, MEX
Dr. Miguel M. Cordoba, MEX  Dr. Carolyn Inch, CAN
Mr. Ed Corrigan, WI  Ms. Caren Cowan, NM
Ms. Karen Cowan, NM  Dr. Bill G. Johnson, AR
Dr. Donald S. Davis, TX  Dr. Terry Klick, OH
Dr. Jere L. Dick, MD  Dr. Victor P. Labranche, MA
Dr. Michael T. Dutcher, MI  Dr. Maxwell A. Lea, Jr., LA
Dr. Anita J. Edmonds, CA  Dr. Thomas F. Linfield, MT
Dr. Dee Ellis, TX  Dr. Daniel M. Manzanares, NM
Dr. Roger G. Ellis, NY  Dr. Bret D. Marsh, IN
Dr. Steven R. Englund, NM  Ms. Phyllis Menden, WI
Ms. Ethel M. Evans, CO  Dr. Robert M. Meyer, CO
Mr. Joe B. Finley, TX  Dr. Andrea Menden, CA
### Committee On Tuberculosis (continued)

<table>
<thead>
<tr>
<th>Name</th>
<th>State</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Michael W. Miller</td>
<td>CO</td>
</tr>
<tr>
<td>Dr. Michele A. Miller</td>
<td>FL</td>
</tr>
<tr>
<td>Mr. Richard E. Nelson</td>
<td>VT</td>
</tr>
<tr>
<td>Mr. Tommy Oates</td>
<td>TX</td>
</tr>
<tr>
<td>Dr. James E. Oosterhuis</td>
<td>CA</td>
</tr>
<tr>
<td>Dr. Mitchell V. Palmer</td>
<td>IA</td>
</tr>
<tr>
<td>Dr. Janet B. Payeur</td>
<td>IA</td>
</tr>
<tr>
<td>Dr. Angela Pelzel</td>
<td>TX</td>
</tr>
<tr>
<td>Ms. Laurie S. Prasnicki</td>
<td>WI</td>
</tr>
<tr>
<td>Dr. Anette Rink</td>
<td>NV</td>
</tr>
<tr>
<td>Dr. Mo D. Salman</td>
<td>CO</td>
</tr>
<tr>
<td>Mr. Shawn P. Schafer</td>
<td>ND</td>
</tr>
<tr>
<td>Dr. David D. Schmitt</td>
<td>IA</td>
</tr>
<tr>
<td>Dr. Stephen M. Schmitt</td>
<td>MI</td>
</tr>
<tr>
<td>Dr. Gerhardt Schurig</td>
<td>VA</td>
</tr>
<tr>
<td>Mr. Charly Seale</td>
<td>TX</td>
</tr>
<tr>
<td>Dr. Sarah B. S. Shapiro Hurley</td>
<td>WI</td>
</tr>
<tr>
<td>Dr. Clarence J. Siroky</td>
<td>ID</td>
</tr>
<tr>
<td>Mr. Les C. Stutzman</td>
<td>OH</td>
</tr>
<tr>
<td>Mr. George Teagarden</td>
<td>KS</td>
</tr>
<tr>
<td>Dr. Paul O. Ugstad</td>
<td>CA</td>
</tr>
<tr>
<td>Dr. Joseph S. Vantiem</td>
<td>MD</td>
</tr>
<tr>
<td>Dr. Ray Waters</td>
<td>IA</td>
</tr>
<tr>
<td>Ms. Diana L. Whipple</td>
<td>IA</td>
</tr>
<tr>
<td>Mr. Dave Whittlesey</td>
<td>CO</td>
</tr>
<tr>
<td>Dr. Richard D. Willer</td>
<td>AZ</td>
</tr>
<tr>
<td>Mr. Ross Wilson</td>
<td>TX</td>
</tr>
<tr>
<td>Dr. George O. Winegar</td>
<td>MI</td>
</tr>
<tr>
<td>Mr. David Winters</td>
<td>TX</td>
</tr>
<tr>
<td>Mr. Steve Wolcott</td>
<td>CO</td>
</tr>
<tr>
<td>Dr. Glen L. Zebarth</td>
<td>MI</td>
</tr>
</tbody>
</table>

### Committee On Wildlife Diseases

**Chair:** Dr. John R. Fischer, Athens, GA  
**Vice Chair:** Dr. Stephen M. Schmitt, Lansing, MI

<table>
<thead>
<tr>
<th>Name</th>
<th>State</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Wilbur B. Amand</td>
<td>PA</td>
</tr>
<tr>
<td>Dr. Robert D. Angus</td>
<td>ID</td>
</tr>
<tr>
<td>Mr. Keith E. Aune</td>
<td>MT</td>
</tr>
<tr>
<td>Dr. Daniel R. Baca</td>
<td>TX</td>
</tr>
<tr>
<td>Mr. John R. Behrmann</td>
<td>PA</td>
</tr>
<tr>
<td>Mr. Charles S. Brown</td>
<td>NC</td>
</tr>
<tr>
<td>Mr. Alan G. Clark</td>
<td>UT</td>
</tr>
<tr>
<td>Dr. Robert A. Cook</td>
<td>NY</td>
</tr>
<tr>
<td>Dr. Walter E. Cook</td>
<td>WI</td>
</tr>
<tr>
<td>Dr. Todd Cornish</td>
<td>WI</td>
</tr>
<tr>
<td>Dr. Thomas J. DeLiberto</td>
<td>CO</td>
</tr>
<tr>
<td>Dr. Leslie A. Dierauf</td>
<td>WI</td>
</tr>
<tr>
<td>Dr. Mark L. Drew</td>
<td>ID</td>
</tr>
<tr>
<td>Mr. Tim J. Feldner</td>
<td>MT</td>
</tr>
<tr>
<td>Mr. Bob Frost</td>
<td>CA</td>
</tr>
<tr>
<td>Dr. Bob Gerlach</td>
<td>AK</td>
</tr>
<tr>
<td>Dr. Colin M. Gillin</td>
<td>OR</td>
</tr>
<tr>
<td>Dr. Donald E. Hoening</td>
<td>ME</td>
</tr>
<tr>
<td>Dr. Sam D. Holland</td>
<td>SD</td>
</tr>
<tr>
<td>Dr. David L. Hunter</td>
<td>MT</td>
</tr>
<tr>
<td>Dr. Dave Jessup</td>
<td>CA</td>
</tr>
<tr>
<td>Ms. Holly C. Johnson</td>
<td>MN</td>
</tr>
<tr>
<td>Dr. Susan J. Keller</td>
<td>ND</td>
</tr>
<tr>
<td>Dr. Patrice N. Klein</td>
<td>MD</td>
</tr>
<tr>
<td>Dr. Terry Klick</td>
<td>OH</td>
</tr>
<tr>
<td>Dr. Terry Kreeger</td>
<td>WY</td>
</tr>
<tr>
<td>Dr. Thomas F. Linfield</td>
<td>MT</td>
</tr>
<tr>
<td>Dr. Jim Logan</td>
<td>WY</td>
</tr>
<tr>
<td>Dr. Phillip M. Mamer</td>
<td>ID</td>
</tr>
<tr>
<td>Dr. Kristin Mansfield</td>
<td>WA</td>
</tr>
<tr>
<td>Dr. Charles E. Massengill</td>
<td>MO</td>
</tr>
<tr>
<td>Dr. Robert G. McLean</td>
<td>CO</td>
</tr>
<tr>
<td>Dr. Daniel G. Mead</td>
<td>GA</td>
</tr>
<tr>
<td>Ms. Phyllis Menden</td>
<td>WI</td>
</tr>
<tr>
<td>Dr. Robert M. Meyer</td>
<td>CO</td>
</tr>
<tr>
<td>Dr. Sarah B. S. Shapiro Hurley</td>
<td>WI</td>
</tr>
<tr>
<td>Dr. Clarence J. Siroky</td>
<td>ID</td>
</tr>
<tr>
<td>Dr. Joe Starcher</td>
<td>WV</td>
</tr>
<tr>
<td>Dr. Pamela K. Swift</td>
<td>CA</td>
</tr>
<tr>
<td>Mr. Cleve Tedford</td>
<td>TN</td>
</tr>
<tr>
<td>Dr. John B. Thurston</td>
<td>TN</td>
</tr>
<tr>
<td>Dr. Samuel J. Vainsi</td>
<td>WI</td>
</tr>
<tr>
<td>Dr. Johna K. Veatch</td>
<td>KY</td>
</tr>
<tr>
<td>Dr. Kenneth Waldrup</td>
<td>TX</td>
</tr>
<tr>
<td>Ms. Diana L. Whipple</td>
<td>IA</td>
</tr>
<tr>
<td>Mr. Dave Whittlesey</td>
<td>CO</td>
</tr>
<tr>
<td>Dr. Margaret A. Wild</td>
<td>CO</td>
</tr>
<tr>
<td>Dr. Richard D. Willer</td>
<td>AZ</td>
</tr>
<tr>
<td>Dr. Steve Wolcott</td>
<td>CO</td>
</tr>
<tr>
<td>Dr. Taylor Woods</td>
<td>MO</td>
</tr>
<tr>
<td>Dr. Glen L. Zebarth</td>
<td>MN</td>
</tr>
</tbody>
</table>
II. 2004 Annual Meeting
   A. USAHA/AAVLD Presidents’ Reception and Dinner
   B. USAHA Membership Meetings
   C. USAHA/AAVLD Plenary Session
   D. USAHA Scientific Papers
   E. Committee Business
      1. Committee Reports
      2. Time-Specific Scientific Papers
      3. Related Papers
   F. Other Reports
      1. What is USAHA? Short Version for U.S. Veterinary 2005
      2. USAHA - Accomplishments in Service to the Animal Agriculture Industries and the Nation’s Security
A. USAHA/AAVLD PRESIDENTS’ RECEPTION AND DINNER

UNITED STATES ANIMAL HEALTH ASSOCIATION (USAHA)
AMERICAN ASSOCIATION OF VETERINARY LABORATORY DIAGNOSTIANS (AAVLD)
PRESIDENT’S RECEPTION AND DINNER
SUNDAY, OCTOBER 24, 2004

DONALD H. LEIN, PRESIDING

INVOCATION AND MEMORIAL SERVICE

David W. Hertha

Let’s bow our heads for a moment of silence as we reflect on those members who have passed away this past year:

Dr. Ahmed H. Dardin - Life Member - Frankenmuth, MI - October 4, 2003
Dr. Robert W. Mead - Former State Veterinarian - Eatonville, WA - November 15, 2003
Dr. Benjamin Pomeroy - Life Member - St. Paul, MN - January 16, 2004
Dr. Marion T. Szatalowicz - Member - Stanley, WI - January 19, 2004
Dr. E. M. Christopherson - Life Member - Salem, OR - August 9, 2004

Heavenly Father,

We thank you for being a loving and merciful God. For the friends and families of these members who are deceased we ask that you bring comfort to them. We thank you for good memories to those who were close to these members.

Thank you for this wonderful meeting place and for safe travel for those traveling both to and from the conference. We pray for wisdom and discernment in decision making and planning during the committee meetings. Lord, show thyself strong!

For those with afflictions or burdensome trials in their or their loved ones lives, we ask for comfort and wisdom for handling those situations. We ask for protection for our troops especially those in harms way. We ask for protection for our president and those in authority in our land. Give them wisdom in decision making.

Bless the food now and the fellowship at this dinner. We ask these things in Thy Holy Name.

Amen.
A. USAHA/AAVLD PRESIDENTS’ RECEPTION AND DINNER

WELCOME TO GREENSBORO

N. David Smith
Deputy Commissioner of Agriculture for North Carolina

On behalf of Commissioner of Agriculture Britt Cobb, welcome to North Carolina. Our State Fair is wrapping up tonight and Commissioner Cobb is busy thanking the last of over 800,000 fairgoers for attending our state’s largest agricultural exposition. I understand he will be here tomorrow. I hope you get a chance to meet him.

We are very happy you selected North Carolina for your annual meeting, although our State Veterinarian, Dr. David Marshall, has been nervous about this meeting ever since he learned North Carolina had been selected. I want to formally recognize Dr. Don Lein, President of the U S Animal Health Association, and Dr. Willie Reed, President of the American Association of Veterinary Laboratory Diagnosticians. Thank you Dr. Lein and Dr. Reed for your dedication to animal agriculture and food safety.

Agriculture is very important to the economic well being of North Carolina. Agriculture and agribusiness contribute $60 billion to the state’s economy. However, our agriculture is in transition. The recent tobacco buyout means we will go through a few years of uncertainty as tobacco farmers work through the process of selling at world market prices and finding alternative ways to make a living. With that caveat, the importance of animal agriculture continues to expand and we expect the pace to accelerate.

I’m sure you are expecting me to recite our agricultural ranking for the major commodities. Please don’t be disappointed if I skip that information. Rather, I want to talk to you about what we want to achieve for the future.

• North Carolina has the fourth most diversified agriculture in the country. Only California, Florida, and Texas are more diversified. We want to move up that list because more diversification means more opportunities for our farmers.
• We want to maintain our current “Class Free” status in all major program livestock and poultry diseases and continue to expand current efforts in the surveillance, biosecurity, and producer education areas to eliminate disease issues as an obstacle to trade and commerce and competing in a global market.
• We want to continue to elevate the role of veterinarians and our Veterinary Division into areas not traditionally recognized for the skills that group of professionals has to offer; in particular to the food safety, public health, and emergency response arenas.
• We want to expand our involvement with our state Wildlife Re-
A. USAHA/AAVLD PRESIDENTS’ RECEPTION AND DINNER

sources Commission and USDA’s Wildlife Services in addressing our mutual interest in diseases that can impact animal agriculture and wildlife resources.

- We want to be looked to as a leader in technological capabilities regarding animal disease surveillance, response to diseases, mapping, and Global Information Systems (GIS) technology. I would be remiss if I didn’t mention the formation of our Emergency Programs Division. We have assembled a group of highly motivated professionals who are dedicated to monitoring animal health and responding quickly in the event of natural and man-made disasters.

- We want to continue to develop our collaborative relationship with our USDA APHIS, university, and industry counterparts as we realize that a strong national program is dependent on a seamless cooperative relationship.

Thank you again for selecting North Carolina for your meeting. Dr. Marshall and his staff are ready to assist you to ensure a successful meeting. I hope you will look back on this meeting and say we should come back to North Carolina more often.
A. USAHA/AAVLD PRESIDENTS’ RECEPTION AND DINNER

RESPONSE TO THE WELCOME

Nan Hanshaw-Roberts
Acting Pennsylvania State Veterinarian

Good evening,

I am honored to be selected to represent Pennsylvania tonight. Unfortunately I am here because Dr. John Enck has resigned as our State Veterinarian. Dr. Enck is here tonight, but he is here as the director of the Penn State Animal Diagnostic Laboratory. Dr. Enck was a wonderful boss and he is a good man, and we miss him at the Department of Agriculture.

I attended the North Carolina State University School of Veterinary Medicine, but I was born and raised in Hershey, so I consider chocolate to be a major food group. I hope that I see each of you at the annual conference in Hershey next year. The conference will be held at the Hershey Lodge and Convention Center. Although Hershey Park is closed for the season at that time of year, Chocolate World is open and has been remodeled with a new ride, and shopping is available in Hershey and in Lancaster County, where tourist season is over, so crowds should not be a problem. Thank you, and see you next year.
A. USAHA/AAVLD PRESIDENTS’ RECEPTION AND DINNER

REMARKS OF THE PRESIDENT OF USAHA

Donald H. Lein
President, USAHA
Ithaca, New York

Good evening again to our special guests, both new and old members of USAHA and AAVLD, sponsors, and other attendees. Again, this meeting has broken a record with over 1,300 registered and a record number at this dinner. The excellent program put together by USAHA President-Elect Rick Willer and AAVLD President-Elect Gary Osweiler and the Committees of both organizations as well as a need for resolution of several national animal health issues are the magnet to attract members, new and old and attendees to this meeting.

I want to thank several people for their help during my tenure as President, especially my wife, Janet, for her support and enduring my days away, and my colleagues and staff at the Animal Health Diagnostic Laboratory at Cornell University for their support. The Executive Committee of USAHA, Executive Board of AAVLD, President Willie Reed, and the administrative staff, Linda Ragland and Hillary Campbell have all been so important to me during this year. Thank You!

The USAHA Committees are the life of this organization and I want to thank them, especially the Chairs, for their major accomplishments this year. Several have been busy throughout the year. I would like to mention a few of the major efforts. The Committee on Transmissible Diseases of Poultry and other Avian Species has had two subcommittees active throughout the year; the Exotic Newcastle Disease (END) Surveillance Program Education Committee chaired by Second Vice-President Lee Myers and the Live Bird Market System Avian Influenza (AI) Control Program Committee chaired by former USAHA President Ernie Zirkle. The Committee on Tuberculosis studied and updated the 2000 Strategic Plan for the Eradication of Bovine Tuberculosis with input of several members over a short period of time resulting in the development of a new 2004 strategic plan. The Committee on Infectious Diseases of Horses continued with its sub-committee on Equine Infectious Anemia, also chaired by Ernie Zirkle, and has prepared a new control and eradication program. Extremely busy was the Committee on Livestock Identification with several species sub-committee meetings throughout the year. I know that several other committees have also met throughout the year and I want to thank all of them for their important work.

I have had the pleasure of attending several important meetings as USAHA President throughout this year. President-Elect, Rick Willer and I were able to attend all four of our Regional Meetings. These are truly impressive meetings and important to discuss, resolve and put
forward issues for action that have occurred since the annual meeting or maybe regional in importance. We also appreciated their hospitality as well.

The Government Relations Committee Meeting in Washington, D.C. with AAVLD, was well planned by First Vice-President Bret Marsh and is always a highlight of working with several of our colleagues in the United States Department of Agriculture (USDA), Animal Plant Health Inspection Service (APHIS), Veterinary Services (VS), USDA-Agricultural Research Service (ARS), USDA-APHIS-Wildlife Services (WS), USDA-Cooperative State Research, Education and Extension Service (CSREES), the Food and Drug Administration (FDA), Center for Veterinary Medicine (CVM), American Veterinary Medical Association (AVMA), Association of American Veterinary Medical Colleges (AAVMC), Animal Agriculture Coalition (AAC), and the International Association of Fish and Wildlife Agencies (IAFWA). We thank all of these people for their time and commitment to meet with us.

Other important meetings that I attended included the National Cattlemen’s Beef Association (NCBA) Annual Meeting in Phoenix, Arizona, the National Institute for Animal Agriculture (NIAA) Annual Meeting in Salt Lake City, Utah, and the (AVMA) Annual Meeting in Philadelphia, Pennsylvania. These meetings are extremely important in continuing to work with colleagues and committees on the resolution of current animal health issues.

I think some major accomplishments were noted this year. In January 2004, USDA dedicated the ground breaking of their new Biosafety-Level 3 (BL3) Laboratories for the National Centers For Animal Health (NCAH) that includes laboratories of USDA-ARS, USDA-APHIS-VS National Veterinary Services Laboratory (NVSL), and USDA-APHIS-VS Center for Veterinary Biologics (CVB) under the Ames, Iowa Facilities Consolidation and Improvement Plan (Master Plan). In August 2004, USDA dedicated the NCAH Facility at Ames, Iowa and USAHA was presented a plaque in special recognition of our assistance in obtaining support for this building and the Ames Master Plan. First Vice-President Bret Marsh represented USAHA with other members. I would like to have Dr. Marsh come forward and deliver the plaque which we will exhibit at the registration area of this meeting and finally in our office at Richmond, Virginia. Thank you Dr. Marsh for representing USAHA and thanks to USDA-APHIS for your recognition of USAHA. USAHA continues to hold as its priority the completion of the Master Plan in Ames, Iowa.

Other important priorities for USAHA are the establishment of the study of the future of Plum Island Animal Disease Center by AVMA in conjunction with USAHA, AAVLD and several of our Allied Industry members. The white paper on Plum Island by USAHA last year demonstrated the great need for this. The continued expansion of the Na-
A. USAHA/AAVLD PRESIDENTS’ RECEPTION AND DINNER

tional Animal Health Laboratories Network (NAHLN) is also a very important priority for the future safeguarding of our animal health. Several programs have been initiated or completed such as Bovine Spongiform Encephalopathy (BSE), Chronic Wasting Disease (CWD) of Deer and Elk, END, AI, Johne’s Disease, Pseudorabies and old problems have re-emerged with brucellosis in Wyoming and bovine tuberculosis in the western states.

All of these animal health issues would not be solved without partnerships. I want to thank our several partners, especially AAVLD and National Association of State Animal Health Officials, the AAC, AVMA, AAVMC, NIAA and all our allied industry associations, wildlife associations, academic members and other members. Special thanks to USDA-APHIS-VS, USDA-ARS, USDA-APHIS-WS, and USDA-Food Safety Inspection Service (FSIS), for their availability, excellent communication and their great number of attendees at this meeting. I want to thank our newer members, Department Homeland Security and their expertise in emergency management, bio-terrorism and CDCP and their expertise in emerging and zoonotic diseases. We look forward to working closely with them.

I think of the tragedies and disasters we have seen in animal and public health, but also look at the opportunities and what programs have been initiated; National Surveillance System, NAHLN, Laboratory Response Network (LRN), Food Emergency Reporting Network (FERN), National Animal Health Emergency Management Steering Committee, National Animal Identification System, Veterinary Medical Services Act, Veterinary Accreditation reform, END, AI, CWD, BSE, Johne's disease, scrapie programs; all lead to programs that provide increased surveillance, bio-security, communications, networking, education, research, prevention and response that is much more rapid to detect, control and hopefully prevent animal and public health problems.

I thank all of you members for giving me the opportunity to serve you as President of USAHA this year. Have a great meeting.

Now, it is with great pleasure for me to introduce our special guests to the USAHA/AAVLD Presidents' Reception and Dinner tonight. We are honored by several and I want to recognize them individually. They are: Mr. Paul Hoffman, Deputy Assistant Secretary, Fish and Wildlife and Parks, Department of Interior; Dr. Gerald Parker, Science and Technology Directorate, Department of Homeland Security; Dr. Bennie Osburn, President of the Association of American Veterinary Medical Colleges and Dean, School of Veterinary Medicine, University of California, Davis; Dr. Henry Childers, President-Elect of the American Veterinary Medical Association and wife Pat; Dr. Ricardo Rego Pamplona, Subdirector of Animal Protection, Brazil Ministry of Agriculture, Livestock and Nutrition representing Brazil’s Chief Veterinary Officer, Dr.
A. USAHA/AAVLD PRESIDENTS’ RECEPTION AND DINNER

Jorge Caetano; Dr. Birao Cedeno, Instituto Colombiano Agropecuario, Ministerio de Agricultura y Desarrollo Rural, Colombia; Dr. Joee Angel del Valle, Chief Veterinary Officer, Mexico; Dr. Brian Evans, Chief Veterinary Officer, Canada; Dr. Alex Thiermann, President, Terrestrial Animal Health Standards Commission of the World Organization for Animal Health (OIE); and Dr. Lonnie King, Dean, College of Veterinary Medicine, Michigan State University. I especially want to give special recognition to Dr. Ron Dehaven, Administrator of USDA-APHIS for his excellent handling of the Bovine Spongiform Encephalopathy and Exotic Newcastle Disease outbreaks in our nation.

We are especially grateful to our sponsors and their support and want to recognize their sponsorship and representatives at our dinner this evening. We thank: AgInfoLink, Mr. Glenn B. Smith and Mr. Mark Armentrout; Alflex USA, Inc., Mr. Glenn Fischer; Arizona Cattlemen’s Association, Dr. E. Ray Hinshaw; Bio-Rad Laboratories, Inc., Dr. Asmita Patel; Cepheid, Mr. Roger Schaller and Mr. Richard Price; Colorado Serum Company, Mr. Majon Huff (coming since 1937) and Mr. Joe Huff (Mr. Majon Huff is an extraordinary special guest; he has been attending these meetings since 1937; thank you for all of your support over these years; Computer Aid, Incorporated, Mr. Bill Kushubar and Mr. Charles Anderson; Food and Drug Administration, Dr. Richard Barnes and Dr. Daniel McChesney; Global VetLink, L.C., Mr. Keven Maher and Amelita Facchiano; North American Deer Farmers Association®, Ms. Phyllis Menden; Reindeer Owners & Breeders Association, Mr. Tom Scheib; Research Management Systems, USA, Inc., Mr. Johnston Cairns and Mr. Marty Goldberg; Ventana Medical Systems, Ms. Terry Haikara

A. USAHA/AAVLD PRESIDENTS’ RECEPTION AND DINNER

REMARKS OF THE PRESIDENT OF AAVLD

Willie M. Reed
President, AAVLD
East Lansing, MI

Good evening. Distinguished guests, colleagues, fellow members of the American Association of Veterinary Laboratory Diagnosticians (AAVLD) and United States Animal Health Association (USAHA), ladies, and gentlemen, it is my pleasure to welcome you to this joint USAHA/AAVLD dinner and general session. For the 47th time, we gather at our annual scientific conference to exchange and disseminate scientific information. For all these years, our two organizations have worked together in a strong partnership to address animal health issues that threaten the economic vitality of animal agriculture.

For the past 12 months, it has certainly been a highlight of my professional career—and a great pleasure—to have served as AAVLD President and to represent over 1100 members from the United States, Canada, and 33 other countries.

The AAVLD was created on the foundation of “Seven Pillows”, which are just as relevant today as they were back then. These include:

- Dissemination of information relating to the diagnosis of animal diseases.
- Coordination of diagnostic activities of regulatory, research, and service laboratories.
- Establishment of unique diagnostic techniques.
- Improvement of diagnostic techniques.
- Development of new diagnostic techniques.
- Establishment of guidelines for the improvement of diagnostic labs relative to personnel qualifications and facilities.
- Serve as consultant to the USAHA on uniform diagnostic criteria involved in regulatory and disease programs.

Over the years, many have worked hard to achieve these notable objectives, and because of their efforts we have the best and most extensive network of laboratories in the world. AAVLD laboratories are a national resource, and we are being called upon increasingly to help protect the nation from emerging diseases and the intentional or accidental introduction of foreign animal diseases that threaten both human and animal health. For the past few years, both the USAHA and AAVLD have placed increased emphasis on strengthening old partnerships and creating new ones. Our partnership with United States Department of Agriculture (USDA) has never been so robust, and our partnerships with the new Department of Homeland Security, Centers for Disease Control and Prevention, American Veterinary Medical As-
A. USAHA/AAVLD PRESIDENTS’ RECEPTION AND DINNER

sociation, and American Association of Veterinary Medical Colleges are becoming stronger. Thankfully, the leadership of both organizations had the vision to see the need for collaboration as the best way to serve our nation.

A review of the history of disease eradication and control throughout the 20th Century demonstrated that for the successful control and eradication of diseases, at least four elements were necessary, if not essential. First, talented scientists to work hard, with a sense of urgency and desire for excellence. Secondly, the presence of committed and persistent individuals in regulatory medicine, who would work with and help translate the science into practical applications in the field. Thirdly, a close working relationship with industry and academia. And finally, mutual respect and understanding that the job was too big to have a go-it-alone attitude.

Our nation has faced a seemingly endless onslaught of animal health issues. The most recent, of course, was the December 23, 2003, announcement of the first case of bovine spongiform encephalopathy (BSE) in the United States. This was certainly one of the most significant animal health issues to face our nation since the outbreak of exotic Newcastle disease, and it was another good test of our leadership, preparation, and the strength of our partnerships. Damage to our agricultural markets and loss of consumer confidence in U.S. beef were averted due to the exemplary leadership of Veterinary Services (VS), APHIS—most notably by Dr. Ron DeHaven, whose expertise in communicating risk to the public resulted in controlling a situation that was potentially devastating to our cattle industry. We all are very grateful to Ron and the many APHIS employees who worked through the Christmas holidays and well into the new year—and even until now—to eliminate BSE from our country and prevent its reintroduction. The BSE diagnosis and subsequent expanded surveillance plan demonstrated just how necessary AAVLD labs are in providing the testing capacity for foreign animal diseases for a nationwide surveillance program. Let this be the example of how AAVLD labs will work hand in glove with National Veterinary Services Laboratory (NVSL) in the future to provide surveillance testing for foreign animal diseases, as well as endemic and zoonotic diseases, and let this be the example of why it is so important to secure funding to complete the National Animal Health Laboratory Network to include all 50 states or, at the very least, all AAVLD-accredited laboratories.

AAVLD laboratories are also capable of playing an expanded role in protecting human health, and we must not wait for another zoonotic disease such as monkeypox to threaten human health before there is an awareness of the need for veterinary diagnostic laboratories to partner with our public health colleagues to become members of the Center for Disease Control and Prevention (CDC) Laboratory Response
A. USAHA/AAVLD PRESIDENTS’ RECEPTION AND DINNER

Network (LRN). I am encouraged about the progress made in the past year in a few states, where veterinary diagnostic laboratories have been admitted to join the LRN. I am optimistic that, through continued discussions and interactions, there will be full appreciation that all resources should be utilized when it comes to protecting our nation.

In closing, I would like to thank members of the AAVLD Executive Committee and Executive Board, chairs of committees, and the general membership for their hard work in support of the many activities of our organization, and for their continued dedication to advancing the field of diagnostic medicine. I want to especially thank Drs. Terry McElwain, Past President of AAVLD; Bob Frost, Past President of USAHA; and Don Lein, President of USAHA for their tireless efforts to strengthen current partnerships and build new ones. They are great champions for our organizations, and they are by far the most dedicated group of volunteers with which I have been privileged to be associated. Last, but certainly not least, I would like to thank Dr. Randall Levings and all the NVSL staff for their continued efforts to work with AAVLD in a mutually respectful manner, no matter the difficulty or complexity of the issue.

Thank you for the opportunity to share a few of my comments with you tonight.
I’d like to thank the United States Animal Health Association (USAHA) and President Don Lein for inviting me to speak with you this evening. I would like to just provide a few perspectives on the importance of partnerships between human and animal health as they pertain to our future preparedness. Let’s begin by reviewing what we’ve experienced in the last five years. We began in 1999 with the first occurrence of West Nile virus in North America, had the 9/11 event that was followed by the anthrax letters attacks, followed by several more summers of West Nile virus outbreaks, followed by monkey pox. Internationally SARS came into play. There was the pesky cow over the Christmas holidays and the continuing highly pathogenic H5N1 outbreaks in Southeast Asia. When you think of each and every one of these emerging threats it is absolutely critical that the public health system and the animal health system intersect effectively. It is only through this partnership that we will be able to successfully recognize and respond to all of these threats in this very small world in which we live.

There are commonalities between USAHA and the Centers for Disease Control and Prevention (CDC), and Futures Goal #2—Preparedness. It’s not surprising to go to the USAHA website and see organizational objectives that you can also find on the CDC website, such as communication and coordination concerning disease eradication, emergency preparedness, emergency response and recovery, emerging diseases, food safety, public health and disease topics such as Avian Influenza, BSE, Brucellosis, Exotic Newcastle and Chronic Wasting Disease. CDC has two health protection goals, the first in health promotion and the second is preparedness—we want people in all communities to be protected from infectious, environmental, and terrorist threats. In regard to preparedness, we are taking an “all hazards approach” and broadening that approach to encompass areas of threat beyond those that are uniquely associated with terrorism.

Preparedness for emerging infectious disease threats is extremely important. We know that prepared clinicians, veterinarians and laboratorians are the frontline of defense for emerging threats. It was the infectious disease doctor in Florida who had the foresight to recognize that those gram-positive rods were anthrax, and that same clinician alerted the Public Health Department of the nature of this threat.
It was Dr. Urbani, the Italian physician, who was looking at the SARS outbreak in Vietnam and reported back to the World Health Organization that 56% of the healthcare workers in the French hospitals were afflicted with SARS. He sounded the alarm and certainly warned us of a serious health threat unlike any that we had seen before, and sadly Dr. Urbani died as a consequence of SARS in his commitment to protecting healthcare workers in Hanoi. And it was an alert clinician who recognized the small lesion a child's hand represented a pox infection, and connected that pox infection with the sick prairie dog that the child was handling. The prepared veterinarian plays a key role in our frontline of defense against emerging infectious disease and bioterrorism threats in detection and reporting of illness in animals that have human health consequences. It was the veterinary pathologist in New York City that recognized that the dead crows were a harbinger of the West Nile virus infection and certainly helped us recognize that this is a new virus and not the typical St. Louis encephalitis virus that we had originally thought. Bovine spongiform encephalopathy (BSE) was first discovered in 1986 in the United Kingdom through the cooperation of a concerned animal producer, an astute veterinarian and a dedicated laboratory scientist. In 2003, the cow in Washington State later to be diagnosed with BSE came from a farm owned by a veterinarian who was alert to the cow's clinical signs.

These examples of alert clinicians underscore the importance of what we call connectivity. Certainly all preparedness ultimately is local but it is the local Public Health Department, state department of agriculture, the local healthcare organizations, and importantly the local veterinarian, clinicians and laboratorians that are our strongest link, but each can’t do this alone. Their strength really comes because of their connectivity. Often this connectivity is word of mouth and pick up the telephone and call. No matter what we do to amplify this connectivity, ultimately the face-to-face recognition, the networking, the human element of connectivity, is what pays off. And I believe one of the important values of the planning process that we’ve been engaged in for the past two or three years really is the fact that people are convening at the local level, getting to know each other and having a much more robust network of connectivity to reach out to each other when some health emergency appears.

The Public Health and Animal Health Laboratory Partnership is also extremely important. We need to recognize and appreciate the incredible responsibility and role that laboratorians play in response to outbreaks of zoonotic diseases. In response to the anthrax events of 2001, CDC Laboratory Response Network, or LRN, laboratories processed more than 121,000 environmental specimens representing an incredible demonstration of surge capacity. The United States Department of Agriculture, National Veterinary Services Laboratories in Ames, Iowa
A. USAHA/AAVLD PRESIDENTS’ RECESSION AND DINNER

and other veterinary diagnostic laboratories directly contributed to this effort. We have many investments in the LRN and are pleased with the increase in the number of laboratories both domestic and internationally. The utility of the LRN was further demonstrated in support of the SARS and Monkeypox outbreaks.

The LRN is working closely with the American Association of Veterinary Laboratory Diagnosticians for a proposed expansion of LRN membership to include one animal disease diagnostic laboratory in each state for bioterrorism preparedness and integrated response capacity to other public health emergencies. Today there are 6 veterinary laboratories in the LRN with 8 more laboratories pending. The animal disease diagnostic laboratories can provide a key link between animal health and human health systems. They can provide surge capacity for testing of specimens associated with zoonotic agents, support laboratory based surveillance where animals may be sentinels to human disease, provide for biosafety-level 3 animal necropsy per lessons learned from monkeypox, and provide food testing capacity where samples may involve Select Agents. The LRN is working with key stakeholders to resolve integration issues and response roles, and developing a prioritized and integrated list of where labs are most needed, and putting appropriate public and veterinary health decision makers together at the state level.

For surveillance of zoonotic diseases, there is still progress to be made in both public health and agriculture. We need to improve the linkage between veterinary and human data, address confidentiality and economic issues and ensure that all important zoonotic organisms are well addressed by surveillance systems. A new focus on surveillance for emerging infections in wildlife is needed. We need to ensure that measures for the detection of human and livestock infections are adequate for the identification of similar diseases in wildlife. In addition, we need an action plan for what will trigger a response, and definition of roles and responsibilities of the different agencies and stakeholders. The human and animal health sectors must work together to fully identify obstacles to progress and possible solutions, and implement the most effective methods to incorporate non-traditional partners into a coordinated system of surveillance for detection of zoonotic diseases.

Now that I’ve outlined the tasks, I’m pleased to say that CDC staff are working with staff from the National Surveillance Unite of USDA-APHIS located in Ft. Collins to address these issues as part of an effort to develop a comprehensive, coordinated, integrated surveillance system for animal and public health, as well as environmental health and food safety. Cornerstones of this system include the LRN, the National Animal Health Laboratory Network and the Food Emergency Response Network.
A. USAHA/AAVLD PRESIDENTS’ RECEPTION AND DINNER

There are new threats that demand new partners. Given the pressures of our crowded, interconnected, and highly mobile world, other zoonotic agents will surely exploit new opportunities to cross species barriers and spread. Our preparedness to respond to these convergences of human and animal threats will depend increasingly on strong partnerships between the animal health and public health communities. Because of your skills and training in zoonotic disease agents and the pathology of infectious diseases in livestock, wildlife, zoo and companion animals, veterinary professionals are strongly positioned to increase their active role in these efforts.

In conclusion, I’ve tried to highlight what I think are extremely important aspects of partnership in preparedness for emerging infectious diseases. But there is one more issue to mention and that is complacency - the enemy of preparedness. I think it’s very important to just think back to your own response to learning about the existence of a positive BSE cow in the United States, or learning about the connection between the human and poultry cases of avian influenza and say, “are we really ready to face the next threat?” The only deterrent we have is preparedness—and to the extent that we can prepare and mitigate and take threats off the table, we will be able to combat microbial threats effectively. So we are together in the frontline and I think we have to maintain our vigilance. We have a responsibility to prepare. We have an accountability to work together as partners and to make wise use of the investments that we have. So thank you for providing me with the opportunity to be here and I look forward to the rest of the meeting. Thank you.
A. USAHA/AAVLD PRESIDENTS’ RECEPTION AND DINNER

APHIS ADMINISTRATOR’S AWARD

Ron DeHaven
Administrator, Animal and Plant Health Inspection Service (APHIS),
United States Department of Agriculture (USDA)
Washington, DC

Every year, APHIS honors one individual who has made a significant difference in protecting and improving the health of animal agriculture in the United States. This year’s recipient is Dr. Joan Arnoldi.

All of us at APHIS take special pride in bestowing this honor upon Joan. Joan spent many years with APHIS serving in leadership roles that are critical to our mission of safeguarding the health of America’s livestock and poultry resources. As director of our National Veterinary Services Laboratories (NVSL) in Ames, Iowa, she oversaw laboratory diagnostic testing for domestic and foreign animal diseases, disease control and eradication support, import and export certification, and laboratory certification. She also directed NVSL's foreign animal disease diagnostic training seminars for State and private veterinarians.

Joan moved on to become the Nation's Chief Veterinary Officer, leading our Veterinary Services program's efforts to protect the health, quality, and marketability of our country’s animals, animal products, and veterinary biologics. She was instrumental in building within Veterinary Services the capabilities to help us meet animal health challenges in this new age of globalization. With Joan at the helm, APHIS was at the center of efforts to steer a balanced, risk-based course with regard to our safeguarding and trade facilitation objectives. She was also instrumental in helping to make progress in eradicating bovine brucellosis, bovine tuberculosis, and swine pseudorabies. Joan later rose to become APHIS’ Associate Administrator. I am fortunate to have had the honor of working closely with her during these years as part of the APHIS management team.

As much pleasure as I take in highlighting Joan’s distinguished record of service with APHIS, her experience and leadership outside of the Federal Government is no less impressive. Before joining the U.S. Department of Agriculture (USDA), Joan served as Wisconsin’s State Veterinarian. She has also served with distinction in several leadership roles within USAHA, including as this organization’s past Second and Third Vice Presidents. Currently, she serves as the Chair of USAHA's Committee on International Standards, working to raise awareness among members about key international animal health trade issues. Recently, Joan served on a National Academy of Science’s committee studying the threat of bioterrorism to U.S. agriculture. Her willingness to share her expertise and experience in animal health matters outside of the government arena has contributed greatly to animal industries, animal health education, and animal health advocacy.

When Joan departed APHIS to raise horses in Wisconsin, my APHIS
A. USAHA/AAVLD PRESIDENTS’ RECEPTION AND DINNER

colleagues and I were certain that she was capping off her long and incredibly successful career with the ultimate reward for herself—we were all quite envious. Well, it turned out that her ultimate reward was becoming State Veterinarian for Michigan, and, typically, she excelled at it.

Joan was responsible for bringing together key industry representatives, producers, and regulatory officials to satisfy USDA’s criteria for Michigan attaining split-State status for bovine tuberculosis. This status—which was conferred to Michigan earlier this year—allows the majority of livestock producers in the State to move their livestock more freely interstate.

Joan also achieved success in preparing Michigan for potential emergency animal disease situations by aggressively promoting training in the incident command system (ICS) and planning exercises. Currently, all Michigan Department of Agriculture (MDA) employees have completed the basic level ICS certifications, and all key executives have finished more advanced levels of ICS training. MDA has also held numerous field and tabletop exercises to better prepare the State to handle an animal health emergency and meet national homeland security guidelines regarding emergency management.

These are but a few examples of Joan’s long list of achievements in the animal health field. Her extensive and distinguished record of leadership in numerous areas—including veterinary diagnostics, regulatory veterinary medicine, international animal health standard setting, and trade facilitation—makes her uniquely deserving of this honor.

Joan, thank you for all of your hard work over the years—work that you continue to conscientiously carry on for the overall benefit of U.S. animal agriculture. Please come up to receive your award.

Ron DeHaven presents APHIS Administrator’s Award to Dr. Joan Arnoldi.
A. USAHA/AAVLD PRESIDENTS’ RECEPTION AND DINNER

E. P. POPE AWARD

Terry McElwain
AAVLD Awards Chair
Pullman, WA

I am very pleased to be able to present the 2004 American Association of Veterinary Laboratory Diagnosticians (AAVLD) E. P. Pope Awardee.

Dr. Pope was Secretary/Treasurer of AAVLD from 1959-1972. The E. P. Pope Memorial Award was established in his honor in 1974 to recognize outstanding contributions to the discipline of diagnostic medicine and to AAVLD.

This year’s awardee is Dr. Bruce Akey. Dr. Akey received a BS degree in Biology from the College of William and Mary in Virginia, an MS degree in Veterinary Parasitology from the University of Florida and a DVM degree from the University of Minnesota.

Dr. Akey is currently the Assistant State Veterinarian and Assistant Director, Division of Animal Industry of the New York State Department of Agriculture and Markets. He previously held the position of Assistant State Veterinarian and Director of the Virginia Animal Health Laboratory System. He was Deputy Incident Commander of the 2002 Virginia Avian Influenza Taskforce.

Dr. Akey served as President of AAVLD in 2000, and is currently Chair of its Government Relations Committee, a committee he established during his Presidency. He also is Co-Chair of the AAVLD/USAHA Animal Health Information Systems Committee and Co-Chair of the National Animal Health Reporting System Steering Committee. He was a member of the National Association of State Departments of Agriculture Animal Health Safeguarding Review of United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services and is now a member of the Information Technology Implementation Team. Dr. Akey previously was named the “2001 Food Hygiene Veterinarian of the Year” by the American Association of Food Hygiene Veterinarians.

During his term as President of AAVLD, Dr. Akey began discussions which led to the Memorandum of Understanding (MOU) with USDA-APHIS. The MOU that was signed when he was Past President in 2001 and established the basis for the productive and open working relationship we enjoy with our federal partners. During his term as President, he was instrumental in getting AAVLD involved with the USAHA Committee on Government Relations meeting in Washington, DC. He initiated and finalized discussions that resulted in official AAVLD representation at the May World Organization for Animal Health OIE annual meeting in Paris. In addition, the first and second AAVLD strategic
A. USAHA/AAVLD PRESIDENTS’ RECEPTION AND DINNER

planning sessions were held in conjunction with exec board meetings during his Presidency. It was during these sessions that several strategic issues for AAVLD were identified and promoted, including establishing veterinary diagnostic laboratories as major players in food safety, zoonotic diseases, water and environmental pathogen detection, and bioterrorism, expanding AAVLD income sources in order to establish a strong long-term funding base for the organization and its programs, and increasing membership involvement in AAVLD activities in order to accomplish organizational objectives.

He worked with his predecessor and successor, Drs. Miller and Zeman, respectively, on the USAHA-AAVLD proposal to reorganize the joint annual meeting. Many of the recommendations from that effort have been instituted over the past 4 years and led to consolidation of the scientific presentations and establishment of the Joint Plenary session that began in 2001 and has been highly successful.

For all his outstanding contributions to the discipline of diagnostic medicine and to AAVLD, it is my pleasure, on behalf of AAVLD, to present this year’s E.P. Pope Memorial Award to Dr. Bruce Akey.

Dr. Terry McElwain presents the E.P. Pope Award to Dr. Bruce Akey.
A. USAHA/AAVLD PRESIDENTS’ RECEPTION AND DINNER

NATIONAL ASSEMBLY AWARD

David Thain
President, National Assembly of State Animal Health Officials
Reno, NV

It is with great pleasure, as President of the National Assembly of State Animal Health Officials, to honor Dr. Steven England, New Mexico State Veterinarian, at this opening joint general session of the 108th Annual Meeting of the United States Animal Health Association (USAHA) and the 47th Annual Conference of the American Association of Veterinary Laboratory Diagnosticians (AAVLD).

The National Assembly presents this award to Dr. England for his outstanding contributions to United States animal health in the regulatory field. In making this presentation, I must note that Dr. England, with a lifetime involvement in farming and ranching and more than 38 years experience in veterinary medicine, has shown exceptional strength in management of projects.

As examples of Dr. England’s accomplishments, I would like to cite his work with the United States-Mexico Bi-National TB Committee and in developing a Border States State Veterinarian Consensus Document that helped reduce tuberculosis cases in cattle imported from Mexico. As New Mexico State Veterinarian from 1985 to the present, Dr. England played a key role in New Mexico attaining freedom from a number of animal diseases, including pseudorabies in swine, brucellosis in both swine and cattle, and tuberculosis in cattle.

His other accomplishments include:

- Establishing and implementing animal identification programs, including those for the scrapie and Johne’s disease programs;
- Establishing a National Poultry Improvement Plan Program at New Mexico State University;
- Participating as a member of one of the United States Department of Agriculture Safeguarding Review Committees, which was charged with evaluating national programs governing animal health and international import-export regulations;
- Participating as a member of the Tri-National Animal Health Consortium, which addresses animal health preparedness encompassing New Mexico, Arizona, Colorado, the Navajo Nation, and two of the border states in Mexico; and
- Developing testing and eradication strategies for lamb wool fungus.

Dr. England received his degree in veterinary medicine from Colorado State University. He has served as president of both the Western States Livestock Health Association and the Western District of USAHA.
A. USAHA/AAVLD PRESIDENTS’ RECEPTION AND DINNER

It is with great pleasure that I present this award to Dr. Steven England.

Dr. David Thain presented the 14th National Assembly Award to Dr. Steve England.
Good morning. The 108th Annual Meeting of the United States Animal Health Association (USAHA) continues to attract increased attendants and shareholders, both national and international. The meeting has a record attendance, 1,241, and the President’s Reception and Dinner last night attracted a record crowd. Membership continues to increase with increased interest in wildlife issues, public health, international trade, and emerging and zoonotic diseases as well as protection of our country in cooperation with the new Department of Homeland Security. We must continue to remain focused on our domestic animal health programs, both bovine and swine brucellosis, bovine tuberculosis and the importance of the post surveillance programs following the elimination of pseudorabies from our domestic swine, still threatened by feral swine pseudorabies and brucellosis. The outstanding joint Plenary Session planned by President-Elects Rick Willer and Gary Osweiler following this meeting will highlight the importance of animal disease surveillance to meet our objectives to safeguard our animal and public health and protect our global food supply.

This year has been marked with accomplishments in advancing the completion of the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), National Center for Animal Health (NCAH), perhaps better known as the Ames Master Plan. We need to continue our focus to complete this plan. Continued focus on a “state-of-the-art” foreign animal disease laboratory and program (Plum Island Study) is equally important and I look forward to the further initiation of this study sponsored by the American Veterinary Medical Association this past year and continued at this meeting. Equally important will be the study and upgrading of other USDA-APHIS programs throughout the United States including at Athens, Georgia, Laramie, Wyoming and Kerrville, Texas.

The National Animal Health Laboratory Network (NAHLN) initiated by American Association of Veterinary Laboratory Diagnosticians (AAVLD) and USDA-APHIS will continue to be a high priority of USAHA. Our state and university animal health diagnostic laboratories need to be fully integrated into a system with laboratories of USDA, the United
B. USAHA MEMBERSHIP MEETINGS

States Department of Human Health Services, Centers for Disease Control and Prevention (CDCP), the Food and Drug Administration (FDA), state departments of public health and wildlife agencies in order to safeguard both animal and human health and our food supply from unintentional and intentional introduction of diseases, toxins and chemicals. Most, if not all, of these laboratories will need funding to accomplish this goal.

USAHA and AAVLD had a weekly, sometimes daily exposure to several issues this year through the efforts of our Executive Committees, USAHA staff at the Richmond, Virginia office, Committee Chairs and members. Teleconferences, electronic mail, several meetings throughout the states and in Washington, D.C. have taken place and these actions are in your Executive Committee notes. I have, with the help of the Executive Committee, Committee Chairs and Allied Industry Organization members submitted several letters concerning proposed rulings on Exotic Newcastle Disease, Avian Influenza, Bovine Spongiform Encephalopathy and other animal health issues of the USDA-APHIS, CDCP and FDA.

USAHA continues to remain strong, dynamic and challenged to meet the need for solutions to increasing animal and human health issues. Our membership increases and adds new partners dealing with public health, wildlife and several animal health issues. We certainly welcome our new and old members and are committed to work with them to reach consensus and provide solutions to their issues.

Special thanks to Robert Frost, Rick Willer, J. Lee Alley and USAHA staff for the initiation of the daily News Alerts and the New USAHA webpage. These services tie the organization to the membership on a daily basis that is so important with the fast moving complex issues that we must deal with.

The USAHA Executive Committee and Board of Directors continue to move toward the financial goal of having two years of operational cost in protected savings. This is happening with increased membership and happens with a modest scale of increased membership dues and continued, successful Annual Meetings. We look forward to attaining this goal in the near future.

I want to thank the membership of USAHA for this opportunity to serve as President. It was a privilege and an honor.
I am pleased to report that the United States Animal Health Association (USAHA) continues to operate on a sound financial basis. Your Association again operated within the budget approved by the Executive Committee.

The Executive Committee changed the Association’s fiscal year from a calendar year to one starting July 1, and ending June 30. The new fiscal year will allow the association to better monitor membership number and dues. It also helps to better manage Annual Meeting finances. USAHA’s Long Range Plan directed the Executive Committee to establish a reserve fund equal to one year’s operating expenditures. I am pleased to report that on October 1, 2004 the Association’s reserves were $453,233.50. Operating expenses for fiscal year 2003-2004 were $421,813.19 and the budgeted operating expenses for fiscal year 2004-2005 are $477,725.00. The current reserve account is slightly larger than the fiscal year 2003-2004 operating expenses but about $25,000 less than the budgeted expenditures for fiscal year 2004-2005. The Executive Committee has approved a recommendation that the reserve fund should equal two years of operating expenses.

For fiscal year 2003-2004 (July 1–June 30) the Association’s total income was $480,939.31 and the total expenditures were $421,813.19. The Association had a net income of $67,307.60.

The Audit Committee met and reviewed the Association’s financial records. We found the financial records and statements to be in good order. The monthly chart of accounts provides an accurate accounting of all financial activities. The chart of accounts provides an excellent document to monitor the budget. The Audit Committee compliments the Richmond office on their documentation of the Association’s final activities.

Detail financial statements will be provided to the Board of Directors during their first meeting Monday afternoon October 26, 2004. Also Secretary J. Lee Alley has a complete set of the chart of accounts for calendar year 2003 and fiscal year 2003-2004. He will be glad to make them available for your review.

I would be glad to respond to questions if there are any.
B. USAHA MEMBERSHIP MEETINGS

REPORT OF THE COMMITTEE ON NOMINATIONS

Chair: R. E. Frost

Mr. R. E. Frost, Chair of the Committee on Nominations and Resolutions presented the 2005 slate of nominees: President, Richard D. Willer, Arizona; President-Elect, Bret D. Marsh, Indiana; First Vice-President, Lee M. Myers, Georgia; Second Vice-President, James W. Leafstedt, South Dakota; Third Vice-President, Donald E. Hoenig, Maine; Treasurer, Jones W. Bryan, South Carolina. The nominees for regional delegates are: North East – Robert J. Eckroade, Pennsylvania and Ernie Zirkle, New Jersey; North central – Velmar Green, Michigan and James Lewis, Minnesota; South – Wayne Godwin, Florida and Greg Rosales, Alabama; West – Cal Lum, Hawaii and William Sauble, New Mexico.

Mr. Frost announced that the slate of officers for 2005 would be posted on the bulletin board and would be brought up for discussion during the Wednesday USAHA Membership meeting at 1:00 pm. At that time, members have an opportunity to amend the report by replacing an individual’s name on the Committee on Nominations with another name. The nominations report as is or as amended and approved by a majority of the membership present at the USAHA Membership meeting then goes to the Board of Directors for consideration. Acceptance by the Board of Directors constitutes election.
This is the second reading of the action on the Committee on Nominations. The report was presented on Monday and the action is the same today. The nominations slate is President, Richard D. Willer, Arizona; President-Elect, Bret D. Marsh, Indiana; First Vice-President, Lee M. Myers, Georgia; Second Vice-President, James W. Leafstedt, South Dakota; Third Vice-President, Donald E. Hoenig, Maine; Treasurer, Jones W. Bryan, South Carolina. The nominees for regional delegates are: North East – Robert J. Eckroade, Pennsylvania and Ernie Zirkle, New Jersey; North central – Velmar Green, Michigan and James Lewis, Minnesota; South – Wayne Godwin, Florida and Greg Rosales, Alabama; West – Cal Lum, Hawaii and William Sauble, New Mexico. That is the report of the Committee on Nominations and I move for acceptance of the report on Nominations.

President Lein: You’ve heard the Report of the Committee on Nominations, there is a motion on the floor for acceptance, is there a second.

Dr. Hillman: Second.

President Lein: Is there any discussion or amendments to the report? All in favor of the acceptance of the Report of the Committee on Nominations say, aye. Those opposed, like sign. The report is approved. Is there any unfinished or old business to come before this body? Hearing none I'll call for any new business. Is there any new business? Hearing none, I’d like to call our new President Rick Willer to the podium so that I can present him the President’s gavel and for his remarks to this body.
Dr. Don Lein passes the presidential gavel to the new incoming president, Dr. Richard Willer.
Thank you Dr. Lein, and thank you for your service to this organization over the past year as our President. It will be a challenge to fill your shoes. It is with great honor that I accept this gavel and all that it represents, and assume the position as your 109th president. Serving this Association on the Executive Committee is undoubtedly the highlight of my veterinary career and a special honor to be only the second Arizonan to serve this great Association as President. One hundred years ago, nearly to the day, Dr. James C. Norton addressed the Interstate Association of Live Stock Sanitary Boards, the founding organization of the United States Animal Health Association (USAHA), as its President at its 8th Annual Meeting in St. Louis, Missouri. Dr. Norton was at the time serving as the territorial veterinarian for Arizona. By the way, he was from Ames, Iowa and moved to Arizona because he had contracted tuberculosis.

To arrive at this point in my life, I would be remiss if I didn’t recognize the support I have received from a number of individuals. While there is not time to recognize them all, I must specifically recognize a few. I would like to recognize, former Hawaii State Veterinarian Cal Lum and Past Presidents Bob Frost and Dick McCapes for encouraging me in 2001 to seek election to the Executive Committee; my friends and colleagues from the Western States Livestock Health Association who entrusted me to serve them and this Association; USAHA Secretary J. Lee Alley who has tirelessly served this Association for many years and provided valuable counsel to me as I have moved through the chairs of the Executive Committee; former Arizona State Veterinarian E. Ray Hinshaw and the Arizona Cattlemen’s Association for their support and encouragement; and of course, my own agency, the Arizona Department of Agriculture, for their unwavering support.

As you have heard, the 108th Annual Meeting in this beautiful setting of Greensboro has set records for attendance. Secretary Alley tells me we had over 1,300 in attendance. The Sheraton Hotel has been very accommodating and a great venue for our 108th Annual Meeting. Record attendance is due in part to the efforts of Past President’s including Bob Frost and Don Lein who worked overtime to bring new stakeholders to the USAHA table encouraging full participation in our deliberations. A special thank goes to APHIS Administrator Ron DeHaven and Veterinary Services Deputy Administrator John Clifford for the strong support they and their agency have shown, and continue to show USAHA through record attendance of APHIS employees. We need to thank our host State Veterinarian Dr. David Marshall and his
B. USAHA MEMBERSHIP MEETINGS

North Carolina team for all their hard work and contributions to this successful meeting. In addition, we must recognize the leadership of the committee chairs and for their hard work at the annual meeting and throughout the year. Finally, I can’t forget the great support and assistance from our office staff Linda Ragland and Hillary Campbell, as well as Karl Gregory and Kim Sprout who oversee the workroom and are always important contributors to our successful meetings.

My friends, USAHA has changed. We are not the same Association we were 100, 50 or even 20 years ago. USAHA has evolved and through the persistence and leadership of presidents over the past decade, equipped with a roadmap in the way of the Long-Range Plan, have made USAHA a year-round organization in spite of budget limitations. While Past President J. C. Norton might not recognize us, he certainly would recognize the process, a process that has not changed over 108 years and continues to serve us well. Former APHIS Administrator Frank Mulhern described that tried and true process rather well. In Dr. Mulhern’s review of the role of USAHA at our 88th Annual Meeting, he reported that the strength of USAHA is its ability to bring together all stakeholders, including state and federal governments, universities, researchers, and industry, to reach consensus on problems confronting the animal agriculture industry. He stated that despite obstacles resulting from conflicting interests, USAHA has had a long history of achieving success.

As you know, your Executive Committee has made a strong effort in the past few years to bring in a number of new “partners”, both in the form of individual members as well as new members of the Board of Directors. Last year, the membership on the Board of Directors was increased by 8, adding 5 Official Governmental Agency partners – the Lawrence Livermore National Laboratory, the National Wildlife Health Center of the United States Department of Interior (USDOI), the National Park Service (USDOI), the Science and Technology Directorate of the Department of Homeland Security, and the Food and Drug Administration of the Department of Health and Human Services (DHHS). In addition, 3 new Allied Industry Organization members were added – the Association of American Veterinary Medical Colleges, the National Chicken Council, and the U.S. Poultry and Egg Association. This year, 6 new partners were added to the Board of Directors. These new partners include 3 Official Governmental Agency representatives from Wildlife Services of the United States Department of Agriculture, Animal and Plant Health Inspection Service, the U.S. Fish and Wildlife Service (USDOI), and the National Center for Infectious Diseases at Centers for Disease Control and Prevention (DHHS). In addition, 3 new Allied Industry Organization members were added – the National Dairy Herd Improvement Association, the National Pork Producers Council, and the National Turkey Federation. Our effort to bring in new
B. USAHA MEMBERSHIP MEETINGS

partners is in recognition of the need to be inclusive instead of exclusive when addressing the complex animal health issues of today. To be effective in accomplishing our mission, we need everyone at the table.

The USAHA Board of Directors now has sixty-five Official Governmental Agencies represented including the 4 national animal health agencies from Australia, New Zealand, Mexico and Canada, and thirty-one Allied Industry Organizations. There is no other body like USAHA it in the entire world. Dr. Brian Evans, Chief Veterinary Officer of Canada, stated in his talk Monday at the joint USAHA/AAVLD Plenary Scientific Session that he has traveled the world, been in 90 countries, and found no organization that even approaches USAHA.

It is clear that the health of domestic animals, the health of wildlife, and the health of people are closely linked. Each of our first three speakers at the joint plenary scientific session emphasized this as well as Dr. Dixie Snyder, featured speaker from the Centers for Disease Control and Prevention at our President’s dinner. In recognition of the importance of disease issues at the livestock/wildlife interface, I have asked Past President Bob Frost to continue his efforts on our behalf to bring wildlife disease issues to the USAHA forum. Bob has graciously accepted and I appreciate his leadership in this important area.

One disease issue at the livestock/wildlife interface that is particularly challenging is the brucellosis situation in the Greater Yellowstone Area. After many decades of disease eradication activities, we have virtually eliminated brucellosis from the nation’s cattle population. Bison and Elk in the Greater Yellowstone Area are the last remaining focus of Brucella abortus. Elimination of this pathogen from the bison and elk populations is an extremely complex issue; there are no easy answers. Whoever said that elimination of diseases like Texas cattle fever, screwworms, Contagious Bovine Pleuropneumonia, or hog cholera were going to be easy. Yet we were successful.

It is apparent that in order to get the job done, we must improve the tools available to us for addressing the bison and elk brucellosis issues. To that end, I am appointing a special committee to address wildlife brucellosis issues in the Greater Yellowstone Area. This committee will include representation from United States Department of Agriculture, the United States Department of Interior, the Greater Yellowstone Interagency Brucellosis Committee, state wildlife agencies from the Greater Yellowstone Area, and academia. My first charge to this special committee will be to plan and hold a working symposium to address the research needs for new and improved vaccines, vaccine delivery systems, and diagnostic techniques for use in bison and elk, and what it is going to cost for this needed research. The special committee will report back to us at our Annual Meeting in Hershey next year. President-Elect Bret Marsh has agreed to chair this special committee.
B. USAHA MEMBERSHIP MEETINGS

As you know, we have many other important issues on our plate. We will continue to address them as we have addressed other animal health issues for 108 years. While it would take too long to list them all, some of particular note include implementation of a national animal identification system, completion of eradication programs for TB, scrapie, and cattle brucellosis, control programs for Salmonella, Johne’s disease and Low Path AI, early identification of foreign and emerging diseases, emergency preparedness and response, completion of the National Animal Health Laboratory Network, and addressing other national laboratory needs such as the Plum Island Animal Disease Center and the Arthropod Borne Animal Disease Research Laboratory.

As your president for the coming year, I can tell you I am not here to tread water. Rather I am committed to supporting the mission of USAHA, addressing the complex animal health issues head on, and improving our ability to provide service to our members. Leading this Association is not a one-man job. While the President is certainly the most active and visible member of the Executive Committee, it requires a team effort to provide a year-round presence. We welcome Third Vice-President Don Hoenig, State Veterinarian of Maine, to the Executive Committee and thank him for his commitment to serve this Association over the next six years. Finally, and again, we must recognize our committee chairs as an important component to the year-round team. With that I want to thank you and may God bless each and every one of you.
B. USAHA MEMBERSHIP MEETINGS

RECOGNITION OF IMMEDIATE PAST PRESIDENT

R. E. Frost

Dr. Willer: At this time I would like to call on Past President Bob Frost.

Mr. Frost: Thank you, Dr. Willer. This is the part of the program that we recognize immediate past president Don Lein. On behalf of the association, we thank you for your outstanding service as our 2003-2004 President. As a token of the memberships gratitude to you, I would like to present you the President's Plaque, your life member badge and the USAHA gold key. This is a small token to express the association's appreciation for your many contributions to USAHA.

Dr. Lein: Thank you, Bob.

Dr. Willer: I declare this second General Membership Meeting adjourned.

Mr. Bob Frost presents outgoing President, Don Lein, with the President's plaque in recognition of his service to USAHA throughout his year as President.
C. USAHA/AAVLD JOINT PLENARY SESSION

KEYNOTE ADDRESS

ANIMAL HEALTH SURVEILLANCE: RESPONSE TO PUBLIC HEALTH AND TRADE

Alex Thiermann

My charge today is to present a global perspective on animal disease surveillance and how the Organisation for Animal Health (OIE) is developing guidelines and recommendations on how to apply surveillance. OIE defines animal health surveillance as the systematic ongoing collection, collation and analysis of data, and the timely dissemination of the information to those that need to know, so that action can be taken. This surveillance can be used in three ways. Namely it can be aimed at demonstrating absence of disease or infection in a country, zone or compartment; when a disease is present, it can be used to monitor the occurrence or distribution of an epizootic, or perhaps its eradication; and it can be utilized to detect the appearance of previously unknown or emerging disease as early as possible.

Surveillance is an essential component in the detection of disease particularly, those listed by the OIE. It supports a country or region’s claim of freedom from a disease or infection, provides data for the required OIE notification, provides the necessary data in support of the risk analysis process, and substantiates the rationale for sanitary measures that are taken, whether on imports or justifying a country’s exports.

Surveillance can be classified in three ways; the means by which it is collected - active or passive; by the disease focus – pathogen specific (i.e. bovine spongiform encephalopathy) or general (i.e. to detect an emerging agent); or by how the unit of observation is collected – structured versus non-random data source. These are roughly the guidelines found in the OIE Animal Health Code (OIE Code) chapter on surveillance.

In my opinion, surveillance is basically the credibility tool for a country’s Veterinary Services, whether it is for the traditional approach to demonstrate freedom from a disease, or the more recent approach used by OIE on Code chapters that give specific recommendation on the safety of trade in commodities even when the disease is present. It
C. USAHA/AAVLD PLENARY SESSION

is also essential to be able to demonstrate that we know where and how it is distributed. With new tools, such as zoning and, more recently, compartmentalization, it is impossible to approach these concepts without the appropriate and credible surveillance.

In the OIE Code, there are general guidelines in the chapter on general surveillance, general principles for disease freedom and specific appendices for major diseases such as Rinderpest, contagious bovine pleuropneumonia, bovine spongiform encephalopathy (BSE), scrapie and foot-and-mouth disease. OIE is trying to give more detail on general surveillance and only identify those issues that are specific to a particular agent so they encourage veterinary services to focus on the detection of agents and thus be better prepared to detect unknown agents rather than having very targeted disease surveillance targeted on specific diseases. Nevertheless, there are certain diseases where surveillance is essential and we are working today, in collaboration with the Scientific Commission of the OIE, to develop surveillance guidelines which will be attached as appendices to the current OIE Code chapters. Currently being worked on are surveillance appendices on avian influenza (AI), Classical Swine Fever, bluetongue, Aujeszky’s Disease and Newcastle Disease.

In looking at examples from the past and what was done or could have been done—the foot-and-mouth disease (FMD) outbreak in the United Kingdom (UK) and the European Union in 2001 showed the weakness in the veterinary infrastructure in the UK because the disease was detected quite late and it was difficult to control. On the other hand, the detection of it in The Netherlands and France, after they had been alerted to the situation in the UK, demonstrated their rapid response and appropriate actions and in a very short time, they managed to control it.

We can look at the situation in North America with West Nile Virus (WNV). WNV was detected early in a crow, and through excellent surveillance, not only in domestic animals but particularly wildlife, we have been able to monitor the movement and evolution of this disease.

Highly Pathogenic Avian Influenza (HPAI) in Asia has been an exercise, not only in weak surveillance but also in honest surveillance. Some countries reported what little they knew and some did not report quite a bit they knew. This will be reflected in their credibility and the ability they will have to trade in the future. China was one of the latest to come forward with information. The notification system of the OIE not only relies on the official reporting of the veterinary services but also OIE has the ability, through a number of search engines, to check unofficial information worldwide and then to ask the official delegate of the country to confirm or deny the report. China has been an official member of OIE but is not an active member. This underscored the need for member countries to provide data as quickly as possible even
C. USAHA/AAVLD PLENARY SESSION

if they don’t have the complete picture of what is going on.

In contrast, HPAI in Chile is an example of rapid reporting and good action on surveillance. Chilean authorities were very quick to report and sought expert advice from OIE. Recommendations were made and implemented by Chile in spite of the risk to the chief veterinary officer and the eradication was accomplished very quickly.

Evolution of BSE in Europe may be an example of excessive surveillance however, we have been able to adjust recommendations in the OIE Code based what we have learned through the very active surveillance on the part of the European member countries.

The requirements for good surveillance include a strong veterinary infrastructure as a whole including in a good diagnostic and quarantine capability that must be linked to an emergency response. Surveillance must also be linked to the results of risk analysis and it is very important that there is participation by all stakeholders, not just the official authorities. Surveillance must also be supported by a sound regulatory framework with political support.

There are disadvantages to good surveillance. Good surveillance is costly and transparent reporting often results in unjustified trade restrictions. At times it is difficult to sell, particularly when there are no problems. It is important to have a strong surveillance system in place to better prepare us to detect the unexpected emerging disease – the agents we have not learned to manage before. Also, we are encountering a lot of complaints from developing countries as an unnecessary expense or barrier to trade. Thus, it is important to make it clear that the surveillance needs to be adjusted to be commensurate with the risk identified and hopefully encouraging them to have a broader approach to surveillance instead of one to sell pigs and another to sell chickens.

At times, targeted surveillance is the preferred alternative. It may even be targeted to only part of the country instead of the whole country. It has the advantage that it utilizes resources more effectively and is closely linked to specific trade benefits. It permits trade even in countries where the disease is present.

Some examples of targeted surveillance include: In the case of FMD, it is needed for determining the status of the country, zone or compartment. OIE has not made clear commodity specific recommendations for trade in cases where countries are free but are still using vaccine. In these cases, the surveillance is stricter in countries that want to prove freedom but are still using vaccine. They must prove the absence of virus circulation. And also there are specific surveillance recommendations for how a country can recover its status after they have lost it whether or not they continue vaccinating.

The Code Chapter on AI surveillance is still under construction. The Code has general statements relative to surveillance and the hope is after the meeting of experts this fall, more specific guidelines can be
C. USAHA/AAVLD PLENARY SESSION

proposed. What the OIE is calling for is having notifiable AI which includes two groups – HPAI, any H5 or H7 AI that has the amino acid sequence that shows the hemagglutinin molecule is similar to HPAI, and any H5 or H7 which have not been classified as HPAI.

For surveillance on AI, what OIE is asking for is through good surveillance, we will be able to recommend trading of certain commodities even when low pathogenic AI is present provided the country has a control program, otherwise there won’t be sufficient incentive to report low path AI (LPAI) if the consequences are going to similar to HPAI. OIE feels both LPAI can be managed and prevented from going to HPAI through good surveillance and honest reporting. And more importantly, surveillance will be an essential tool in compartmentalization and being able to proved the separation of a compartment such as in commercial operations from backyard flocks and migratory waterfowl which is really where the risk is from.

In the case of BSE, the experts tell us that we need to recognize that there are different sub-populations at different risk levels for BSE. This is identified in the surveillance chapter. First, in a country or zone not free of the risk of BSE we find different groups: cattle not exposed to the agent, cattle exposed but not infected, and then infected cattle within which there are several groups. Most will be slaughtered or die before reaching the age when BSE is detectable with current methods. Some will progress to a stage at which BSE is detectable by testing before clinical signs have appeared. A few will reach the stage when clinical signs appear. So surveillance needs to be targeted to one of these groups more than another. So the OIE Code recommends that the active surveillance examine first the cattle that display clinical signs consistent with BSE. Then focus on those displaying clinical signs requiring emergency slaughter such as broken legs that are really not indicative of BSE but where there is no clear idea of what happened. Experts say this the relation to these two groups is 1:100 i.e. one should check at least 100 of the second group. Testing 5,000 normal cattle at slaughter over 30 months of age would be comparable to 100 of the emergency slaughter or 1 displaying clinical signs.

The big question with BSE surveillance is how much surveillance is really needed. Once the risk is identified shouldn’t the focus be on risk reduction rather than more surveillance. For instance, whether a country has one case or 10 cases, the risk reduction measures should be the same. In my opinion, it would be wiser to continue with the traditional surveillance which is necessary but to focus resources on specified risk material (SRM) removal and the prevention of feeding of meat and bone meal (MBM), and taking the necessary animal health and public health prevention measures rather than increasing surveillance. Should the developing countries be forced to conduct extensive surveillance when they have very limited resources or should they be given
a second option, especially if the country claims to be pastoral and have never fed MBM, to focus on SRM removal to reduce their risk? In answer to what is driving the high surveillance, we must ask is it really increasing security, is it a measure to satisfy a lost consumer confidence, or is it just private business that stands to gain by increasing surveillance? Surveillance has to be commensurate with the risk identified. We need to have enough money for surveillance for diseases that haven’t shown up yet. A challenge is how to find a face-saving way for decision makers to back off from unnecessary surveillance in order to appease total loss of consumer confidence in certain parts of the world.

In my opinion, risk analysis must be the determining factor in the type and magnitude of the surveillance we are going to use rather than the surveillance becoming unjustified and mandated on others. We need to be prepared for the future i.e. emerging diseases. Emerging and re-emerging diseases are no longer local or national. We need to work with our partners and our neighbors and make sure our surveillance is regional and global, and the early detection and rapid response will require a much better coordination between animal health and public health. We also need to keep in mind, accidental as well as deliberate introductions of biological agents affecting animals can be and should be controlled by the same infrastructure and intelligence systems and we don’t need to create new ones.

Emerging diseases require collaboration. Most emerging diseases are going to be first detected in animals and we need to adjust our surveillance for that. There is an apparent competition between animal and public health and we need to bring these together and collaborate. We must consider not only the human health aspect but also the domestic and wildlife components. As we know, wildlife quite often play a very important role. Surveillance systems must consider the ability to detect these unknown agents. It is the convergence of human and animal health that provide important challenges and opportunity. We must strengthen these partnerships both in the national and international level.
C. USAHA/AAVLD PLENARY SESSION

IMPORTANCE OF SURVEILLANCE TO NORTH AMERICA

Brian Evans
Chief Veterinary Officer of Canada, Executive Director of the Animal Products Directorate of the Canadian Food Inspection Agency

My talk today will emphasize some of the remarks Dr. Thiermann made from his international perspective because from a North American perspective, we are part of that global community. I would be remiss if I didn't reiterate at the outset and commend USAHA and AAVLD for the importance of what they do and equally how they do it. What USAHA and AAVLD do is as good as or better than any organization I've seen in the 90 some countries I have visited in my career. It builds relationships, bridges jurisdictions, brings sectoral interests together in a way that leads to positive and constructive work. I commend you for that.

During the next 20 minutes, I hope that I can add some scope to your thinking and give some consideration to the critical and strategic outcomes of the investments that must be made in animal and zoonotic surveillance within the North American context. I want to describe to you the convergence of many factors, which are contributing to the current global threat environment that make the investments we are striving to make so essential. We'll touch on some of the challenges we collectively face within North America. And finally to focus on what I believe are at least four areas where we have a collective obligation to take on board if we are to serve our industries and our consumers.

Surveillance is pervasive in so much that we do and take for granted. It is critical to establish a benchmark or baseline of information and knowledge on status so we can adequately define what is truly endemic, what truly is emerging, what is re-emerging, and what may be exotic. The absence of knowledge is not the absence of risk. The investments we make in active and passive surveillance are very important to the risk management strategies that have to be adopted. It is that information that allows for the elaboration of domestic disease control strategies at the national, sub-national and even the herd level. Secondarily, as you move down that continuum of having established a baseline, elaborating the strategies that we feel are necessary to be made, it also becomes the basis on which thorough risk assessments based on international trade obligations we are able to build an import policy and prevention determinations.

As Dr. Thiermann has said previously, the delivery of sound surveillance programs is absolutely fundamental to meeting international reporting and certification obligations. And the privilege of international
C. USAHA/AAVLD PLENARY SESSION

trade is often dictated by the recognition or lack thereof of other countries determination as to how pertinent your surveillance activities truly are. As Linda Detweiler has said, absence of evidence is not evidence of absence and the ability to say that we have not clinically detected, or through very passive surveillance systems we have not determined the presence of a disease really is not a passport into the international marketplace anymore.

Surveillance certainly has significant public health, food safety, and environmental sustainability attributions associated with it, both in terms of the impact of disease prior to its detection (i.e. in the case of FMD, the disease had become pervasive throughout much of the U.K. before the first diagnosis had been made) and the subsequent issues around the environmental disposal issues, society’s changing views around salvage of protein from animals in production systems all become very apparent and how effective was your surveillance at the outset.

We recognize economic impacts at the level of production. The ability to produce viable protein and produce healthy animals comes with a cost. That cost certainly relates to how early we are able to detect a disease and manage it at a herd level. Domestic and international market access is dependent on demonstrating the effectiveness of surveillance which is increasingly becoming very, very prescriptive and very costly and this has an overall impact on competitiveness in the international marketplace.

Early detection provides the greatest opportunity to mitigate the impact of finding of a disease within a national herd. It is essential, the foundation, to regionalization, zoning or compartmentalization potential approaches to mitigate the cost of disease. That can be both at the domestic level as well as international level. There are many examples in North America of diseases where we have successfully used regionalization as a way to mitigate both disease costs within jurisdictions - avian influenza (AI), exotic Newcastle disease (END), eradication programs for tuberculosis (TB) and brucellosis, internationally in terms of bluetongue and other areas. North American has been a beneficiary of these approaches but only based on the ability to demonstrate to the world that these types of determinations can be demonstrated and verified.

We are leading to a rapid conclusion of all these points that surveillance is the foundation for domestic and international market confidence. It is the way by which you protect the investments of importing countries. When they open their door to you, their expectation is that you are protecting their interests through your surveillance programs as well. You don’t want another country to be the sentinel for a disease you have not yet detected in your own national herd. You will not be in the export market very long if you depend on other countries to find
your problem before you have found it.

As we move increasing away from country status as the basis for trade, as we focus on the safety of commodities and the use of mitigation measures from a trade facilitation standpoint, surveillance is that critical component that serves in every import risk assessment that is carried out to demonstrate the infrastructure of the country, its lab capacity, its competency, its quality of delivery of services, all which add up to whether they can do and deliver surveillance at the level necessary to provide the basis for certification credibility.

Before we talk about the challenges within North America, it is important that we situate ourselves in the global threat environment that we all recognize. The reality of globalization with the rapid movement of both products and people provides great opportunity for diseases to move in association with those realities. We see with an ongoing frequency of the evolution of emerging diseases and the rapidity with which these diseases appear. We are seeing resurgence in North America of previously endemic diseases, circumstance around the wildlife interface with livestock production systems with resulting reservoirs that can re-introduce diseases back in populations for which there has been significant investment in disease control to eradicate.

There is certainly an impact of climate and ecosystem change in terms of invasive species, vector maintenance over winter periods previously not seen and other factors that play. Again the wildlife interface is a critical interface that increasingly is expressing itself in terms of disease transmission, both zoonotic and directly to animal populations. In addition, the diversification of species being reared in intensive animal production systems create new dynamics for wildlife to interface with other species that potentially are carrying a new range of pathogens for which we may not fully appreciate how they will be expressed or act when they are introduced into a new susceptible host.

The human factor is also very much a factor in the threat environment. It deals with the reality that no regulatory system can take into account human behavior on an ongoing basis, and also takes into account immigration patterns and diversification scenarios where by in countries as we continue to diversify our populations new populations coming in have a different context around disease control and around regulatory programs. They have cultural values that are different than those established in North America. One only needs to look at the Newcastle Disease situation in California and the concept of backyard flocks as a scenario and how do you regulate that type of an industry to deal with cultural values and cultural sporting events. Certainly there are production and management factors in terms of the intensity and diversification of our production systems that do contribute to the threat environment and requires us to look at surveillance from a different perspective. We recognize, even pre-September 11, the reality of the intentional use of biological agents.

The convergence model demonstrates the interrelation of all these
C. USAHA/AAVLD PLENARY SESSION

factors and how they can impact disease expression. Again, I come back to the critical role I see USAHA and AAVLD playing because is the one organization that brings together the competencies that play in all these various factors in a way that will allow for meaningful dialogue and the elaboration of an inclusive and constructive approach to managing these risks.

There are challenges in North America which doesn't come as a surprise. I believe that we have not effectively characterized our animal populations in a way that allows us to do surveillance in the most cost-effective way. We do not fully understand what we refer to as the movement of animals in "peacetime", when there is an absence of major disease outbreaks and movement control circumstances. In other words, how they move in normal commerce as a predictor of disease problems. Do we really have a full understanding of the changing immuno-status of our populations in light of ongoing breeding programs that continue to narrow our genetic base. We have to continue looking at these factors as we move forward in creating a surveillance program that is not overly costly and prescriptive but at the same time gathers true and valuable information in real-time.

The traceability component is one which is front and center in North America over the last five years and certainly has been taken on with a renewed level of commitment and energy. There is no value in doing surveillance if you can't trace that animal back to its point of origin.

Producer participation is certainly a challenge. We would be remiss if we didn't talk about the concerns producers have of being sentinel for major disease outbreak and how they can be seen as a pariah within their industry in ways that is truly not justified and in fact is well beyond their ability to control. They perceive that the impacts of detection often create unwarranted and unjustified trade restrictions which have huge economic impacts and can result in the massive restructuring of industries. We can speak openly about the human cost of bovine spongiform encephalopathy (BSE) in North America, a disease we have not seen expressed as new variant CJD but it which has caused significant public health problems in terms of stress, bankruptcies, and suicides. BSE is a health risk in North America but for all the wrong reasons.

One must also look at the regulatory structures which exist. While I'm not sure how the regulatory system in the United States plays out but in Canada there are penalties for not reporting a disease that is listed as reportable. In Canada, you can be penalized by two years in prison or a $250,000 fine. At the same time we all recognize that at state and sub-national jurisdictions there is the ability as well, if it is a veterinarian who intentionally subverts or deliberately tries to mask the reporting of the suspicion of a disease that is reportable, there is the threat of lifting of licensure for unethical and immoral conduct at a professional level. It should not take these kinds of penalties to drive an investment in an area where it's truly in the collective best interest to
be reporting diseases in a timely and appropriate manner.

There are huge jurisdictional complexities. When we start looking at public health and wildlife and animal health interfaces, these can be at the federal, state, or sub-national level and cross over in many ways to municipalities, especially when you deal with disposal and other issues. These jurisdictional complexities are very much a challenge in terms of coordinating, collaborating and integrating our surveillance approaches in the most effective way.

Laboratory competency and quality assurance are fundamental to any effective surveillance program. One has to deal with the reality of both false positives and false negatives and the ability to explain those in a way that will instill confidence at the public level of what we are doing.

Integration of laboratory reporting systems is another challenge to allow us to do real-time analysis of the wildlife-domestic animal-human health realities. We have sentinels at both ends of that spectrum and we have yet to achieve in North America the kind of synergy we need in order to use that spectrum of surveillance information, which is currently siloed, in an effective way.

Dr. Thiermann mentioned earlier the cost of a very prescriptive approach to disease surveillance and the trend continues in that way. The fact that we have continued to make huge investments from a public funding standpoint in surveillance targeted activities. In the case of BSE, from both an animal health and public health relative risk perspective, I suspect that in 10 or 15 years, governments will be soundly criticized for the level of investment made because those investments were made at the cost of not making those investments in other areas that may have more direct food safety public health impact. That may prove to be very difficult for the people in the next generation to explain.

Fundamentally, one of the important changes that we in North America have to come to grips with is the proposed changes in the OIE disease notification process that OIE announced last year. With the removal of traditional List A and List B disease reporting, unifying them into one single list of diseases will place extraordinary demands in our ability to report disease in a timely manner. It is important to be aware of the criteria for reporting that are being developed to support this notification system. The overriding criteria for listing by the OIE is its potential for international spread. Other criteria include the capacity for significant spread within naïve populations and its zoonotic potential. As North America moves forward and have the opportunity to have input in how we will implement the change in disease notification, we have to take on board the epidemiological significance of diseases that should be notified immediately. There have been six criteria established to achieve that—the first occurrence of disease in a country/zone/compartment; the reoccurrence of a listed disease in a country/zone/compartment following a report by the CVO that the previous outbreak
C. USAHA/AAVLD PLENARY SESSION

had been eradicated; the first occurrence of a new strain of a pathogen of a listed disease; a sudden or unexpected increase in morbidity or mortality caused by a listed disease condition; emerging diseases with significant morbidity, mortality or zoonotic potential; and evidence of change in the epidemiology of a listed disease including its host range, its pathogenicity, or strain of causative organism. These are fundamental changes that will change forever how the world looks at and demands surveillance investments on the part of North America and the rest of the world. We have used the List A and List B approach collectively as countries to deal with the reality that in many cases if the disease could be ruled, if it was not a List A disease, then really the investigation often stopped there because of the costs associated with taking it to an end point. In the current environment of emerging and re-emerging diseases we cannot stop by saying what we know it’s not.

The other factor that we need to consider and that will become part of our agenda in years to come is the significant changes that are happening with respect to diagnostic methods. Currently surveillance data largely is derived from lab networks, accredited lab systems, and federal agencies across North America. As we get closer and closer to the use of chute-side testing, on-farm testing, and dip-stick methodologies as the fundamental approach to disease surveillance, that information will no longer be assembled and collated through our current laboratory infrastructure. We need to find ways to engage at the practitioner and producer level to ensure that information is equally shared and part of our real-time analysis of what is happening within our jurisdictions. It is a huge challenge as technology continues to emerge; we cannot continue to think of surveillance in the current paradigm of how we gather our surveillance information.

Integrated commerce and the reality of global trade do result in the requirement for data capture in other jurisdictions. We have benefited in North America because of the investments we have collectively made in disease eradication programs but in times when we do operate with open borders, we see the reality whereby one country has to be intimate to the design of the surveillance by a second country – because what is slaughtered in a Canadian slaughter plant may reflect the disease reality of slaughter cattle or feeder cattle brought from the United States whether it be for brucellosis, tuberculosis or other diseases. So we have to continue to integrate our surveillance approaches so that information of the population at risk is fully considered and reported back in order for appropriate actions to be taken. So integrated commerce carries with it the obligation that we integrate our surveillance and reporting systems in ways we have not previously achieved.

We recognize in a true sense the reality that there are many sources by which information now emerges at the international level – research reports, media reports, journal publications, internet sites, reference laboratories at the international level exchanging information. It is no
C. USAHA/AAVLD PLENARY SESSION

longer simply the role of the delegate to the OIE to be reporting to international organizations but in fact increasingly delegates are held accountable by the OIE saying we have heard this report, read something on the internet, can you validate whether this is a true event in your country. That flow of information in itself, and how we manage it and respond is depended on how strong our surveillance programs are in order to validate whether an event falls within the criteria requiring us to notify the OIE.

Areas we need to continue to focus and move forward – I’ve talked about some of the fundamental changes that are occurring at the international level that will require us to re-think how we do our surveillance program, what level we are able to invest in. No country in the world has the resources to, when we merge the two existing lists, to do active full-time surveillance with a 95% confidence limit of finding within 1% of the population for the complete list of 367 diseases. No government has the ability to make that kind of investment. That is a challenge we have to take on board, how we list these diseases, how we invest in their detection and how we respond.

Jurisdictional complexity requires a seamless and synergistic commitment to the concept of one medicine. The concept of one medicine is over a century old. The issue of one medicine is not about one competency. It’s about an integration of competencies that complement each other in a way that gives us the type of outcomes we are looking for at both a public health and animal health level.

We need to continue to make investments in awareness through education at the level of the producer, the level of veterinary practitioners. They cannot make effective decisions; they cannot do effective on-farm biosecurity if they do not have a full understanding of the threat environment in which they are working. And increasingly, whether it’s endemic diseases such as Johne’s, infectious bovine rhinotracheitis (IBR), Type-2 bovine viral diarrhea (BVD) or bovine leukosis (EBL) these will potentially become issues at the international level. In a true sense, if all countries have the disease, it’s less of an issue. In reality, our endemic diseases may become how we will be judged by the rest of the world if we in fact continue to introduce diseases that we think are not a big issue into their jurisdictions because we do not manage them effectively in our jurisdiction. If we want the right to supply other markets bear in mind that we are the primary import control for those other market’s disease status.

Finally, there is the critical role of USAHA and AAVLD. You have the community of competencies that stretch across all of the various components that can mitigate risk and that can contribute to an understanding in a way that very few organizations have the ability to do. I urge you to use those competencies, to build the bridges to help us collectively as North America to protect our citizens, our food supply, the economic investments of our producers, and beyond our borders, do the same at the international level.
IMPORTANCE OF VETERINARY SURVEILLANCE FOR PROTECTING THE PUBLIC HEALTH

Lonnie J. King
Dean, College of Veterinary Medicine, Michigan State University

As the United States Animal Health Association (USAHA) and the American Association of Veterinary Laboratory Diagnosticians (AAVLD) members gather for the 108th annual meeting of the USAHA, they are likely to confront more challenges and opportunities than at any time in the organization's history. The driving forces of globalization, technology, restructuring of agricultural systems, consumerism, and contemporary societal issues are propelling us into the 21st century with unprecedented speed and added complexity. The impact of these forces will unquestionably change the basic foundation and operations of animal health programs and how organizations such as the USAHA must consider and prepare for the future. Central to the profound changes for animal health is both the recognition of a new era of emerging and re-emerging diseases, and the significant impact of these diseases on the public's health and well-being. The confluence of human and animal health is not a new phenomenon for veterinarians and animal health officials; however, the scope, scale, and worldwide impact of zoonoses today has no historical precedent.

Approximately 10,000 years ago, a new social order was created with the advent of agriculture. Populations became more stable and formed communities and, concurrently, began the process of domesticating animals. These social changes almost certainly led to the rise of zoonotic infections. Over the centuries zoonoses continued to be important human health issues. However, approximately 25 to 30 years ago, a new epidemiologic era began and was characterized by a series of global emerging infectious diseases, of which 75 percent were zoonotic. Infectious diseases emerged and re-emerged around the world and the confluence of human and animal health was recognized as a key ingredient in this new era.

Over the last few decades, the right conditions and factors aligned and resulted in significant numbers of emerging infectious diseases and zoonoses. The Institute of Medicine’s Report on Microbial Threats to Health1 used the metaphor of the perfect storm to describe the occurrence of special events that are producing the “perfect microbial storm.” This report listed a number of factors that are the driving forces in disease emergence and especially those important to the creation of new zoonoses. These factors include: microbial adaptation and change; host susceptibility to infection; climate and weather; changing ecosystems; economic development and land use; human demographics and behavior; technological and industrial advances; international travel and...
C. USAHA/AAVLD PLENARY SESSION

commerce; breakdown of public health measures; poverty and social inequity; war and famine; lack of political will; and, the intent to do harm.¹

Microbes are especially competent at adaptation and change under selective pressures for survival and replication. The remarkable adaptation of microbes to become resistant to antimicrobial products is seen in both human and animal populations and there is a recognized linkage between the two. For example, a type of S. Newport primarily in the U.S. has been found in cattle, equine, and human populations and is resistant to nine different commonly occurring antibiotics. S. typhimurium DT104 was once described as a “superbug” that had adapted as an antimicrobial resistant pathogen with global distribution in both domestic animals and human populations.² The influenza virus is also renowned for its ability to evolve so that new strains emerge annually, giving rise to yearly epidemics in avian and human populations. Most recently, the H₅N₁ strain has continued to emerge in Southeast Asia and almost has all the essential ingredients to shift into a global pandemic strain.

As human populations increase, groups of hosts with impaired immune systems are growing. In developed countries, advances in medicine, science, and technology have led to an increase in the number of people who are immunocompromised. Cancer patients and transplant patients are examples. The staggering increase in AIDS and HIV infections worldwide has led to increases in zoonoses and re-emergence of latent infections. Concurrently, in a number of these countries the fastest-growing cohort of the population are individuals over the age of 60 years. This population will likely have increasing susceptibility to food- and water-borne pathogens and zoonoses, and will possibly be susceptible to a resurgence of childhood diseases. Because the world population growth will grow disproportionately more rapidly in less developed countries, infectious disease agents will continue to take their toll. Host susceptibility to infection is aggravated by malnutrition and poor hygienic conditions. In parts of the world where livestock and poultry production systems are growing rapidly, a progressively larger number of animals are confined closer together, which favors pathogen dissemination. In production systems where animals have been reared for maximal production performance, huge pristine populations of genetically similar animals are especially susceptible to introductions of novel pathogens.

The world’s population quadrupled in the last century and continues to increase by 80 to 100 million people each year. In addition, there has been a mass relocation of rural populations to urban areas, which has been one of the most important demographic trends in the latter part of the 20th century. According to the United Nations, the world’s urban population was 2.9 billion in 2000 and is expected to
reach 5 billion by 2030.\textsuperscript{3} The interactions of these changing and growing populations with animals and animal products are also increasing in an unprecedented manner, and the prospect of the appearance of emerging and re-emerging zoonoses continues to be a predictable outcome.

Ecological and environmental conditions also help determine the epidemic potential of emerging zoonoses. The emergence of Sin Nombre virus and other hantaviral agents offers an excellent example. Hanta viruses are found worldwide and are transmitted from rodents via dried excretion to humans. Rodent populations and hanta virus infections vary temporally and spatially. When environmental conditions are favorable, rodent populations, as well as the associated prevalence of human diseases can increase dramatically. Since the mid-1970s more than 20 tick-borne infectious diseases have been newly identified in humans. These emerging diseases have animal reservoirs and, for a variety of reasons, people are increasingly becoming exposed to tick vectors and associated pathogens. Lyme disease, for example, has progressed from a virtually unknown problem to a clinically significant endemic disease in certain parts of the world, including the U.S., Europe, and Asia.

Although the spread of disease is multicausal, global climate change may be a significant contributor. Weather and climate can influence host defenses, vectors, pathogens, and habitats. There is a growing body of data that demonstrates the impact of weather on infectious disease. Ross River virus is a mosquito-borne disease found throughout Australia, and outbreaks are sensitive to excessive rainfall events. Malaria and dengue fever are two other mosquito-borne diseases that are likely to spread dramatically with global warming. Global warming may help expand the distribution of other vector- and water-borne diseases such as yellow fever and cholera. El Niño/Southern Oscillation (ENSO) is a climatic process that produces changing patterns for rainfall and drought, which, in turn, have influenced vector and host populations and disease. Outbreaks of Hantavirus Pulmonary Syndrome (HPS) have been exacerbated by the ENSO phenomenon. In addition, leptospirosis and Rift Valley Fever are zoonotic diseases that have changing patterns of occurrence based on climatic conditions that produce excessive rainfall.\textsuperscript{4}

The phenomenon of globalization has been one of the most remarkable changes in our lives over the last quarter of a century. Globalization has been the driving force that has profoundly impacted international trade, economics, and cultural interactions. The spatial mobility of the average human has increased more than 1,000-fold since 1800. At the turn of this century almost 700 million people traveled internationally and this number is expected to reach 1 billion by 2010.\textsuperscript{5} Not only are more people traveling, but travel is faster, more
C. USAHA/AAVLD PLENARY SESSION

culturally widespread, and permeates into areas of the world not readily accessible in the past. People, animals, and products can circumvent the globe faster than the incubation period of almost any pathogen known today.

During 2003, the U.S. experienced concurrent infections of SARS, West Nile virus, and monkeypox. None of these zoonotic pathogens had ever been found in the western hemisphere before these introductions. The spread of influenza viruses is a global phenomenon found in human, animal, and avian populations – sometimes independently and sometimes as a result of their interactions. Most infectious disease experts believe that we await the next major influenza pandemic, and it will almost certainly be defined by a genetic transfer involving multiple species.⁶

Food-borne illnesses continue to be a major factor in infectious disease epidemiology. More than 200 food-transmitted diseases are known today. The expansion of the global trade of food products over the last few decades has ushered in an era where there has been a significant increase in the scope and range of food-borne illnesses. The total meat (beef, pork, and poultry) exports worldwide for 2004 is estimated to be 17.7 million tons, which is an increase of approximately 5 percent from 2003.⁷ The food system is complex and global, and provides another opportunity for the movement of pathogens into new hosts and populations.

It is interesting to note that over the last decade, a listing of CDC’s most significant global epidemics demonstrate that all the diseases are zoonotic except the Norwalk-like virus outbreaks of 2002. Yet, we also recognize that even noroviruses are significant pathogens for a number of animal populations.

The ability of pathogens to cross species and infect multiple hosts is an ingenious adaptation that also favors their survival. It is estimated that up to 60 percent of human pathogens are found in multiple species and, perhaps, up to 80 percent of animal pathogens are capable of infecting other species of animals. As our human populations grow and domestic and wildlife populations increase, the interactions among them also increase; thus, we are likely to experience more pathogens crossing species lines. BSE, Nipah virus, SARS, and Type A Influenzas have been highly publicized and scrutinized in their abilities to leap from animal hosts to humans with profound consequences.

In an individual microbe’s world, its ecological milieu is limited only by the microbe’s mobility and its ability to adapt and tolerate various factors in its existence. Wherever the conditions are favorable, it will eagerly take hold and help create and redefine a new ecological niche and potentially alter the dynamic of hosts and vectors that share this niche. Microbes are engaged in a constant competition; they evolve, adapt, swap genes, and undergo endless experiments to gain a sur-
vival advantage. As our world populations increase and expand and our potential exposure experiences with microbes and new hosts increase, the ecological balance certainly favors the survival and domination of microbes and emerging zoonoses.

Infectious zoonotic diseases are a continuing threat to our animal and human populations worldwide. They produce suffering and death and impose enormous financial burdens on society. Some countries have made significant advances in the prevention and control of these diseases, while others continue to struggle. Yet, all nations are now threatened by emerging zoonoses and the re-emergence of old pathogens in different locations, and often in different forms.

While zoonotic diseases have always been a part of our lives, the convergence of animal and human health over the last two decades and the creation of new emerging and re-emerging pathogens has been unprecedented. The mingling of animals, both domestic and wildlife, animal products, and people has created a microbial milieu that not only favors the emergence of zoonoses, but suggests that this era of emerging and re-emerging zoonoses will likely continue unabated.

Thus, there has never been a time in which veterinary surveillance has been more important in protecting the public’s health and well-being. Emerging zoonoses are very likely to continue as major human medical events. There is a paucity of research and knowledge about most of these emerging infectious diseases. The improvement of our understanding of these diseases, their dynamics, conditions for emergence, change, maintenance, and hopefully their prevention, will, in part, center on detection, diagnosis, and surveillance systems and capabilities.

Several recent reports also confirmed that the convergence of animal and public health have created both opportunities and challenges. In 2003, The Trust for America’s Health published a report entitled, Animal-borne Epidemics Out of Control: Threatening the Nation’s Health. This report emphasized that the U.S. lacks a national program to prevent and control diseases that impact humans, animals, and our food and that there is a lack of effective communications with the public concerning these zoonoses and their potential impact. In addition, the report discussed the fragmentation of jurisdictions, authorities, statutes, and research to detect and respond to zoonotic diseases and that animal and human disease surveillance systems are not linked.

The Institute of Medicine’s seminal report on Microbial Threats to Health drew similar conclusions. Moreover, this report recommended the need for a more global system including an enhanced global disease surveillance system. The report pointed out the need for exploring innovative systems for surveillance; better connecting domestic animal and human surveillance systems; establishing a comprehensive infectious disease research agenda; and, creating interdiscipli-
There is significant concurrence from both the animal and human health communities that an improved, combined global surveillance system is a key to the detection and effective response to zoonotic diseases. Our world is interconnected in numerous ways that favors the continuation of our era of emerging zoonoses. We need effective surveillance systems to achieve the following outcomes: enhance our ability to more rapidly recognize naturally occurring disease outbreaks; improve the identification and tracking of emerging diseases; better monitor disease trends; make better decisions on cost-effective intervention strategies; and, enhance our ability to gain an understanding of contemporary and emerging zoonoses.

We live and work in special times with regard to animal and public health and the convergence of these two communities. While the cultures of these groups are quite distinct and our past relationship often tenuous, the future success of both groups is dependent on a new collaborative and more trusting partnership. The integration of animal and human health surveillance systems can be the building block to create this partnership anew. From the veterinary perspective, we just need to remind ourselves that the Veterinarian’s Oath specifically contains the pledge to promote public health. Thus, improving the public’s health and well-being is not an option; rather, it is a long-standing obligation and responsibility.

Recent reports and the abundant evidence that our emerging infectious disease era will continue into the future unabated, collectively present a unique opportunity and compelling “call to action.” Critical to this call to action are the following recommendations:

- Linking domestic animal, wildlife, and public health surveillance systems
- Integrating diagnostic laboratory systems and results from animal and human health diagnostic facilities, beginning with the inclusion of veterinary and animal health diagnostic labs in the Laboratory Response Network (LRN)
- Enhancing global surveillance systems for emerging zoonoses
- Creating zoonotic disease centers that emphasize interdisciplinary teams for research that will improve our knowledge and understanding of contemporary zoonoses
- Improving the knowledge, ability to recognize, detect, report, and respond to emerging diseases, either naturally or intentionally introduced, for frontline personnel across the animal health community
- Optimizing the use of private veterinary practitioners and veterinary technicians in the recognition and response to foreign animal diseases, agents of bio- and agroterrorism, and emerg-
C. USAHA/AAVLD PLENARY SESSION

- Adopting a multifunctional approach for disease surveillance that includes bio- and agroterrorism, emerging zoonoses, exotic diseases, and re-emerging endemic diseases.
- Coordinating the education and training of a new infectious disease workforce with the skills and knowledge to be successful in a future characterized by the convergence of human and animal health.

The scope, scale, and consequences of emerging zoonoses and the growing interdependence of the human and animal health communities represent significant changes in our lives and in our work. Zoonotic diseases now have the potential implication of threatening national security, in addition to causing profound health consequences. The animal health community has a wonderful opportunity to proactively lead the way towards an improved animal and human health partnership. Certainly the USAHA, as it enters its second century of operation, has an opportunity to exert the necessary leadership to reinvent this strategic relationship for the benefit of both human and animal health.

NOTES
In both veterinary and human health systems, it is vital to know the health status of populations, in order to allocate resources towards maintaining, or improving, the health status of that population. This knowledge also has a spin-off value in informing about the research questions that need answering to improve disease control. Obtaining information about the health status of populations, often through formal and informal surveys, is therefore a key activity and this process has been termed monitoring. The second component of the health maintenance system is the prevention, control, or elimination of untoward events (e.g. disease) through the implementation of the appropriate response (e.g. increased surveillance, stopping animal movement, or initiating vaccine programs) as a response to the information obtained. When combined into one system, these two components are called surveillance. Thus, surveillance is the explicit strategy for detecting a disease, agent, or elevated risk of either of these, in populations with the intent of having elements of the system respond to any untoward findings in a timely and effective manner. This paper largely focuses on the first components of the surveillance system; namely how to obtain and analyze the information required. This area has seen a lot of activity in recent years, partly because of the failures of previous systems, partly because of technologic advances in laboratory methods and data management/analysis, and partly because of the recognition of the benefits of tying some aspects of animal and human health surveillance together.

Many surveillance systems are a combination of a number of sub-systems with built-in functions for timely sharing of data within and across systems. It should be obvious that high quality laboratories are central to the success of almost every surveillance system. Building on this, a key objective of this paper is to stress the critical need to integrate epidemiologic and laboratory surveillance functions. The diagnostic data must fit into the context of the populations of concern.

At one time surveillance was seen as a component of epidemiology, however, today surveillance is viewed as a separate activity although it continues to use many principles and methods of epidemiology. Epidemiology may be described as the science of health in populations. Thus, it seems that epidemiologic methods can help inform the design and operation of surveillance systems. In practical terms, although surveillance is very action-oriented for rapidly spreading seri-
C. USAHA/AAVLD PLENARY SESSION

ous diseases, and/or diseases, the distinction between surveillance and the epidemiologic approach often gets blurred for non-emergency health problems.

Given the wide interests and mandates of the United States Animal Health Association and American Association of Veterinary Laboratory Diagnosticians in emerging and exotic diseases, in world trade of animals and animal products, in food safety, and in zoonoses, the complexity of surveillance systems can be seen readily. Further, since the process of surveillance is best understood in the context of specific outcomes, as examples of agents, or diseases, of interest we might select the widespread concern over Bovine Spongiform Encephalopathy, highly pathogenic Avian Influenza, West Nile virus, SARS, Foot and Mouth Disease virus, foodborne pathogens such as multi-resistant Salmonella newport, as well as other agents (e.g. Bacillus anthracis, Yersinia pestis) that are naturally occurring disease agents but also agents that could be used by terrorist organizations. If a dedicated system is needed to effectively “survey” one disease, when we multiply this by all the known agents/diseases (or just the list of agents mentioned above) and add in a number of current unknowns about each disease, the task is formidable. Knowledge of the multi-causal will affect the structure and operation of the surveillance system. A few large-scale factors that we must be mindful of include the impact of increasing human and animal travel and trade, the variation in animal housing and management systems among nations, the increasingly centralized integration of the animal industries, and ecologic issues such as the impact of global warming, habitat change, and pollution on disease agents and their hosts.

The nature of surveillance systems

Surveillance has a number of axes; it can be targeted toward specific diseases, in one or more populations, or it can “scari” defined populations for a variety of diseases. Surveillance can be active or passive. By active we mean that the surveillance strategy dictates who will be sampled and when and where the sampling will occur—i.e. the system actively tries to find the agent or population at increased risk. In passive systems, others outside the direct employ of the system are relied on to determine if and when samples will be submitted or authorities notified. Surveillance can be based on primary data (i.e. data collected specifically for the surveillance purpose), or on secondary data (i.e. data collected for purposes other than the surveillance purpose are used as part of the surveillance system). In reality, most systems use a mixture of these features, so hard and fast rules about the merits of one approach over another are not very rewarding. In addition, surveillance can be directed towards endemic, epidemic, or emerging diseases. These different outcomes are very instrumental in setting
C. USAHA/AAVL D PLENARY SESSION

the context and constraints for the operation of an effective system. For example it seems obvious that a system designed to survey dairy cattle in North America for the presence of Bovine Virus Diarrhea Virus persistently infected animals (PIs) would have very different objectives and design features than a system designed to detect the entry or presence of an exotic agent such as FMD.

Step 1: Setting the objectives

Many authors have stressed that establishing objectives is the first step in developing a surveillance system, and we would add that this is true when modifying an existing surveillance system also. Since surveillance systems are an essential component of population-based health care systems, the nature and objectives of the health care system will largely dictate the objectives of the surveillance system. For example, in a reasonably stable environment, most surveillance systems are designed to obtain routine demographic data on health events (births, age structure, growth patterns, survival, and replacement patterns) to determine if there might be a “health” problem, and if so where it is located. With this information in hand, the system should provide for ongoing data collection on a set of “the usual” diseases, thought to impact on each of the selected health outcome(s). However, if the objective is to prevent the entry of “foreign” diseases, or the emergence of new diseases, then the health data gathering phase will be omitted, or constrained, in favour of targeting resources directly towards detecting the agents of concern.

Often, it is wise to use a risk assessment approach to help decide how much effort to devote to specific agents, or classes of disease. Such assessments are based on the frequency of the agents, their major modes of transmission, the likelihood of an agent reaching a susceptible population, and the consequences resulting from that “introduction” or the persistence of that agent in the population. In any event, setting the objectives also leads to defining the population(s) to be surveyed.

Step 2: Defining the population(s) that will be surveyed

Identifying and defining the population(s) to be surveyed is not always a straightforward matter. In addition to our food animal species, surveillance of wildlife (including game farms) is crucial for our understanding and controlling a variety of diseases such as those affecting humans (West Nile, SARS virus, Hanta virus) or domesticated animals (Avian Influenza, Rabies, Tuberculosis, Rinderpest) as well as diseases of importance for wildlife per se (West Nile, botulism). Indeed, it is likely that many emerging diseases will arise from wildlife sources. For foodborne disease surveillance, since many have domesticated animals as the ultimate reservoir (e.g. E coli 0157 in cattle) it
C. USAHA/AAVLD PLENARY SESSION

will be important to focus surveys on a number of populations such as surveillance of agents at the animal and farm level, areas of contamination in the slaughtering process, and on food handling in transportation and markets, as well as outcome data derived from clinical illness in the target species (humans)—which we recognize are notoriously under-reported. Thus, it is becoming obvious, that in order to resolve many of the infectious diseases of humans it will be necessary to have collaborative systems between human and veterinary medicine so that a broad spectrum of populations can be surveyed.

Step 3: Defining “who” within the population will be surveyed, as well as the “when” and “where” for sampling and testing

Often, an explicit sampling frame is not available for the full population(s) of interest. Thus obtaining a list of all the beef producers, or poultry owners (including backyard flocks) in a state or province may be difficult. For many passive surveillance systems the sampling frame is even harder to define since the use of, or involvement in, the system is often voluntary. For domesticated species, suitable sampling frame lists are becoming available, but many of these are of limited value for disease control purposes because they often lack the detailed geographic location of the premises. Many of the limitations of current lists only surface when explicit simulations of outbreaks are used, and such simulations are valuable for a variety of reasons including testing the ability of the crucial players, such as laboratories and the data management teams to “ramp-up” their activities in the face of a serious outbreak. Some of the issues involved in selecting the actual sampled sub-populations can be explained using the surveillance streams for surveying cattle populations BSE. These streams include high risk animals such as clinical suspects, fallen stock, culls submitted for slaughter, and clinically healthy slaughter cattle. In endemic countries, since each of these streams is a biased sample of the total cattle population, it is necessary to adjust surveillance data for the proportion of animals, and their ages, going through each of these streams in order to estimate, accurately, the overall prevalence. For countries that are “free” of a disease such as BSE, these same adjustments can be used to estimate the likely upper prevalence of the disease in the country.

Step 4: Designing a suitable sampling plan for surveillance

Sampling plans need to bear in mind two broad objectives e.g. whether the survey is to detect disease, as in emergent situations, or to estimate the prevalence of a disease, as in endemic situations. Determining the sample size for detection of disease requires that we specify the desired confidence level (usual default is 95%), and the likely frequency of the disease (\( p \)) if it is present. If the sensitivity of the test was only 80% we would need to test an additional number of cattle...
for equivalent confidence. Since test errors often need to be considered, specialized software is available to assist in finding the optimum sampling strategy.

In order to obtain the sample size required to estimate the prevalence of a disease we require the confidence level, the likely prevalence and how close to the likely prevalence we want our answer to be. This approach to sample size estimation is relatively straightforward for simple, systematic, and stratified random samples where the sampling unit (e.g. animal or herd) is the unit of concern. However, often we sample from a higher organizational level (e.g. pens, farms, of provinces/states) using cluster or multi-stage sampling designs and we need to consider the amount of correlation in the response variable (e.g. disease status) between elements within the same sampled unit (e.g. animals within a farm). This is usually expressed as the intraclass correlation coefficient (ICC). This increases the actual variance in our sample estimates, so the more “alike” animals within a herd are, the larger our required sample, and the larger the number of animals we select per herd, the larger our total sample size becomes. Whatever the final sample size, the most economical design which balances costs and precision can be ascertained. Although cluster sampling is sometimes used for practical reasons, the two-stage approach is often much more efficient. This is because almost all the diseases we test for are expected to spread to other animals within a group (this leads to correlation between animals within the same group and hence sampling too many animals per group only provides redundant information.

If we are interested in the status of the group (e.g. Herd), we need to know the group level sensitivity (HSe) and specificity (HSp) and may wish to alter the final design after considering these. Software programs such as FREECALC and HERDACC are available to assist with this process. Other authors have written more complex programs that allow one to specify the necessary information about the population of interest, the proposed sample size, and test characteristics (including their variances); the program then simulates the likely outcome as if the process is repeated many times and also allows the investigator to find pivotal parameters that have a large effect on the results.

Step 5: Deciding what specimens/(or data) will be needed

Many surveillance systems use secondary data and, for example the merits of practitioner reporting systems, textual data mining from published reports in newspapers and the broadcast media (e.g. almost 65% of human disease outbreaks are first reported informally in the media), the internet, laboratory surveillance, and slaughter-based surveillance for disease outbreaks have been discussed. Human health surveillance systems are using additional detection systems such as
syndromic surveillance, data on physician visits and emergency room admissions, telehealth data, and data on sales of biological products as additional early warning systems for communicable diseases. Each source of information tends to have its own strengths and weaknesses, but many solitary approaches suffer from either inadequate coverage (therefore low ability to detect disease) and/or poor timeliness of detection. Thus, rather than relying on a perfect system to detect potential problems, most surveillance systems will incorporate a number of “detection approaches” in order to obtain maximum benefit from the combination of “imperfect” subsystems.

From a diagnostic perspective, a clear case definition is necessary to determine the appropriate specimen(s) and test(s) in a manner that will distinguish between truly positive animals (i.e. maximize sensitivity) and disease free animals (i.e. minimize false positives). The biology of the disease, agent and host-agent interactions must be considered when compiling a case definition. Tests applied to specimens that would detect disease in one phase of the disease may not be useful in another phase. Thus, often diagnosticians will use a combination of specimens and tests in order to obtain the greatest probability of detecting the agent(s) or an immunological response to the agent(s).

Most surveillance systems require laboratory tests to detect either the agent (or more recently just an antigen or nucleic acid), the immunological response to the agent, or both. The test(s) must account for the urgency with which the surveillance information is needed: expediency is utmost in the diagnosis of an exotic reportable disease, whereas a lag phase of several weeks may be acceptable when determining the prevalence of an endemic disease. A perfect test would correctly identify truly infected animals (diagnostic sensitivity \(\text{Se}_D\)) and disease free animals (diagnostic specificity \(\text{Sp}_D\)) 100% of the time. Unfortunately, few, if any tests are perfect. Those designing surveillance systems must critically evaluate the methodology and the reference population(s) of animals used for diagnostic test validation. Ideally, the new test is compared to a gold standard. Since perfect tests are rare, often new assays are compared relative to the current standard test. If a very effective standard test is not available, statistical approaches can be used to provide estimates of Se and Sp. Application of multiple tests to samples from the unit of concern may be a cost effective and efficient approach. Positive results on screening using a test with high sensitivity could be followed by a test with high specificity to help eliminate false positives.

Rapid advances in molecular techniques has fostered the sub-discipline of molecular epidemiology, and newer methods can test large numbers of specimens in a short time period, and differentiate between antigenically similar, but distinct, organisms. Routine application of relatively new technology such as microarrays for identifying
specific nucleic acids, proteins, glycans, viruses, drugs and other molecules is on the horizon and will likely soon be integral to surveillance.

**Step 6: Deciding how the information will be maintained and analysed**

Advances in the computerised storage of large databases are beyond the scope of this paper, but they provide the opportunity for advanced analyses as well as convenient sharing of data among a number of agencies. Frequently, survey data are derived from non-random samples of the population and techniques to formally indicate the uncertainty in these data are very helpful. In addition, even when data are derived from true random samples there are many sources of uncertainty that must be considered to derive a formal estimate of the variance in the statistic of interest. In complex sampling designs, it is very difficult to obtain these estimates using traditional statistical approaches and these are being replaced by data-driven estimates using Monte Carlo Markov chain re-sampling methods, often supplemented by Bayesian methods. In Bayesian methods one starts with the knowledge available before the tests are done (prior estimates) and then modifies this knowledge based on the information contained in the data (e.g. the test results), to obtain posterior estimates (e.g. predictive values).

Beyond obtaining estimates of the mean level of an agent and the uncertainty associated with that knowledge, it is becoming increasingly important to relate these data to specific geographic areas. Computing power and software availability have made this much easier and it adds considerable power to the surveillance system. In addition this technology is used within simulation models designed to help improve our abilities to detect and control selected diseases such as Foot and Mouth disease and Classical Swine Fever models, as well as endemic diseases such as IBR.

Similar advances have been made in the investigation of temporal patterns of endemic diseases (or epidemic diseases for that matter). It is often necessary to formally examine the data for seasonal and cyclic patterns as well as for trends to establish the optimal control procedures. In addition, analytic techniques are being studied to “set off alarms” if the disease frequency surpasses a specified threshold. Thus in addition to the knowledge residing within the laboratory to confirm the cases, it is the clustering of the cases in space and/or time that sets of the alarm and initiates the system response.
Bovine spongiform encephalopathy (BSE) is a transmissible spongiform encephalopathy of cattle, first detected in 1986 in the U.K. and subsequently in other countries. The Transmissible Spongiform Encephalopathies (TSE's) or Prion Diseases are slow fatal transmissible CNS diseases that occur in a variety of mammals, including humans. They can be experimentally transmitted to rodents. They are characterized by prolonged incubation periods of months to decades. Infection can occur from ingestion or parenteral inoculation. TSE’s are always fatal and there is no effective pre- or post-clinical treatment. In addition, there is no sensitive, pre-clinical diagnostic test available. The prion etiology is infectious, sporadic and genetic; all forms are infectious upon subsequent passage. Results of infection are a neurodegenerative and amyloid disease with a short clinical course once signs develop. The neurologic involvement includes cognitive, motor and sensory impairment. The exact nature of the infectious agent is still unclear.

Here we report on the prion protein polypeptide profile and genotype from the first case of BSE diagnosed in the United States. The six-year old Holstein cow, imported into the State of Washington from Canada in 2001 was non-ambulatory at slaughter December 9, 2003. By December 22, 2003 formalin-fixed obex area of the brainstem was found to contain spongiform changes by histopathology and extensive deposition of the abnormal form of the prion protein, PrPres, by immunohistochemistry (IHC). Western blot analyses and an enzyme-linked immunosorbent assay using brainstem and cerebellum derived from fresh tissue from the suspect animal revealed positive results. Comparison of the U.S. BSE isolate to the Canadian BSE isolate and European BSE isolates showed similar sized PrPres polypeptide fragments. In addition, the PrP gene from the U.S. BSE case was found to be of bovine origin with a normal cattle PrP sequence. We conclude from these studies that the PrPres profile from the first BSE case diagnosed in the U.S. showed similar molecular properties to the typical PrPres pattern described for the earlier Canadian and European BSE isolates, and that a germline mutation in the bovine PrP gene was not evident. The animal was most likely exposed to contaminated feed.
C. USAHA/AAVLD PLENARY SESSION

APHIS, in cooperation with FSIS and FDA has implemented an intensive national BSE surveillance plan. This one-time effort will help to define whether BSE is actually present in the U.S. cattle population and if so, provide better estimates of the level of disease. The goal of this plan is to test as many adult cattle in the targeted high-risk population as possible in a 12-18 month period (plus 20,000 healthy slaughter cattle). The animals sampled will be over 30 months of age as evidenced by the eruption of at least one of the second set of permanent incisors. Selection will be from non-ambulatory cattle, cattle with CNS signs and/or rabies negative cases, cattle exhibiting other signs that may be associated with BSE and dead cattle. If a total of 201,000 samples is collected, this level of sampling would allow us to detect BSE at the rate of 1 positive in 10 million adult cattle at a 95% confidence interval. If a total of at least 268,500 samples is collected, this would allow detection BSE at the same rate with a 99% confidence interval. This program could detect BSE if there were only 5 positive animals in the targeted population in the entire United States.

In the surveillance plan, a laboratory diagnosis/case definition is made if one of the following criteria is fulfilled:

- Positive results by Rapid test and IHC
- Positive results by Rapid test and Western Blot – in case sample is not suitable for IHC or brain stem architecture is not evident
- Positive results by IHC only – in case no appropriate fresh brain tissue (formalin fixed) is available to employ either a Rapid or Western Blot test.

Thus far, the yield of positive cases from surveillance of high-risk cattle has been very low. Only one imported case was identified from among more than 70,000 animals sampled up to May 2004. No additional cases have been identified from approximately 95,000 high-risk cattle tested by rapid test since June 1, 2004 through the time of this meeting in October 2004. Thus, BSE appears to be a rare disease in the United States.
Avian influenza virus (AIV) is well known for having a broad host range, including humans, and for its high mutation rate. It also causes a wide range of disease in our domestic poultry species, including asymptomatic infections, mild respiratory disease, serious respiratory disease with some mortality, and systemic disease with high mortality. The reason for this wide range of clinical disease is related to several factors, including how well a virus is adapted to the species in question. Avian influenza is normally an infection of wild birds including ducks, gulls and shorebirds, and from this wild bird reservoir the virus can spread to our domestic poultry species. AIV can also be well adapted for one species and not for another and this can result in a virus causing serious disease for one species and be asymptomatic in another species. For example, highly pathogenic avian influenza causes high mortality in chickens, but in ducks it often causes no clinical disease, although the ducks can be infected and shed virus. This variability in disease expression can complicate disease eradication efforts, since clinical disease can’t always be used to identify infected poultry flocks.

AI infection in poultry is divided into low pathogenic avian influenza (LPAI) and highly pathogenic avian influenza (HPAI). LPAI causes primarily a respiratory infection that may result in mild to serious disease. HPAI causes a systemic disease with high morbidity and mortality. HPAI viruses are produced from the mutation of LPAI in poultry and are restricted to the H5 and H7 subtype. Transmission of AIV is primarily by direct bird to bird contact or through viral contaminated fomites (people moving infected birds or equipment). Other minor routes of spread are possible including aerosol or mechanical or biological vectors (mice, wild birds). AIV results in an acute infection that is generally cleared by the bird 7 to 10 days after infection – or the bird dies within 10 days. AIV is not persistent in individual birds, but potentially may persist in large flocks or live bird markets (LBMs). Detection and duration of antibody response by AGID or HI begins between three and eight days post infection, peaks at around two weeks and declines to threshold values by 150 days for AGID while persisting longer for HI.

Surveillance tools for AI can include detection of clinical signs (prevalence of disease) as well as use of diagnostic tests. These assays can include prevalence of past infection by antibody detection using AGID,
C. USAHA/AAVLD PLENARY SESSION

HI and ELISA as well as virus detection (prevalence of current infection) with virus isolation, real-time RT-PCR and antigen capture ELISA. In a poultry flock, for poultry adapted to AIV, nearly 100% of the flock will be infected. Individual birds will not be infected at the same time, and may be shedding virus or seroconverting at different times. A combination of direct virus detection and serology is unlikely to miss a positive case.

In general the methods for determining prevalence of infection for AIV can be summarized for three distinct avian populations, wild birds, large commercial poultry operations, and small commercial poultry operations.

The virus is endemic in wild birds, and during parts of the year a high percentage of certain birds will be actively infected, for example, mallard ducks in the fall of the year. For most wild bird surveillance programs, efforts are made to isolate and characterize avian influenza viruses to better understand the ecology of the virus. Wild bird surveillance in ducks, gulls and shorebirds represent natural reservoirs for AI. The complete host range is unknown, but all type A influenza viruses in domestic animals and man originated from wild birds. Virus isolation is the primary tool for this group, since serology is of little value. Important to this work will be effective subtype determination and sequence. Overall, the goals of wild bird AI surveillance are to better understand the ecology of AIV in wild birds and to develop a sequence database for wild bird AI viruses. This will improve understanding of virus variation in wild bird isolates and elucidate how viruses adapt to domestic animals. From this information, a database can be developed to help prepare diagnostic reagents.

For our large commercial poultry sector, AIV infections are rare, with relatively few outbreaks occurring each year. However, extensive testing is performed for AIV, including both passive and active surveillance. Most of the active surveillance, primarily using serologic testing, is performed to satisfy requirements for export of poultry or poultry products or through programs like the National Poultry Improvement Plan. During outbreaks of AIV however, direct detection methods such as virus isolation or RRT-PCR are necessary to identify actively infected flocks so that control measures can be used.

Specific goals of a surveillance program in commercial poultry are: 1) to assure that our poultry is free of AI infection for trade purposes. As such, program transparency is important and positive tests of any subtype may result in trade embargos; 2) to identify introduction of disease, where early diagnosis can prevent costly outbreaks, and as well to cover concerns for introduction of foreign animal disease introduction; 3) to provide consumers assurance that the domestic food supply is sound. Surveillance in commercial poultry is a combination of active and passive approaches. Active surveillance includes state surveillance...
C. USAHA/AAVLD PLENARY SESSION

by slaughterhouse-serology sampling; the National Poultry Improvement Plan (NPIP) program for breeder birds; the NPIP Clean program for layers, broilers and meat-type turkeys, and Passive surveillance—response to clinical disease.

Current AI surveillance activity is marked by data from NVSL in 2003. AGID reagents totaling 1,737,480 were sent to state laboratories. Diagnostic surveillance by VI and RRT-PCR comprised 15,267 and HI assays for Import/Export amounted to 214,700 for the year. State and private laboratories conduct AGID, ELISA, VI and RTT-PCR diagnostic surveillance. Most of the integrated poultry industry is free of avian influenza with a few exceptions in fiscal year 2003 and those include H7N2 chickens in CT; H6N2 chickens in CA; H8N4 turkeys in CO; Sporadic cases of swine influenza in turkeys.

The most complicated area for surveillance is with the smaller commercial poultry industry, which includes live bird markets (LBMs), gamebird producers, gamefowl owners, hobby farmers, and organic growers. The incidence of AI infection in these groups is higher for several reasons, including the increased opportunity for gallinaceous and waterfowl to be on the same property (ex. LBMs), greater exposure of to wild birds, and often lower biosecurity standards. The many small flocks are also not well documented and the flock owners typically do not have a history of working with state officials in surveillance programs. Efforts to reach out to this population of poultry growers is increasing, since this is considered to be the most likely source of introduction of viruses to the large commercial poultry sector, and active and passive surveillance programs are increasing for this segment of the poultry industry. Gallinaceous birds entering LBMs are generally serologically free of AI. Surveillance has been direct detection of AIV for birds entering the market and birds at the markets. Most AIV isolated in the U.S. are LBM associated among one another, but not associated with a commercial outbreak. Populated markets are typically depopulated, cleaned and disinfected. The wide variety of species sold in the markets contributes to the problem. Uniform standards for LBMs have been proposed. This would include obtaining birds from certified AI free flocks or tested birds and agreement to have surveillance at least monthly. Furthermore, surveillance will be conducted in the production and distribution systems and positive markets will be depopulated, cleaned and disinfected. Federal indemnity is available for depopulated birds.

Backyard and hobby poultry have experienced very little surveillance in the past. However, the recent Exotic Newcastle Disease (END) outbreak in the Southwest was centered in this poultry sector which created unique problems. Anecdotal evidence of introduction of virus from illegal importation of birds complicates effective surveillance. There is a current National Animal Health Monitoring System (NAHMS) pro-
C. USAHA/AAVLD PLENARY SESSION

gram and in APHIS effort related to END to do more surveillance in this sector. These sectors of poultry production have the greatest exposure to wild bird avian influenza viruses, and increased surveillance will result in more detection and isolation of AIV, and it has resulted in trade embargos. Surveillance of this sector is likely to provide early warning for potential problem viruses based on previous experiences in 1993.

Surveillance for AI has both pros and cons. There are multiple examples of early detection resulting in rapid control of outbreaks. Currently the LBMs and backyard poultry flocks remain the biggest risks, and surveillance in this sector will identify new viruses. However, detection may mean trade embargos and will require that we be prepared for and achieve a proper balance between overstating a problem and providing a rapid and protective early warning system.
EFFECTIVENESS OF SAMPLING AND TESTING STRATEGIES FOR DETECTION OF JOHNE’S DISEASE INFECTED CATTLE HERDS

S. Tavornpanich², C. Muñoz-Zanzi¹, I. Gardner², E. Raizman¹ and S. Wells¹

¹ Department of Veterinary Population Medicine, College of Veterinary Medicine, University of Minnesota, St. Paul, MN.
² Department of Medicine and Epidemiology, School of Veterinary Medicine, University of California, Davis, CA.

Introduction
Johne's disease is a very common and costly animal health problem on US dairy farms, occurring on at least 25% of Midwestern dairy farms, leading to losses to the U.S. dairy industry exceeding $200 million annually (Collins et al., 1994; Garry, 1999). In addition, controversy regarding potential public health associations between M. paratuberculosis and Crohn's disease persists (Naser, 2002). Current ELISA-based testing strategies fail to detect most dairy herds with low infection prevalence (Wells et al., 2002). On the other hand, preliminary evidence from bacterial culture of fecal pools and environmental sampling indicates these methods may be effective for detection of infected herds (Raizman et al., 2004; Tavornpanich et al., 2004).

The initial testing for herd status classification is a critical first step in the Johne’s disease control program as it provides the direction of future efforts (on-farm control or Herd Status Program); however, a better understanding of the interrelationship between the factors affecting the performance of the various testing strategies and a more quantitative comparison of their effectiveness are lacking. The objective of this study was to compare the effectiveness of various sampling and testing strategies to identify M. paratuberculosis infected herds.

Methods
Theoretical modeling was used to elucidate the impact of various animal, assay, sampling, and herd factors on the effectiveness of testing procedures to detect herds infected with M. paratuberculosis. The testing procedures evaluated in the model involved 1) ELISA testing of individual cows; 2) fecal culture testing of individual cows; 3) serologic testing followed by fecal culture of ELISA-positive cows; 4) culture of fecal pools from individually sampled cows; and 5) culture of environmental samples. Specific factors that were considered in the evaluation included herd size, within-herd prevalence, prevalence within subgroups of cattle, distribution of shedding in infected cattle, sampling method, sample size, pool size, and tests' detection limit. A logistic
A. USAHA SCIENTIFIC PAPERS

regression model was used to describe the mathematical relationship between the within-herd prevalence and the probability of a positive environmental sample. Assumptions for the model were obtained from real data from field studies, published reports, and expert opinion. Variability and uncertainty in certain model parameters were incorporated using probability density functions and empirical data.

Outcomes evaluated included herd detection probability, misclassification probability, within-herd prevalence, and cost-effectiveness of the testing strategies. A Monte Carlo simulation approach was used to compare the effectiveness of the various testing strategies. The model was run for 1,000 iterations which yielded a probability distribution for each outcome. The expected outcome and 90% prediction interval were obtained as the mean and the 5th and 95th percentiles of the distribution.

Results

Preliminary results showed that within-herd level prevalence and number of animals sampled were positively associated with detection probability. Assuming a herd of size 500 cows and low within herd prevalence, detection probability was the lowest for the strategy that included ELISA testing followed by culture. ELISA testing perform reasonably well (detection probability range from 0.8 to 1 when sample size ranged from 20 to 50) and to be cost-effective in identifying \( M. \) paratuberculosis infected herds. Under these same conditions, using pooled fecal culture increased the detection probability compared with fecal culture of individual samples. Culture of environmental samples yielded detection probabilities equal or greater than 0.8 when the number of environmental samples tested was 10 samples or higher.

Conclusions

The simulation model developed in this study combined the current state of knowledge of the epidemiology, pathogenesis, and diagnosis of Johne's disease. Results of this theoretical model can help us understand the impact of the various factors influencing the effectiveness of sampling and testing strategies for detection of infected herds. In addition, sampling and testing strategies can be compared quantitatively and recommendations can be made for future applications in the field, including their use in the Voluntary Johnes Disease Herd Status Program.

References

Garry, F., et al. APHIS Veterinary Services: Who can afford a $200
D. USAHA SCIENTIFIC PAPERS

**Introduction**

Bluetongue virus (BTV) infects sheep, cattle and other ruminants and is transmitted by biting midges, *Culicoides* spp. The virus is maintained in nature by the insect vector taking a blood meal from an infected ruminant host and then transmitting the virus to an uninfected animal during subsequent feeding. Virus transmission is interrupted in temperate climates during winter months when the insect vector is no longer active. Seasonal bluetongue disease outbreaks coincide with resumption of significant insect vector activity. Possible mechanisms for over-wintering of BTV and the seasonal transmission cycles include 1) the spread from areas of year-round endemic activity to areas of epizootic seasonal activity via the movement of vectors and/or animals, 2) prolonged persistence of virus in cattle or wild ruminants, and 3) virus persistence in the insect vector. In the latter, over-wintering of BTV in the insect vector could occur by infection and survival in the adult insect, vertical transmission of virus from the infected adult to its progeny, or a combination of these two events. We present an overview of the available evidence for persistence of BTV in the insect vector by these two mechanisms.

**Over-wintering of BTV in adult *Culicoides***

Adult *Culicoides* may provide a means for over-wintering of bluetongue virus in areas experiencing relatively mild winters. Host-seeking female *Culicoides* were captured throughout the year at a dairy in southern California (Gerry and Mullens, 2000). The potential for over-wintering of BTV, African horse sickness virus (AHSV), and epizootic hemorrhagic disease virus (EHDV) in different geographic locations was assessed based on a formula using average maximum and minimum temperatures necessary for *Culicoides* activity and flight. This model predicts that *Culicoides* activity could continue in areas experiencing milder winter conditions (western Turkey and southern Spain), but not in areas experiencing more harsh winter conditions (Madrid and British Columbia) (Sellers and Mellor, 1993). In areas of Morocco, where *Culicoides imicola* is most abundant, adult insects were found throughout the year, and could provide a means of over-wintering for
D. USAHA SCIENTIFIC PAPERS

AHSV (Baylis et al., 1997). An interesting observation was that the infection and replication rates of AHSV in *Culicoides* are temperature dependent. As the temperature was decreased, the infection rate fell to near zero; however, this subsequently increased upon raising the temperature (Mellor et al., 1998). Similar results have been demonstrated with BTV where no detectable virogenesis was noted in *C. sonorensis* fed a blood meal containing BTV but was detectable in these midges when the temperature was raised for 4-10 days (Mullens et al., 1995). Thus, at lower temperatures, virus may persist at an undetectable level in the adult insect, but replication may occur once the temperature is increased. It is possible that adult insects could survive in temperate climates experiencing more severe winters in protected micro-environments or habitats, and could serve as a source of virus transmission once they resume host seeking and feeding activity. However, this has not been reported to occur in nature.

Over-wintering of BTV by vertical transmission

In general, *Culicoides* over-winter as larvae and in the spring adults emerge (Jones, 1967). If adult *Culicoides* were infected in the fall with BTV and vertically transmitted this virus to larvae capable of over-wintering, infected adult insects could emerge with the return of more favorable weather and immediately transmit virus to a susceptible mammalian host. In an early report, virus could not be isolated from adult insects reared from eggs from colonized *Culicoides* females that had been infected with BTV (Jones and Foster, 1971). A later study was also unable to isolate infectious virus from similarly reared adult colony insects. However, viral antigen was detected by immunoelectron microscopy in proteid yolk bodies and in the vitelline membrane of developing oocytes in the infected females (Nunamaker et al., 1990). This finding suggests that the transovarial transmission studies may not be able to detect a low rate of vertical transmission or replicate environmental conditions required to induce physiological changes in the gravid female necessary for vertical transmission.

Support for vertical transmission has come from investigations of BTV replication in cell lines produced from *Culicoides* eggs, where the virus is not cytopathic and persists in these cells (McHolland and Mecham, 2003; Wechsler et al., 1989). To determine the mechanisms that may be responsible for establishment of BTV persistence, infection of one of these *Culicoides* cell lines (KC cell line) was monitored by virus assay and viral nucleic acid and antigen detection. Surprisingly, viral nucleic acid was detected by polymerase chain reaction (PCR) amplification in un-infected control KC cells. Bluetongue virus genome segments 3 and 10, which encode VP3 and NS3, respectively, were routinely detected by PCR; whereas, other segments (most notably 2) were not detected. Sequence analysis indicated that the same seg-
moment 3 had persisted in the cell line since its inception (Jensen et al., 1994).

Larvae from the AK colony, from which the KC cell line had been derived, have also been examined for the presence of BTV RNA segments. Similar PCR products were detected in the larvae as in the un-infected KC cells. The ABADRL established the AK colony from larvae collected during a BTV outbreak investigation. BTV isolates collected at the same time and location in Idaho were examined to try to determine the origin of the BTV RNA. There was a high degree of sequence identity to the BTV RNA from the AK larvae and the KC cells; however, there was also some sequence variation. This variation may have resulted from differences in circulating virus populations, mutations after Culicoides colonization, or establishment of a persistent infection in the insects prior to the BTV outbreak in this area (unpublished data).

Immunological staining was used to determine if BTV antigen could also be detected in the un-infected KC cells. Un-infected KC cells were negative for the VP7 core protein of BTV after 3 days in culture; however, after 10 days in culture, the cytoplasm stained positive for this protein. A year-old cold-adapted un-infected KC cell culture also showed cytoplasm staining for the VP7 protein. In addition, un-infected KC cells stained positive for the non-structural protein, NS3, after several days in culture (unpublished data).

Sonicated, un-infected KC cells and supernatant fluid from these cell cultures were used as inocula for infection of Aedes albopictus C6/36 cells, a mosquito cell line known to be susceptible to BTV, and BPAE (bovine arterial pulmonary endothelial- also designated CPAE) cells, a cell line with very high susceptibility to BTV (Wechsler and McHolland, 1988). No cytopathic effect (CPE) was seen, nor was infectious virus recovered, during successive blind passage of these cells following inoculation. Co-cultivation of KC cells with BPAE cells also failed to induce any CPE (unpublished data).

More direct evidence for vertical transmission as a mechanism for transeasonal maintenance of BTV was the detection of BTV RNA and antigen in Culicoides sonorensis field collected larvae in Colorado (Deines, 1995; Raich, 1995; White, 2001). Follow up studies, using RT-nested PCR, detected BTV sequences in pools of larvae and adults raised from larvae collected from these sites in two different years. The S7 RNA segment (which codes for VP7) was routinely detected, while the L2 RNA segment (which codes for VP2) was detected less frequently. No virus was isolated from these insects. Cell lines derived from Culicoides larvae collected at one of the sites (McHolland and Mecham, 2003) also had BTV S7 and L2 RNA sequences. However, L2 RNA was only observed using one primer set and not another, suggesting that only a portion of this viral genome may be present in these cells (White et al., 2003; White et al., 2004).
D. USAHA SCIENTIFIC PAPERS

Discussion

The available evidence supports over-wintering of BTV in adult *Culicoides* in regions experiencing relatively mild winters. This would allow the immediate resumption of host seeking behavior and virus transmission with the return of more favorable weather. In more temperate climates with harsher winters, this mechanism of over-wintering seems unlikely. However, protected micro-environmental niches in these areas could allow survival of some insects with subsequent virus transmission to susceptible hosts.

Transovarial transmission of several arboviruses has been shown to occur in other hematophagous insects (Aitken et al., 1979; Comer et al., 1990; Watts et al., 1973). An alphavirus, western equine encephalomyelitis, has been shown to exist in over-wintering mosquito larvae, and is recovered in the reared adults (Fulhorst et al., 1994). An orbivirus (Orungo virus) has been isolated from wild-caught male mosquitoes in the Ivory Coast (Cordellier et al., 1982), suggesting vertical transmission of that virus.

There is indirect evidence that vertical transmission may be a mechanism of BTV over-wintering in *Culicoides*. Bluetongue virus RNA and antigen were detected in *Culicoides* embryonic cell lines and in both laboratory and field collected larvae; however, efforts to isolate infectious virus have been unsuccessful. This virus, which we have termed host-specific persistent virus (HSPV), may exist in the insect cells in a non-productive state until an appropriate stimulus causes production and release of infectious virus. The VP2 and VP5 outer core viral proteins are thought to be essential for infection of mammalian cells by BTV, but not for infection of insect cells (Mertens et al., 1996). There is evidence that the inner core VP7 viral protein is the attachment protein for insect cells (Tan et al., 2001; Xu et al., 1997). If the HSPV is defective or down-regulated in its ability produce the outer-coat proteins (as suggested by the inability to detect the genes encoding them in un-infected KC cells), it may be unable to infect mammalian cells under most circumstances. This is supported by the lower rate of RNA isolation coding for the outer proteins compared to RNA coding for the inner core proteins in field collected larvae (White et al., 2003). The insect-transmitted plant reovirus, wound tumor virus (WTV) has been shown to lose dsRNA genome segments in a portion of the virus population after successive vegetative propagations (Reddy and Black, 1974; Reddy and Black, 1977). It is possible that a similar situation might also occur with BTV after successive insect propagations. A physiological signal(s) may be necessary for release or conversion of the HSPV to allow infection of susceptible mammalian cells. This conversion could be the up regulation of the outer capsid genome segments or cellular changes that favor replication of complete virions within the population. This signal could include stress responses to environmen-
nal conditions (temperature, etc.), or physiological changes initiated by taking a blood meal. The effects of stress signals on other persistent viruses have been reported (Feuer et al., 2002; Oglesbee et al., 1993; Way et al., 2002; Yoshinaka et al., 1999).

Epidemiological support for over-wintering of BTV is provided by molecular studies. Sequence analysis of various viral genes has demonstrated geographical topotyping of orbivirus isolates (Bonneau et al., 2002; Cheney et al., 1995; Gould and Pritchard, 1991; Mecham et al., 2003; Sugiyama et al., 1982; Wilson et al., 2000). Geographically distinct virus strains or populations could be maintained from season to season in either an animal host or insect vector. However, these analyses are complicated by a number of factors, including differences in mutation rates of the RNA genome segment analyzed and potential differences in the maintenance cycle for virus populations from different geographic locations. Not all individuals or populations of insects may be capable of vertically transmitting BTV, which may occur at a low frequency. If this is the case, amplification of the virus in susceptible animal host populations may be required before sufficient virus transmission occurs, resulting in notable disease. This may account for the typical late summer to early fall outbreaks of BTV epizootics in temperate regions. Rigorous and thorough investigations will be needed to determine if BTV over-wintering does occur in Culicoides and the affect this over-wintering has on the epidemiology of disease. These studies are complicated because of the complexity of the virus life cycle, involvement of multiple host species and differences in environmental habitats.

Understanding the maintenance of BTV in nature, in the absence of apparent disease outbreaks, may help in developing more effective risk management and control strategies for bluetongue disease. If vertical transmission occurs, earlier application of larvicides may be necessary to effectively control disease outbreaks. Rather than first proving vertical transmission before implementing control strategy changes, one approach could be to test earlier intervention in a defined area where larval habitats have been identified. If this proved effective in reducing bluetongue infections, it could be applied on a larger scale.

References
Bonneau, K.R., Topol, J.B., Gerry, A.C., Mullens, B.A., Velten, R.K.
D. USAHA SCIENTIFIC PAPERS


Jones, R.H. and Foster, N.M. (1971). Transovarial transmission of bluetongue virus unlikely for Culicoides variipennis. Mos-
D. USAHA SCIENTIFIC PAPERS

quito News 31(3), 434-437.


D. USAHA SCIENTIFIC PAPERS

of the United States and at different times. Am J Epidemiol 115(3), 332-47.


D. USAHA SCIENTIFIC PAPERS

RESEARCH CHALLENGES FOR BRUCELLOSIS ERADICATION

Philip H. Elzer
College of Veterinary Medicine
Louisiana State University
Baton Rouge, LA

Summary:

*Brucella* species are Gram negative, facultative intracellular pathogens that cause disease in man and animals. The primary hosts for *B. abortus* are cattle, bison and elk. With the eventual eradication of this disease in the U.S. domestic cattle herds, the bison and elk of the Greater Yellowstone Area (GYA) remain the last natural reservoir of brucellosis. The free ranging and infected wild animals in the GYA migrate from public land onto private lands and may come into contact with cattle. *Brucella*-induced abortions in both bison and elk have been documented under experimental and field conditions. Interagency negotiations culminating in the revised Yellowstone Bison Management Plan and Environmental Impact Statement have identified vaccination as one of the primary means of managing brucellosis in Yellowstone National Park (YNP) bison. Feral swine in the southern United States and caribou in Alaska are infected with *B. suis*.

There are many challenges which need to be addressed with regards to the eventual eradication of brucellosis in the United States. Another challenge is to find an efficacious vaccine which can be used to protect wildlife species. Complicating this issue is the mode of delivery to these animals which have a wide range of habits and habitats. Current commercially available vaccines do not appear to be the answer to these problems. Diagnostic tests and surveillance continue to be important in the eradication effort.

Numerous special interest groups have various stakes and agendas in the GYA with regards to the wildlife in this area. Although not an issue in the GYA, feral swine present problems for regulatory agencies in the United States due to management practices. Caribou in Alaska are also problematic since they can transmit the disease to farmed reindeer.

Current vaccines have been tested in these wild ungulates and have provided no to limited protection against virulent challenge of animals under experimental conditions. New vaccines are being investigated for their safety, pathogenicity, and vaccine efficacy. Once a suitable vaccine is found delivery methods can be tested for wide usage in these wildlife reservoirs.
D. USAHA SCIENTIFIC PAPERS

Discussion:

There are many challenges which need to be addressed with regards to the eventual eradication of brucellosis in the United States. Domestic cattle and swine are at risk of contracting this disease which causes abortion and infertility from numerous wildlife reservoirs. Elk and bison of the Greater Yellowstone Area (GYA) serve as a natural reservoir of *Brucella abortus*, and feral swine and caribou serve as natural reservoirs of *B. suis*. The primary concern is the commingling of animals in habitats or pastures which can lead to the transmission of these organisms from wildlife species to domestics. Another challenge is to find an efficacious vaccine which can be used to protect wildlife species. Complicating this issue is the mode of delivery to these animals which have a wide range of habits and habitats. Current commercially available vaccines do not appear to be the answer to these problems. Diagnostic tests and surveillance continue to be important in the eradication effort.

The GYA has a unique situation in that numerous special interest groups have various stakes and agendas with regard to the wildlife in this area. This adds to the complications that both the Federal and State agencies have with managing animals with this disease. Although not an issue in the GYA, feral swine present problems throughout the United States in that the socioeconomic issues of farming and hunting these animals are a regulatory nightmare. Caribou in Alaska present similar problems in that they frequently commingle with farmed reindeer and can transmit this disease.

Transmission of brucellosis has been documented from bison and elk to domestic cattle. Recently two states have experienced transmission of field strain from elk to cattle which has jeopardized their brucellosis status. Numerous times it has been demonstrated that feral swine are responsible for infecting cattle with *B. suis*. The same can be noted with caribou and reindeer in Alaska. All of these brucellosis wildlife reservoirs serve as a threat to domestic livestock and also to public health with this zoonotic disease.

Two *B. abortus* vaccines have been used as potential candidates to control this disease in wildlife. These vaccines are Strain 19 and Strain RB51. The USAHA Brucellosis Scientific Advisory Committee reviewed all of the pertinent literature regarding the use of these vaccines in bison and elk. The complete report can be found at [www.usaha.org](http://www.usaha.org) for the year 2003. Due to the limited protection provided by these vaccines, it was determined that new vaccine candidates should be explored to aid in controlling and the eventual eradication of brucellosis in the GYA.

A new experimental vaccine is currently being tested in swine. This vaccine strain is VTRS-1, a rough derivative of *B. suis*, which was developed at Virginia Tech, Blacksburg, VA. VTRS-1 has been found
to colonize swine, and it is not pathogenic to pregnant sows, i.e., it does not cause fetal death or fetal colonization. In a pilot study, VTRS-1 provided superior protection in gilts compared to RB51 against virulent field strain exposure. Currently larger numbers of swine are being tested in the above described experiments to validate the previously observed results using both the subcutaneous and oral routes of delivery.

In an effort to develop a vaccine to protect domestic swine against pseudorabies and brucellosis, diseases transmitted from feral swine, a new vaccine has been developed. VTRS-1 was modified to express pseudorabies glycoprotein D, producing a multivalent vaccine for swine. Glycoprotein D is an immunogenic protein of the virus which may play a role in protective immunity. Currently this new candidate VTRS-1/D is being evaluated for its ability to colonize pigs, safety in pregnant sows, and vaccine efficacy against virulent Brucella using the oral and subcutaneous routes.

With the variety and large numbers of wildlife reservoirs, vaccine delivery becomes a major issue which needs to be addressed. It will be impossible to hand inoculate the >30,000 elk in the GYA or the millions of feral swine throughout the United States. Although biobulleting of bison is a possibility, there have been recent reports that the bullets do not adequately or reproducibly penetrate the thick hides of these animals. Because of these and other constraints, oral delivery systems have been developed to vaccinate maximal numbers of animals against brucellosis. Current research has found that the agent must be in a vegetative state and is not very effective when lyophilized. It has also been demonstrated that the vaccines have increased efficacy when presented with a scarifying agent to facilitate vaccine uptake in the mucosa. One also has to keep in mind that when placing vaccine out in various baits and locations that non-target species may be exposed to the vaccines.

The wildlife reservoir issue also impacts existing diagnostic tests and surveillance protocols. The current bovine brucellosis tests need to be verified for their accuracy for wildlife species’ testing. It will be important to adapt B. abortus tests for B. suis-infected animals. Tests being developed must be applicable to multiple species of animals and brucellae. The surveillance in endemic areas must be diligent and consistent.

What does the future hold for Brucellosis research and eradication? Can we truly eradicate this disease from our domestic livestock with current vaccines and technologies? Continued research efforts are necessary since we do not have a truly efficacious vaccine for all wildlife species.

References:
D. USAHA SCIENTIFIC PAPERS

D. USAHA SCIENTIFIC PAPERS


D. USAHA SCIENTIFIC PAPERS

EXPERIMENTAL INFECTION OF REINDEER (RANGIFER TARANDUS) WITH MYCOBACTERIUM BOVIS: PATHOLOGICAL AND IMMUNOLOGICAL FINDINGS

Mitchell V. Palmer1, W. Ray Waters1, Tyler C. Thacker1, William C. Stoffregen1, Bruce V. Thomsen2, Ralph E. Slaughter3, Stephen L. Jones4, Josh E. Pitzer5 and F. Chris Minion5

1Bacterial Diseases of Livestock Research Unit, National Animal Disease Center, USDA, Ames, IA
2National Veterinary Services Laboratories, Animal and Plant Health Inspection Service, USDA, Ames, IA.
3Biocor Animal Health, Omaha, NE
4CSL Limited, Victoria, Australia
5Department of Veterinary Microbiology and Preventive Medicine, Iowa State University, Ames, IA

Mycobacterium bovis is the primary cause of tuberculosis in ruminants. The USDA began a campaign to eradicate tuberculosis from domestic livestock in 1917. In 1994 members of the family Cervidae were added to this program after the discovery of tuberculosis in various elk (Cervus elaphus) herds in the US. Under the guidelines of the Uniform Methods and Rules for the eradication of bovine tuberculosis, all members of the family Cervidae are subject to monitoring for tuberculosis. Intradermal tuberculin testing is the approved means of ante-mortem diagnosis of tuberculosis in Cervidae. Tuberculosis in captive elk (Cervus elaphus), as well as both captive and free-ranging white-tailed deer (Odocoileus virginianus), has been documented although the prevalence is low and varies with geographic region.1-6 Tuberculosis in reindeer (Rangifer tarandus); however, is exceedingly rare and has not been reported in North America. Few published reports of M. bovis infection in reindeer exist.7 Notably, absent from the literature are descriptions of lesions in tuberculous reindeer. Moreover, intradermal tuberculin testing in reindeer results in high numbers of false positive reactions, resulting in the unnecessary euthanasia of non-tuberculous reindeer.8 The cause of the high proportion of false positive test results is unknown, but may be due to prior exposure to environmental non-tuberculous mycobacteria, species specific sensitivity to mycobacterial antigens or a lack of understanding of disease pathogenesis and immune response in reindeer infected with M. bovis.

In cattle, an in vitro method of tuberculosis diagnosis has been developed and approved for use in the US as a complimentary test to be used in conjunction with skin testing. The in vitro assay detects
IFN-gamma produced by peripheral blood mononuclear cells exposed to no antigen (i.e., background response), *M. avium* purified protein derivative (PPD), *M. bovis* PPD, or mitogen (e.g., pokeweed mitogen). Recently, recombinant antigens specific for virulent tubercle bacilli (e.g., ESAT-6, CFP-10, MPB-59, MPB-64, and MPB-70) have been evaluated for use in both in vivo (i.e., skin test) and in vitro tests (i.e., IFN-gamma test) that discriminate between *M. avium*-exposed, BCG-vaccinated, or tuberculous cattle. ESAT-6 and CFP-10 are particularly robust inducers of recall IFN-gamma responses by infected cattle. A test similar to the Bovigam™ assay, designed to detect IFN-gamma produced by red deer (*Cervus elaphus*) leukocytes (i.e., Cervigam™ assay, Biocor Animal Health) also reacts with IFN-gamma produced by white-tailed deer leukocytes. Thus, antibodies within the assay are cross reactive with IFN-gamma from at least 2 species of Cervidae. In vitro-based tests such as the Cervigam™ assay are particularly appealing for use in reindeer and other deer species because animals are handled only once for this test, thereby minimizing capture-associated injuries that are more likely with multiple handling events.

The objectives of the current study were to describe lesion character and distribution as well as intradermal tuberculin responses in reindeer experimentally infected with *M. bovis*. Another primary objective was to evaluate the ability of the Cervigam™ assay to detect IFN-gamma produced by *M. bovis*-infected reindeer in response to in vitro stimulation with crude (i.e., PPD’s) and specific (i.e., ESAT-6 and CFP-10) antigens. This information should provide much needed assistance to animal health officials in more accurate antemortem diagnosis of tuberculosis in reindeer as well as assist in the analysis of risk associated with *M. bovis* and reindeer.

Seventeen 9 month-old, reindeer were divided into 2 groups identified as inoculated (n=13) and naïve (n=4). Thirteen deer were experimentally inoculated by intratonsilar instillation of 1.6 x 10⁴ (colony forming units) CFU of *M. bovis*. Four naïve deer were housed similarly but in a separate building with no direct contact with inoculated deer.

All reindeer were tested 3 and 8 months after inoculation using the comparative cervical test (CCT). Results were interpreted by plotting measurements on a scattergram developed by USDA for interpretation of the CCT for Cervidae. Results of the CCT were used to classify deer as negative, suspect, or reactor in relation to exposure to *M. bovis* according to USDA guidelines for skin testing in Cervidae. Blood was collected prior to inoculation and monthly thereafter, and analyzed by an in vitro assay to detect IFN-gamma produced by peripheral blood mononuclear cells. Purified protein derivative (PPD) from *M. bovis* (PPDb) and *M. avium* (PDDa), as well as the recombinant antigens CFP-10 and ESAT-6 and a fusion protein CFP-10/ESAT-6 were used in the assay. Thirteen months after inoculation, all reindeer were eu-
thanized and a thorough postmortem examination was conducted. All experimentally inoculated reindeer developed lesions in the medial retropharyngeal lymph nodes. Microscopically, lesions were characterized as granulomas with caseonecrotic centers and low numbers of intralesional acid fast bacilli. Tracheobronchial, mediastinal and mesenteric lymph nodes, tonsils and lungs were less frequently affected. Lesions were less widely distributed than in white-tailed deer (*Odocoileus virginianus*) similarly inoculated. The CCT accurately identified *M. bovis* inoculated reindeer, but false positive results were common among negative control reindeer. Modifications in the USDA's method for interpretation of the CCT decreased false positive results without increasing false negative results. The in vitro blood-based assay to measure IFN-γ production showed that mycobacteria-specific IFN-gamma responses from *M. bovis*-infected reindeer exceeded those of negative control reindeer. However, positive IFN-gamma responses to (PPDb) were also detected in negative control reindeer. ESAT-6 and CFP-10 are antigens unique to *Mycobacteria spp.* within the tuberculosis complex. While use of these antigens did not diminish detection of *M. bovis*-infected reindeer, it did decrease false positive results in negative control reindeer. Reindeer are susceptible to infection with *M. bovis*; however, lesions are fewer in number, less severe in nature and less widely disseminated than those seen in experimentally infected white-tailed deer. Comparative cervical skin testing of reindeer can be highly sensitive, but has low specificity. Specificity can be improved by modification of criteria for interpretation of the CCT. A blood-based IFN-gamma assay may prove useful for tuberculosis diagnosis when recombinant CFP-10 or ESAT-6 / CFP-10 antigens are used to enhance the specificity of the IFN-gamma assay.

**References**

D. USAHA SCIENTIFIC PAPERS

D. USAHA SCIENTIFIC PAPERS

RECONSTRUCTION AND ANALYSIS OF ERADICATION EFFORTS DURING THE 2002-03 OUTBREAK OF EXOTIC NEWCASTLE DISEASE

Rosemary Speers, Michael Webb, Barry Howell, Matthew Grund, Christine Hughes, Elizabeth Myrus, and Joel Silverman
Operations Evaluation Group and Public Research Division
The CNA Corporation
Alexandria, VA

Introduction

The Animal and Plant Health Inspection Service, Veterinary Services (APHIS-VS) within the U.S. Department of Agriculture (USDA) asked the CNA Corporation to conduct a reconstruction and analysis of eradication efforts during the 2002-03 outbreak of exotic Newcastle disease (END). Reconstruction of such complex operations can inform APHIS-VS and other organizations about what happened and why, from many different perspectives. During an event, most responders can only see what they directly experience, and it is difficult for even the leading officials to maintain a broad perspective. Unexpected and complex issues often stimulate the most interesting, and most important, decisions and actions. Reconstructing these areas can further understanding of the overall event and enhance preparedness for future disease response operations.

CNA has reconstructed a full timeline of the END eradication efforts at all response levels, by examining the key actions, decisions, events, and how the operations developed over time. To do so, we have drawn evidence from three primary sources: APHIS-VS documents and databases, state and local documentation, and interviews with those involved. Through subsequent analysis, CNA has investigated both quantitative and qualitative "models," or methods of description, that show how the operation was executed and how the response components fit together.

The 2002-03 outbreak of END began in California and later spread to bordering areas of Nevada and Arizona. For the first several months it spread among backyard poultry flocks in southern California, partly due to movements of birds that were bred for exhibitions and cock-fighting. In late December 2002, END was confirmed in a commercial poultry operation. By January 2003, the disease had spread to other states as well as additional counties within California. In April 2003, a different strain of END virus was detected in western Texas and those response operations were folded into the overall Area Command structure. Most quarantined areas in the affected states were released in May, though several remained until September 2003 when eradication was deemed complete.
Overall, 19 counties were quarantined within five southwestern states (CA, NV, AZ, TX, and NM). A total of 932 infected premises were identified, and over 4 million birds were euthanized. Differences in authorities, capabilities, and fundamental strategies created differences in response operations among the various Incident Command Posts. New processes for laboratory testing, personnel dispatch, risk assessment, response management, data management, and surveillance standards were developed during the eradication efforts.

**Selected Results**

Using information from the Emergency Management Response System (EMRS) database that was provided to CNA, we present summary metrics of the disease spread, outbreak investigations, laboratory samples, and number of personnel deployed to accomplish the END eradication. While EMRS may arguably be considered the most authoritative data source related to the END outbreak, it does not contain the exhaustive data for these topics. For example, personnel dedicated to the END response from the California Animal Health and Food Safety (CAHFS) laboratories are not generally included in the administrative portion of the EMRS database. Selected results are illustrated in Figure 1, including the numbers of premises with a status of “diagnosis positive”, herd investigations, laboratory samples collected, and personnel “on-station” per day, across the timeframe of September 2002 through September 2003.

**Premises with a positive diagnosis for END**

An overall average of slightly more than 4 premises per day received a new status of “diagnosis positive”, peaking at more than 20 per day in December 2002 and again in February 2003. The first peak in mid-December 2002 appears to mark the dramatic increase in the spread of disease observed later that month and into January 2003. By late March 2003, the number of new diagnosis positives per day stays consistently below 5 premises per day.

**Herd investigations**

The number of herd (or “flock”) investigations conducted by Task Force personnel was less than 200 per day for the early stages of the outbreak and then increased dramatically in January and February 2003. By March, the number of daily investigations was routinely more than five or six hundred, at times nearing 1000 investigations per day. This level of effort continued essentially unabated until late in the summer of 2003, when it quickly decreased to less than 100 per day.

**Lab samples collected**

On average, nearly 100 lab samples were collected per day; with a peak of more than 200 per day in April 2003. This metric exhibits qualitatively different behavior from the two previously discussed. The number of lab samples slowly increased throughout the time period of January to May 2003, and maintained a level near that peak for the next few
months; well after most of the other data metrics had substantially decreased. This suggests that, as might be expected, after the outbreak was essentially contained, continued testing was required to ensure that the disease had in fact been eradicated. During the surveillance period after May 2003, the number of laboratory samples collected was routinely more than 150 per day.

**Personnel “on-station”**

At the peak of the END response (Feb.-Mar. 2003), over 1,600 people were deployed to a variety of sites to participate in the operations. We calculated the number of personnel working on the END Task Force on a daily basis (personnel “on-station”), as well as the number of new assignments. The data indicate a slowly increasing workforce of up to 200 personnel during the early winter of 2002, followed by a huge increase after the discovery of END in commercial premises near the end of the year. This increased level of effort with more than 1,400 personnel was maintained until June 2003, when it dropped quickly throughout the remainder of the summer. New personnel were assigned at an average rate of 43 per day, peaking at 230 per day in May 2003. These data indicate that Task Force leadership must manage both small groups as well as large numbers of deployed personnel, and be able to handle swift increases and decreases in the number of people assigned.

**Conclusion**

Our retrospective analysis of the operational data available in EMRS suggests that a real-time, accurate operational picture of key elements can play an important role in helping commanders manage the response. For example, the metrics we briefly examine here illustrate the magnitude of the problem the Task Force faced, and give some indication of the variability and uncertainty in these measures. The variability confirms the highly volatile nature of the outbreak, and monitoring such parameters in real-time can provide decision-makers at least partial insight into how successfully the disease containment and eradication processes function.

A key challenge for leadership managing a disease outbreak response is to capitalize on the available operational data to optimize the response performance. This is not an easy task. In many circumstances, response commanders may find it difficult to obtain a clear and concise picture of what is happening. This “fog of war” can sometimes delay key operational decisions, or worse yet, cause commanders to make unwise decisions in the presence of incomplete or sparse information. Personnel who collect and manage operational data play a crucial role in aiding the decision-makers as they employ their resources in the battle against the disease. For the future, an expanded data collection and analysis effort that takes place on-scene, during the operation, could benefit incident commanders and decision-makers at
Another challenge for any foreign animal disease incident management team is to develop additional indicators beyond the basic metrics discussed here, and which can provide some ability to predict or anticipate the future direction of the response. Some indicators have a tendency to trail the outbreak. For example, the number of laboratory samples collected tends to trail the other metrics as testing is a key element of continued surveillance. Other indicators might tend to lead the response. In this particular outbreak, the discovery of END in commercial premises impacted the response dramatically and led to vast increases in the number of personnel assigned. Through our continuing analysis, we will focus on developing metrics that are derived from real-time operational data and could potentially serve as useful indicators of the evolution of the outbreak. Careful analysis supported by a complete reconstruction of the eradication efforts will lead to recommendations for improvements in overall preparedness for foreign animal disease outbreaks.

Figure 1. Operational metrics from the 2002-03 END outbreak response, including (a) the number of new premises with a diagnosis of “positive” for END; (b) the number of herd investigations performed by the END Task Force; (c) the number of laboratory samples collected; and (d) the number of personnel “on station” during the END response. The data source for these metrics is the Emergency Management Response System (EMRS) database provided to CNA by USDA. Graphs (a), (b), and (c) illustrate the daily values of these metrics as well as an expanded moving average. The time axis is the same for all graphs.
Multi-jurisdictional animal health emergencies require coordinated response from a wide range of government, nongovernmental groups, and local communities. Analysts of emergencies and disasters increasingly posit their human characteristics, rather than the natural or biological ones, as central to their dynamic. The response to END may be thought of in terms of three related social domains (Hilhorst, 2003).

The first domain was composed of the more than 7,000 individuals who worked as part of the END Task Force in California, Nevada, Texas, and the Colorado River Indian Tribal lands and their home agencies. This domain has been described as that of “emergency governance,” dominated by the concepts of science and “technical rationality.” The Task Force utilized the Incident Command System (ICS) as the organizational model for the Task Force. One of the central challenges in this domain was to shift the culture of the Federal and State veterinary agencies to the ICS model. This shift involved adapting the ICS structure to an animal disease emergency while adhering to a set of ICS behaviors and values that differed markedly from those found in regulatory agencies. A second challenge was the rapid scaling up (and then down) of activity levels, incorporating hundreds of individuals from different work backgrounds on different rotation cycles into an integrated, coherent workforce and supporting them with appropriate administrative, communication and logistical systems.

A second social domain consisted of the organizations or associations with which the Task Force established ongoing linkages. The bridge to this domain was the establishment of regular communication and negotiation between a “permanent” contact from the Task Force and a key “broker” or formal representative on the other. One type of scientific linkage could be exemplified by the California Animal Health and Food Safety Laboratory System (CAHFS) which, while formally part of the Task Force, had a clearly focused function. Because of its clear focus, CAHFS was able to create and leverage a network of scientific and technical firms in and beyond California to develop the high volume real-time RT-PCR for END detection described at last year’s AAVLD. A second type of linkage was established with established and “emergent” associations, usually of poultry and other producers. “Brokers” for these groups were able to establish a level of trust both
D. USAHA SCIENTIFIC PAPERS

with the Task Force and with the groups they were held to represent. These “brokers” facilitated communication and negotiation on planning and policy, arguing for “practical” regulatory steps by the Task Force and “compliance” by their members.

A third social domain consisted of local communities, the neighborhoods of owners of “backyard” poultry pet birds. This population was aware of the virulent nature of the disease through their own experience, experience of their neighbors, or public information campaigns. They were, however, greatly removed from the driving ideology behind the eradication effort: the existence of a “list A” of diseases, the risks to US commercial industries, and the threat to US exports. Cultural, rather than technical, rationality formed the idiom of their understanding of the disease. Language differences, income, ethnicity and social status all contributed to their differential vulnerability to the outbreak and to the actions of the Task Force. Their primary concerns were with the fate of their birds, their relation to outside authority and loss of control of an aspect of their way of life. The Task Force generally lacked permanent contact positions to these communities or groups of these “backyard” producers. Their relationships were largely left to the public media campaign or to individual contacts with constantly rotating members of the Task Force. The absence of “brokers” on either side to negotiate or interpret actions at the local level created an information vacuum, especially in regard to policies such as preemptive slaughter, the non-release of test results or “what was happening down the street.” In at least some communities, this vacuum came to be filled with rumor, stories, and mistrust, leaving a residue of misunderstanding that could threaten cooperation in future outbreaks.

While END can be considered in terms of its viral, microbiological, or pathological aspects, the outbreak and the response were themselves driven by human behaviors and public and private institutions. END provides an excellent case study in animal disease emergencies that can occur in social domains stretching beyond the usual confines of commercial animal agriculture and their immediate Federal and State agencies. If lessons from this experience can be incorporated into the ICS system, the development of “broker” relationships and interaction with local communities, future response efforts of this scale will greatly benefit.
D. USAHA SCIENTIFIC PAPERS

WILDLIFE DISEASE RESEARCH AT THE APHIS NATIONAL WILDLIFE RESEARCH CENTER

National Wildlife Research Center, Wildlife Services, APHIS, USDA, Fort Collins, CO

Research on wildlife diseases at the newly formed Wildlife Disease Program (WDP) at the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS), National Wildlife Research Center (NWRC) concentrates on wildlife diseases of importance to domestic animal and human health. We are conducting studies on wildlife rabies, bovine tuberculosis (TB), chronic wasting disease (CWD), West Nile virus (WNV), pathogenic bacteria of birds, and pseudorabies (PR). The goal of the research is to develop innovative methods for surveillance, intervention, prevention, and control of these diseases.

NWRC Facility and Capabilities

The NWRC is located on a 43 acre master facility located on the Colorado State University campus in Fort Collins, Colorado. It includes an 83,000 square foot Wildlife Science Building with 30% dedicated to specialized laboratories and 70% in offices and administrative and information areas. There is a 25,000 square foot Animal Research Building (ARB) containing laboratory animal modules, cage washing area, necropsy and surgical rooms, state certified incinerator, and an approximately 2,000 square foot BSL-3 biocontainment area with 6 small and 2 larger rooms for animals and 350 square feet in 3 laboratory rooms and pass-through autoclave. A state of the art complex of 19 outdoor animal pen structures and 4 support buildings has just been completed to hold a variety of mammal and avian species. Construction on a new Invasive Species Building will begin in the fall of 2004. The NWRC employs an animal care veterinarian and animal care staff and has Animal Care and Use and Biosafety Committees to oversee animal care and disease studies.

The NWRC (formerly the Denver Wildlife Research Center) was established in the 1940’s. The mission of the NWRC is “to seek to protect wildlife from adverse effects of human activities while also reducing the damage and hazards that wildlife causes to agriculture, forests, industry, and other areas of human involvement and to investigate and manage zoonotic diseases to protect human health” and recently to investigate and manage livestock/wildlife disease interactions. The mission of the WDP of NWRC is to study the ecology of wildlife diseases, to assess the risk of disease transmission among
D. USAHA SCIENTIFIC PAPERS

wildlife, domestic animals, and humans, and to develop methods that reduce or eliminate such transmission.

The WDP has a large 1800 square foot standard BSL-2 laboratory and 3 smaller 200-300 square foot laboratories in the Wildlife Science Building. The small laboratories in the BSL-3 biocontainment suite in the ARB contain two biosafety cabinets and the equipment to work with live viruses and bacteria that are BSL-3 agents. The laboratories are fully equipped to conduct serology and antigen detection, standard bacteriology procedures, specimen processing, and reagent preparation. The diagnostic capabilities of the WDP in virology and bacteriology include methods using standard microbiological procedures; cell and tissue culture for virus isolation; viral identification and serology by cell culture neutralization and rapid focal inhibition (RFIT) tests; molecular genetic analysis by polymerase chain reaction (PCR), electrophoresis, genetic sequencing, and microarrays; antibody and antigen detection by enzyme-linked immunosorbent assay (ELISA), direct and indirect fluorescent antibody (FA and IFA), immunohistochemistry (IHC), and PCR; and histopathology. The laboratory has staff and the equipment to currently process about 500 samples per week, depending upon the tests required, for serology, bacterial isolation, and antigen detection. Additional staff, laboratories, and high throughput processing equipment (robotics) will be needed to dramatically increase the sample processing load. The WDP has a new field station at Texas A&M University-Kingsville in south Texas that will conduct research on wildlife diseases of importance to humans and to livestock, such as pseudorabies in feral pigs.

NWRC is also entering the planning stages to construct a stand alone wildlife disease research building (WDRB) on the NWRC campus to meet BSL-3 criteria and it is the final component of NWRC’s facility Master Plan at its Fort Collins headquarters site. The basic principles underlying the need for this building were approved by APHIS officials in 2001. The building, with its BSL-3 containment capability, will allow APHIS to conduct much more extensive wildlife disease monitoring, surveillance, and research projects than NWRC currently can. The existing facilities are not amenable in content or size to the Center’s current research requirements, let alone the extensive research NWRC is being asked to do in the future. The NWRC will also be able to separate its biocontainment research from all other types of laboratory wildlife research, giving a much greater margin of safety for staff, for the research being conducted, and to NWRC neighbors.

When completed, the NWRC will have the capability to detect and develop control methods for wildlife diseases in free-ranging wildlife and will provide the laboratory and animal holding/testing facilities necessary to develop methods to identify, monitor, control and possibly prevent the introduction of wildlife-borne foreign animal diseases into
the United States. Scientists at NWRC will be better able to study the ecology and epidemiology of foreign animal diseases and emerging diseases in wildlife and carry out research concerning the control and possible eradication of some wildlife-related diseases such as CWD, WNV, TB, brucellosis, pseudorabies virus (PRV), rabies, hantavirus, leptospirosis, tularemia, plague, and salmonella. The building also will provide APHIS with increased facilities and capacity for use in responding to emergency situations, such as the recent introduction and human infection with monkeypox virus.

Guidelines are being developed by APHIS for membership in the National Animal Health Laboratory Network (NAHLN). Increasingly USDA-APHIS-VS National Veterinary Services Laboratory (NVSL) is relying on member diagnostic and research labs to support its ability to respond to animal health emergencies. While our BSL-3 facilities would not function as a full spectrum diagnostic laboratory, the NWRC mission is consistent in lending emergency diagnostic support for specific organisms, especially those whose reservoirs are in wildlife. Our existing Quality Assurance/Good Laboratory Practice infrastructure along with our laboratory expertise and capabilities will allow us to apply for accreditation and serve as a surge laboratory for specific diseases and pathogens, e.g. avian influenza. Within this context of normal endemic disease emergencies, support for wildlife disease surveillance for foreign animal diseases and support for emergency laboratory testing as a result of a bioterrorism event are within our technical and infrastructure capacity for specific agents and protocols once accreditation is achieved.

In addition, the demand and need for BSL-3 wild animal space to conduct controlled experimental infection studies on diseases of wildlife has increased dramatically during the last 10 years with the introduction and emergence of important zoonotic diseases such as West Nile virus, Bovine TB, hantavirus, rabies, and monkeypox and wildlife diseases like chronic wasting disease. The planned construction of a new WDRB will help address the wild animal needs and will provide APHIS with increased facilities and capacity for use in responding to wildlife disease emergencies and the ability to resolve important disease issues that involve livestock-wildlife and human-wildlife interactions. To support both experimental and field investigations, a complete laboratory infrastructure is needed which will include BSL-3 laboratory rooms, biosafety hoods, and associated equipment to provide laboratory support for lab and field studies, surveillance, and vaccine testing and evaluation. In addition, rapid diagnostics for diseases in wildlife (rabies, TB, WNV, etc) can be developed or modified for use in support of wildlife disease research. The ability to process large numbers of samples for multiple diseases in any surveillance effort will require expanded capabilities for rapid processing of samples. The infra-
structure of the new WDRB would include diagnostic capabilities in
the areas of virology and bacteriology, including methods using stan-
dard microbiological procedures; cell and tissue culture for virus iso-
lolation; viral identification and serology by cell culture neutralization and
rapid focal inhibition (RFIT) tests; molecular genetic analysis by poly-
merase chain reaction (PCR), electrophoresis, genetic sequencing,
and microarrays; antibody and antigen detection by enzyme-linked
immunosorbent assay (ELISA), direct and indirect fluorescent anti-
body (FA and IFA), immunohistochemistry (IHC), and PCR; and histo-
pathology.

The NWRC has a centralized library with an information and com-
munication center, conference facilities, centralized computer system,
large storage facilities, metal and wood workshops, garage, electron-
ics and chemistry support laboratories, administrative support person-
nel, fleet of vehicles, and nine field stations located throughout the
states to support its research efforts.

Wildlife Diseases of Special Importance

In 2000, The United States Secretary of Agriculture enacted Decla-
rations of Emergency for TB and rabies, citing threats to livestock, and
human health and safety. In an effort to eradicate TB and rabies, the
NWRC was directed to conduct research that would lead to a reduc-
tion or elimination of the potential transmission of these diseases.

**Bovine TB in Wildlife.** The significance of TB is reflected in the
efforts to eradicate it from the United States since 1917, and the USDA-
APHIS has made major progress in eliminating the disease. By the
mid-1990s, only a few known infected cattle herds remained and it
looked like the eradication of the disease in the United States was
forthcoming. However, between 1975 and 1998, TB was documented
in Michigan white-tailed deer (*Odocoileus virginianus*) with increasing
prevalence, and scientific evidence suggested that deer had transmit-
ted the disease to cattle (Schmitt et al. 2002). Consequently, Michigan's
“Accredited-Free Status”, which allows for unrestricted interstate move-
ment of cattle, was suspended by USDA/APHIS in 1998. Large eco-
nomic costs are incurred by a state and the livestock industry when the
state loses its Accredited-Free status. It has been estimated that Michi-
gan will incur losses of $22-74 million over a 5-year period.

In Michigan, the focal point of the disease is in the northeast corner
of the lower peninsula. A variety of measures are being, or have been,
implemented in Michigan in an interagency attempt to slow the spread
of the disease. These include more testing of cattle herds, depopula-
tion of infected cattle herds, liberal hunting seasons to reduce deer
density, restrictions on artificial feeding of deer to avoid concentrating
deer in small areas where disease transmission is more likely, and the
depopulation of a large, private herd of captive cervids (mostly white-
tailed deer) by USDA-APHIS-WS.

Research on TB in Michigan began at the NWRC in 2001 and continues today. The research effort is aimed at understanding the role of wildlife as reservoirs and vectors of the disease. Studies, to date, have found that TB is being transmitted to cattle by deer through indirect routes; i.e. by contaminated feed, rather than by direct contact. Other studies have shown that at least four wildlife species in Michigan, other than deer, are infected with TB: raccoons (*Procyon lotor*), opossums (*Didelphis virginiana*), gray fox (*Urocyon cinereoargenteus*), and coyotes (*Canis latrans*). However, only coyotes have an apparent high prevalence of infection with TB, nearly 25%, whereas the other species are less than 4%. Coyotes, therefore, may serve as a good sentinel species because they apparently magnify the infection rate found in Michigan deer which average about 2%.

Current studies are obtaining information on other species that scavenge deer and are sympatric with deer and cattle, such as raccoon and red fox (*Vulpes vulpes*). These species could also serve as effective sentinel species for assessing the presence and prevalence of TB in the environment and aid in understanding and managing TB. To obtain information on their home range sizes, dispersal distances, and proximity to livestock, which are fundamental in determining if they could be effectual sentinel species, we have radio marked 56 raccoons and 5 red foxes throughout a 4.63 km² farmland community in the endemic area. Radio marked individuals are further documented at cattle watering sites by data loggers and animal-activated cameras. This effort has just begun and no results are in, though, observationally we are routinely documenting direct and indirect contact between these carnivores and cattle. Whether these wildlife species, other than deer, transmit the disease to other animals is not known but is a subject for future research at NWRC.

Other studies conducted by NWRC scientists attempt to reduce the indirect contact between deer and cattle in the TB infected area in Michigan. Those studies involve the use of fencing, guard dogs, and various scare devises aimed at keeping deer away from cattle and their feed, such as haystacks and silage. Some of these experiments have shown success, including the use of fences around cattle feed sources and the use of dogs to keep deer away from the cattle farms.

The evaluation of livestock protection dogs to minimize direct and indirect contact between potentially TB-infected deer and cattle was conducted on two privately-owned deer farms that contained unnaturally high deer densities to insure a challenging evaluation of the dogs. Protected pastures contained a dog and 4 calves and unprotected pastures contained just 4 calves. We used a variety of tracking and observation methods of data collection. We documented that deer used cattle feed 113 times in unprotected pastures and never in protected...
pastures, deer approached within 5 m of cattle 79 times in unprotected pastures and 3 times in protected pastures, and deer use of cattle pastures as detected by video data occurred 3 times in protected pastures and 426 times on unprotected pastures. These data suggest that dogs may reduce the potential for disease transmission from deer to cattle. The efficacy of the dog protection on actual cattle operations in the TB endemic area is being evaluated.

Wildlife Rabies. Rabies is an acute, fatal viral encephalomyelitis of mammals most often transmitted through the bite of a rabid animal. Greater than 90% of all animal cases reported annually to the Centers for Disease Control and Prevention (CDC) now occur in wildlife (Krebs et al. 2000). The principal rabies hosts today are wild carnivores and bats. The majority of rabies cases reported to the CDC each year occur in raccoons, skunks (primarily *Mephitis mephitis*), and bats (Order Chiroptera). However, rabies is maintained in other wildlife including gray fox, red fox, and coyotes.

Although human rabies deaths are now rare in the United States, there are significant impacts associated with rabies. The estimated public health costs associated with rabies detection, prevention, and control have risen to over $300 million annually (Krebs et al. 1995). If raccoons, gray foxes, and coyotes are not prevented from spreading to new areas of the United States, the health threats and costs associated with rabies are expected to increase substantially as broader geographic areas of the U.S. are affected.

The primary means of controlling wildlife rabies in the United States has been through the use of oral rabies vaccination (ORV) (Slate et al. 2003). Since the first field release of the *Vaccinia*-Rabies recombinant (V-RG) vaccine-laden baits in 1990, the annual number of oral vaccine baits produced and distributed has risen nearly exponentially to a total of well over 10,000,000 in 2003. These baits are designed to target raccoons in the eastern and southeastern United States and for control of rabies strains in coyotes and gray foxes in south and west-central Texas. Though the ORV program has been used successfully for nearly 15 years, a number of issues regarding its safety and efficacy have not been fully addressed. For example, improved vaccination rates in target populations, effects on non-target populations, potential for vaccinated animals to shed recombinant *vaccinia* virus, optimal barrier widths for vaccination, more efficient delivery systems, and on alternative vaccines. Scientists at the NWRC are addressing these issues by conducting field studies on raccoons, skunks, and gray fox, and experimental pen studies on a number of species.

Research by NWRC scientists have found new bait design and formulations to use in skunks and are working on better baits to use in raccoons for delivery of the oral V-RG vaccine. Field studies by NWRC
scientists are presently underway to evaluate these baits in 5 states. In collaboration with various universities, NWRC scientists are conducting research on raccoon and skunk ecology in urban as well as rural settings, on better techniques to estimate raccoon density and on the effects of density and target population distribution on vaccine bait distribution.

Although several studies have previously looked at the question of bio-safety concerning the rabies vaccine being used in wildlife, some species were not evaluated. Therefore, pen-studies are underway at NWRC to address concerns of bio-safety of the recombinant vaccinia virus associated with rabies vaccine in selected avian and mammalian species. To date evaluations have found no lesions or safety concerns due to the vaccinia in several species of wildlife. The rabies vaccine, V-RG, appears to be safe for use in the field for wildlife.

Studies will soon be underway on evaluating the persistence of protective antibody of rabies once an animal has been vaccinated with the oral V-RG. Past studies have only evaluated the protection of the vaccine on a short-term basis. Our studies will evaluate protection long-term, up to 18 months. Also, studies will soon begin on gray fox ecology associated with the ORV zone in Texas. Studies are in the planning stage to assist with development of an oral rabies vaccine for skunks, since the V-RG being used in raccoons is not efficacious in striped skunks.

Other Wildlife Diseases of Importance

In 2003, the NWRC began research studies on CWD in collaboration with USDA-APHIS-VS; Wildlife Disease Surveillance, Monitoring, and Research as part of the National WDP of WS; and PRV and other diseases of importance to livestock and humans in Texas.

Chronic Wasting Disease. In May 2003, the NWRC received $500,000 from the USDA-APHIS-VS line item in the FY03 budget with Congressional language to address CWD. As a result, the NWRC Wildlife Disease Research Program developed a CWD research project, selected a Project Leader and devoted the remainder of FY03 to project planning and meeting with federal, state, and academic scientists involved with CWD. The initial funding was used to initiate the project and develop infrastructure and to establish cooperative research studies in several states. These field studies are providing basic information on CWD epidemiology, and are developing and implementing methods for decreasing prevalence and transmission within and among cervid species and between captive and wild cervids. Funding for research in FY04 increased 50% and has allowed us to expand ongoing collaborative studies and initiate new research.

One of the primary concerns of APHIS was the potential transmission of CWD between captive and free-ranging cervids (Miller and
Williams, 2004) and NWRC has begun research to understand the rates and types of contacts between them and is developing cost-effective barrier techniques and strategies to reduce or eliminate contact. We are using track plots and motion-activated video to determine how common interactions through game farm fences are between farmed and wild cervids (mule deer [Odocoileus hemionus], white-tailed deer, and Rocky Mountain elk [Cervus elaphus nelsoni]). Our primary objective is to determine if disease transmission risk exists along game farm fences. We are evaluating 9 fences around elk farms in Colorado and 5 fences around white-tailed deer farms in Michigan. Track-plot data are collected bi-weekly and video data are collected continuously. Track plots document where animals visited the same point during a 24-hour period. Video documents when wild or farmed animals were at the fence and the nature of interactions. We are finding considerable variation in the species, sex, age class, and number of wild cervids that frequent game farm fence lines. Preliminarily, direct interactions between farmed and wild white-tailed deer (1) appear less common than between farmed and wild elk (71). We are using a Geographic Information System (GIS) to document relationships between farmed and wild cervid interactions and landscape attributes. Game farm management practices appear to impact fence-line activity. Stocking rates, proximity of males to females, feeding procedures, and fence construction all appear to contribute directly to the potential for interaction. Based on our results, we will develop recommendations for methods of reducing interactions.

The NWRC is investigating and comparing the density, movement, and habitat use of white-tailed deer and mule deer and how these characteristics relate to the manifestation, transmission, and spread of CWD in Nebraska. In western Nebraska, where CWD occurs, NWRC is using telemetry to learn about the ranges and movements of mule and white-tailed deer. Concurrently, we are conducting fine-scale surveillance to locate infected deer. Deer range in the area centers on the North Platte River, and the potential exists that CWD could move east along the river rather quickly if management actions are not taken. At the same time, we are continuing a long-term study of the ecology of deer along the Missouri River. Data from this study will be used in the development of models and formation of management decisions.

Investigations of a potential CWD vaccine using scrapie prions in mouse and rabbit models have begun at NWRC as well as collaboration on the development of rapid tests to identify prions in biological and environmental samples and on methods to decontaminated surfaces and environmental samples. Studies are planned to investigate the role of predators and scavengers in the possible transmission and/or dissemination of CWD and to improve capture and census techniques for wild cervids.
Bacterial Pathogens Associated With Wild Birds. The growing populations of non-migratory Canada geese have raised public health concerns about the transport of cattle and human bacterial pathogens by these birds (Kullas et al. 2002). These disease concerns focus on two areas: fecal contamination of public water-ways and lawns and contamination of cattle herds. There are many factors involved in calculating disease risk, including presence of pathogens in the environment, how humans or livestock may become exposed to the pathogens, and the susceptibility of the host to the pathogen. Our research is directed toward determining the nature of the pathogen population found in goose feces and the possible role geese may have in transporting pathogens across the landscape. We radio collared Canada geese in southeastern Pennsylvania to determine their movement patterns across agriculture and urban landscapes. We found that local populations of geese moved from rural pasture settings where they foraged in dairy cattle pastures to urban parks, amusement parks, and lawns. We isolated and characterized E. coli strains in geese, beef cattle, dairy cattle feces as well as in grass and soil substrates, and found strains of human or cattle pathogenic E. coli in goose feces. We were also able to determine that these strains contained genetic virulence markers for K1 (a trait to help the bacteria evade the immune system), eae (a trait that allows the pathogenic strain to attach to the intestine), and SLT-2 (a gene responsible for producing shiga-like toxin associated with hemorrhagic disease). These results suggest that geese may pick up pathogens from one site and transport them to another site, and that goose feces contain pathogenic bacteria of concern to human and cattle health.

Dairy cattle that are no longer productive generally enter the human food chain as the source of ground beef. If the cattle are infected with pathogenic bacteria at the time of slaughter, fecal contamination of the beef is possible. A single infected cow can contaminate multiple beef products at the slaughter-house level. One means of minimizing this risk is to increase biosecurity at the farm site. In an effort to better understand sources of infection of cattle with human pathogens we surveyed local pigeon populations at dairy farms in Colorado. Pigeons were identified as carriers of pathogenic Salmonella and E. coli. Eight percent of pigeons carried some type of virulence marker gene associated with hemorrhagic disease in humans. Three percent of pigeons carried pathogenic Salmonella. Pigeons should be viewed as agents of transport or reservoir for human and cattle pathogens and pigeons control should be incorporated as part of routine farm-side biosecurity measures.

Pseudorabies Virus Studies in Feral Hogs. As part of the research project at the new NWRC Field Station at Texas A&M University-Kingsville, we are determining the prevalence of diseases, prima-
D. USAHA SCIENTIFIC PAPERS

rily PRV, in feral hogs and evaluating the potential for disease transmission from feral to domestic swine. We are using global positioning system (GPS) collars to monitor the movements of feral hogs across the landscape and determine their home range and movement patterns. Partial disease results for some of the initial 30 captured hogs have documented PS and brucellosis infections in free-ranging populations.

Surveillance, Monitoring, and Research of Wildlife Diseases. The NWRC-WDP provides technical advice, training, support and laboratory analyses of specimens for a variety of collaborative research studies on WNV in a number of avian and mammal species for cooperators in Wildlife Services, Centers for Disease Control and Prevention (CDC), local and state health departments, state and federal wildlife agencies, universities, and others. Some of the wildlife disease research conducted by NWRC under this project is described below.

A new surveillance method to provide an early warning predictor of human WNV activity was investigated utilizing cliff swallows (Hirundo pyrrhonota) in the western United States. We empirically conducted surveillance for WNV in cliff swallow colonies and were able to detect cliff swallow infection five weeks prior to the human epidemic. We believe that this system has utility as an early warning system for human public health risk and are working with local city and county health officials. These groups are using our spatial data of virus occurrence to help guide their vector control efforts. Swallows are a good model for early detection of WNV. They breed in habitats that have high mosquito populations, thus exposing them to high numbers of vectors early in the season. They are abundant and ubiquitously distributed. Their nesting colonies occur at almost every overpass and culvert throughout the western United States. We chose to monitor nestlings because they represent stationary targets that integrate virus activity in local geographic areas and are easy to sample. Nestlings may become infected by being bitten by mosquitoes, nestling may be fed infected mosquitoes by their parents, and nestlings may be infected by nest parasites (Cimicid bugs) that live in nests and were infected during the previous year. We are in the process of documenting all of these routes of infection.

A multi-year mark-recapture study of forest passerine birds and serological survey for WNV is being conducted in southeastern Pennsylvania. The objective of the study is to characterize time-structured epidemiological information on the disease dynamics of WNV in deciduous forest-passerine ecosystems. Using mist-nets we are marking local bird populations. We have been able to recapture birds between and within seasons, taking blood samples at these intervals, totally 2000 samples to date. From these data we are able to determine WNV prevalence and risk of exposure, and to estimate survivorship within
the populations. These field data will allow us to quantitatively estimate
the impact of WNV on birds and the data will also be useful in parameterizing simulation models we are developing.

Little is known about the distribution and susceptibility of small mammals to WNV, i.e., whether small mammals are dead-end hosts or potential amplifying hosts and reservoirs for disease. In collaboration with CDC, we conducted a sero-survey for West Nile virus in small mammals in five states throughout the United States and in white-tailed deer in one state to determine which species were frequently infected with WNV. Raccoons, opossum, white-tailed deer, and squirrels (fox, Sciurus niger, and gray, S. carolinensis) all showed evidence of high exposure of local populations to the virus. Experimental infection studies will be conducted to characterize morbidity, mortality, viremia and antibody response over time to determine if any of these mammal species are competent reservoirs and/or useful for surveillance. The data will be used in the development of epidemiologic models.

Greater Sage-Grouse (Centrocercus urophasianus) suffered significant mortality from WNV infection in 2003 (Naugle et al. 2004) and we investigated their susceptibility to WNV during experimental studies conducted in collaboration with the U.S. Fish and Wildlife Service and Colorado State University. In completing the study objective we housed grouse under captive conditions. No study had successfully maintained wild sage grouse in captivity for extended periods of time. We were able to do so, and we were able to get two of the birds to reproduce in captivity. This was an unexpected added benefit to this study that will prove useful in the conservation of this species. Greater Sage-Grouse appear to be the most susceptible species to WNV studied to date. Mortality is 100%, with 80% of birds dying within 3 days of infection. Infected grouse circulated high titers of virus by the time of death, suggesting that during this time period the birds were highly infectious. This species is likely to be listed by the U.S. Fish and Wildlife Service as a threatened species. This news of its susceptibility is not encouraging for long-term conservation efforts. Extensions to these experimental studies are being contemplated for the future.

Geographically explicit, agent-based simulation models for the establishment, persistence, and spread of mosquito-borne diseases, e.g. WNV, are being developed in collaboration with the University of Pennsylvania. A multi-host/multi-vector model was developed and coded for computer simulations. The stochastic spatial model was compared to traditional epidemiological multi-host models (SIR models), the standard for the discipline, and was found to produce similar results. We are now poised to further develop this model to incorporate spatial aspects (something the SIR models cannot do) and validate the model under different ecological settings mentioned above. This model will be useful in evaluating “what-if” scenarios, e.g. mosquito control strat-
D. USAHA SCIENTIFIC PAPERS

egies, and their impact on disease dynamics (e.g., spread, establishment, persistence). The model is intended as an aid in disease management. The model will be adaptable for other disease systems, e.g. TB, rabies, etc.

Summary

The types, frequency, and distribution of wildlife diseases are expanding in the United States (Friend et al. 2001) which increases the risks to livestock and human health. Some significant diseases of livestock were nearly eradicated (bovine TB, brucellosis, pseudorabies), but reservoirs in wildlife have emerged and threatened the eradication status. New and emerging zoonotic diseases of wildlife are impacting public health and both bring new challenges and controversy surrounding disease management when a highly valued public resource, such as wildlife, is involved. The NWRC is conducting research on a variety of wildlife diseases and is developing methods and strategies to reduce or eliminate transmission to domestic animals and humans. Our studies, of course, depend upon a lot of cooperation and collaboration among many public agencies, both state and federal, and private property owners who own much of the land inhabited by our wildlife species.

Literature Cited


D. USAHA SCIENTIFIC PAPERS

Diagnostic Laboratory connectivity with electronic health certificates provide laboratories and private practitioners with real-time record keeping, accurate epidemiology data queries for the dissemination of information relating to the diagnosis of animal diseases, animal movement tracking and trace back reports necessary for regulatory surveillance, monitoring, and control of existing, emerging and/or foreign animal diseases.

The rationale for this abstract is built upon significant accomplishments in the development and implementation of electronic health certificates and diagnostic lab connectivity since 1999.

The concept of electronic health certificates developed as a result of state veterinarians growing concerns for foreign animal diseases in the mid 90s. The United States Animal Health Association (USAHA) supported this initiative more than five years ago. Concurrently, the Government Paper Elimination Act (GPEA), a 1998 initiative requiring electronic paperless interaction with various publics by 2003, aids the achievement of real-time ability to trace disease issues related to ongoing food safety concerns. Today, electronic Interstate Certificates of Veterinary Inspection are being implemented by the U.S. Department of Agriculture (USDA)/Animal and Plant Health Inspection Service (APHIS)/Veterinary Services (VS) Center for Epidemiology and Animal Health (CEAH) and fully coincide with the U.S. Animal Identification Plan (USAIP) and National Animal ID System (NAIS).

The need for animal disease diagnosis and surveillance are key components of the National Animal Health Laboratory Network (NAHLN) project in its state and federal partnership to safeguard animal health. Diagnostic lab connectivity to electronic health certificates achieves the goal of both projects by creating reporting of diagnosis and surveillance real time.

Objective

The objective of this paper is to present the epidemiology results with electronic health certificates with diagnostic laboratory connectivity for Equine Infectious Anemia (EIA)/Coggins between September 2001 and September 2003.

Methods/Materials

In 1999, the Florida Department of Agriculture and Consumer Ser-
D. USAHA SCIENTIFIC PAPERS

ervices (FDACS), Division of Animal Industry (DAI), contracted with GlobalVetLink, LC of Ames, Iowa, for a project encompassing Internet applications for all species and diagnostic lab connectivity for EIA applications necessary for animal health regulatory management.

The pilot phase included more than 20,000 animals from several species groups and became the state’s official online health certificate system in September 2001.

Results

From a time period of September 2001 through September 2003, the State of Florida produced a total of 50,114 certificates for 19,701,679 total animals. Of the total queried, the numbers represent 19,437 EIA/Coggins and 2,681 Official Certificates of Veterinary Inspection that include diagnostic lab test results. The system is used in the export of horses to more than 47 states and 3 US territories.

Tests for the 20,200 EIA/Coggins application were submitted to one (1) state and two (2) private diagnostic labs. All tests were reported Negative. None were positive, suspect or needed retest. Ninety percent were run by AGID and 10% ELISA. The reasons for testing were: 18,834 Annual, 9 Breeding, 49 Change of Ownership, 31 Export, 274 First Test, 87 Market, 123 Other, and 51 Show.

Discussion

The dissemination of information relating to the diagnosis of animal diseases between equine practitioners, diagnostic labs, shipping and receiving state veterinarian is immediate and real time. This uniform diagnostic technique established a huge reduction in administrative time; costs and paper trail indicating greater epidemiology benefits when challenged.

Diagnostic labs can perform immediate data queries electronically by test or tube ID, accession number, results and or submitting practice name.

State and federal animal health agencies can search data by veterinary practice name, animal owner name, certificate type, purpose of movement, accession number and/or animal name.

Additional benefits of electronic health certificates and diagnostic lab connectivity include digital images vs. hand drawings and vaccinations records required for Official Certificates of Veterinary Inspection. Digital images, an additional method of identification, are provided on the lab submittal form and are available in the lab applications should a Certified Copy be requested by a veterinarian and/or client. With diagnostic lab results and vaccination records readily available on Official Certificates of Veterinary Inspection, the electronic health certificates provide immediate ability to verify tests results and vaccines requires for the movement of animals.
The events that followed September 11, 2001, have raised the U.S. Department of Homeland Security’s attention to terrorist threats and prompted them to focus on security levels for foreign animal disease nationwide. This awareness reveals real concerns regarding the clear, present danger and need to safeguard animal health today and in the future. Any disease that affects livestock has various residual effects on all aspects of the horse industry both domestically and internationally.

States experiencing budget cuts may also be faced with the inability to allocate funds for certain forms necessary for regulatory compliance; therefore, compromising animal health regulatory management. Diagnostic lab connectivity and electronic health certificates provide equine practitioners key applications including diagnostic laboratory interface, real-time record keeping, accurate epidemiology data queries, tracking, and trace-back reports necessary for regulatory surveillance, monitoring and control of existing, emerging and/or foreign animal diseases.

Electronic health certificates offer the ability to create complete and legible documents, incorporate digital images and signatures of practitioners and lab technicians, compile real time data, allow for ease of data analysis, and disseminate documents to the appropriate animal health officials with the same ease as sending e-mail. Reduction of paperwork and time/cost benefits to administrative staff accomplishes the goals supported by USAHA, which are now in national implementation stages by USDA/APHIS/VS. This project compliments the goals of NAHLN and their partnership with state and federal agencies to safeguard animal health as well as fully coincides with the USAIP and NAIS.

Acknowledgements/References
Florida Department of Agriculture and Consumer Services
Kissimmee Diagnostic Lab, Kissimmee, FL
Professional Vet Lab, Ocala, FL
Antech Diagnostics, Tampa Bay, FL
E. COMMITTEE BUSINESS

REPORT OF THE USAHA/AAVLD COMMITTEE ON ANIMAL HEALTH INFORMATION SYSTEMS

Co-Chairs: Dr. Bruce L. Akey, Albany, NY
Dr. François Elvinger, Blacksburg, VA

Mr. John B. Adams, VA; Dr. J. Lee Alley, AL; Dr. Charles W. Beard, GA; Dr. Stan D. Bruntz, CO; Dr. James T. Case, CA; Dr. Max E. Coats, Jr., TX; Dr. Robert J. Eckroade, PA; Dr. Mark Engle, CO; Dr. Peter J. Fernandez, DC; Dr. Robert Fourdraine, WI; Dr. Jerome E. Freier, CO; Mr. Bob Frost, CA; Dr. Jorge Hernandez, FL; Dr. John P. Honstead, CO; Dr. Richard D. Hull, IL; Dr. Robert F. Kahrs, FL; Dr. David R. Kinker, IA; Dr. Stanley H. Kleven, GA; Dr. Elizabeth A. Lautner, NY; Dr. Donald H. Lein, NY; Ms. Jodi A. Luttropp, VT; Ms. Janet Maass, CO; Mr. Kevin D. Maher, IA; Mr. Larry D. Mark, VA; Dr. Charles E. Massengill, MO; Mrs. Phyllis Menden, WI; Dr. John R. Ragan, MD; Dr. Leon H. Russell, Jr., TX; Dr. Mo D. Salman, CO; Dr. Jack L. Schlater, IA; Dr. John A. Schmitz, NE; Dr. David Thain, NV; Dr. Mark C. Thurmond, CA; Dr. Jon C. Van Berkom, ND; Dr. Stephen E. Weber, CO; Dr. Richard D. Willer, AZ; Dr. Saul T. Wilson, Jr., AL; Dr. Nora E. Wineland, CO.

The Committee met on Monday, October 25, 2004 from 12:30 pm to 5:30 pm. There were 58 people in attendance, including 15 committee members, although at times there were in excess of 80 people in the room. Twenty attendees requested to be added to the committee roster. Drs. Akey and Elvinger presided. Minutes of the meeting are as follows:

Dr. Akey welcomed the participants and laid out the agenda for the session.

Dr. Stanley Bruntz, United States Department of Agriculture (USDA), Animal Plant Health Inspection Service (APHIS), Veterinary Services (VS), Center Epidemiology and Animal Health (CEAH), National Surveillance Unit (NSU), Fort Collins, Colorado presented an annual update on the National Animal Health Reporting System (NAHRS), now integrated with the newly created NSU at CEAH. In 2003, 40 states participated in the NAHRS, with 36 states reporting each of 12 months. As of September 2004, all but nine states were participating, with 5 of those slated to participate by the end of this year 2004. Recruitment of the last remaining non-participants is now directly supported by the APHIS administrator and the VS deputy administrator. Reporting is to be facilitated in the near future through a newly developed Web-based reporting tool, to be piloted in November 2004 and made available to
REPORT OF THE USAHA/AAVLD COMMITTEE

all states by February 2005. Dr. Bruntz presented a set of changes to the NAHRS Uniform Methods and Rules (UM&R), proposed at the NAHRS Steering Committee meeting, September 13-14, 2004, in Fort Collins, Colorado. The proposed changes and their dispositions are presented in the report of the business section at the end of this report.

Co-chair François Elvinger presented the outcome of the resolution submitted by this Committee, the USAHA Committee on Foreign and Emerging Diseases, and the Epidemiology Committee of the American Association of Veterinary Laboratory Diagnosticians at the 2003 Annual Meeting on Strategic Planning and Development of a National Animal Health Surveillance System (NAHSS). The resolution requested that USDA-APHIS-VS establish a working group to develop a strategic plan for animal disease surveillance. VS, under the leadership of Dr. Valerie Ragan, Assistant Deputy Administrator, put in place a NAHSS Steering Committee that participated and oversaw the drafting of such a strategic plan by and with the NSU, led by Dr. Brian McCluskey. The draft of the plan has been reviewed by the VS Management Team and has been posted for general review on the NSU website at: http://www.aphis.usda.gov/vs/ceah/ncahs/nsu/nahss_strategic_plan_draft.pdf.

Dr. Brian McCluskey, USDA-APHIS-VS-CEAH-NSU introduced the NAHSS Strategic Plan and the NSU. The NSU was established in late 2003 and currently is in the process of hiring the necessary staff to fulfill its mission as laid out in part in the NAHSS Strategic Plan. The Strategic Plan is to provide the framework to set priorities and create a roadmap for the transformation of current and design of future surveillance activities into the NAHSS to support greater protection of animal populations from endemic, emerging and foreign animal diseases. Surveillance is to be comprehensive, coordinated, and integrated, and needs to mobilize and rely on partnerships with all federal, state, and industry stakeholders. The Strategic Plan defines 4 major goals: 1. early detection and global risk surveillance of foreign animal diseases, and 2. of emerging diseases; 3. enhanced surveillance for current "program diseases"; and 4. monitoring and surveillance for diseases of major impact on production and marketing. Twelve objectives were defined and matched as appropriate to the 4 goals, with the addition of action items and target dates for those action items listed for all objectives. The NSU, which was recently combined with the National Animal Health Monitoring System (NAHMS) into the Center for National Animal Health Surveillance (CNAHS), is to assume the leadership role in design and implementation of the NAHSS.

Dr. James Case, California Animal Health and Food Safety Laboratory System, University of California, Davis, presented the status and future developments of the National Animal Health Laboratory Network (NAHLN) Information Technology (IT) component. The key goals of the NAHLN are the expansion of detection and response measures and
ANIMAL HEALTH INFORMATION SYSTEMS

capabilities for pathogens that threaten animal agriculture. Therefore the NAHLN is to bolster laboratory capability for select agents, which requires sufficient and well-trained personnel, appropriate equipment and testing. Standard diagnostic approaches for identification of select agents have to be deployed, data sharing among animal health agencies has to be bolstered, a secure, two-way communications network and a national repository for animal health data needs to be created. This requires the bolstering of cooperation and communication amongst animal health officials, and with maintenance of the confidentiality of source data has to provide alerts at appropriate response level. Four major areas for development of the NAHLN IT infrastructure have been recognized, including the development of a laboratory results repository to capture standardized result data, a laboratory registry of capabilities and capacity, and a registry of validated methods to support NAHLN labs, which are all linked by secure communications. Of the 12 laboratories identified for the first phase of NAHLN, 5 laboratories (California, Colorado, Iowa, National Veterinary Services Laboratory (NVSL), Washington) have been selected for the NAHLN IT pilot project to develop message profiles (using HL7 standards), and terminology subsets for tests (LOINC), for species/breeds and results (SNOMED), and unique identifiers (NAIS, ISO). Secure communication processes were established using cURL and digital certificates. Future developments include the expansion of the IT infrastructure to all NAHLN laboratories, which now number 44 laboratories in 37 States. This will require the development and distribution of detailed system requirements specification, the production of a comprehensive messaging implementation guide for laboratories, continued enhancement of terminologies to support the NAHLN (secure communications and visualization), training and resources for new laboratories, expansion of coverage of important diseases as resources become available and cooperation with other entities. Obstacles to full development and implementation of the NAHLN are the limited funding to support all activities, the limited resources in health information standards, the limited personnel time to dedicate to NAHLN activities, which leads to the establishment of interim solutions that do not conform to NAHLN standards.

Dr. Wayne Cunningham, Colorado State Veterinarian with the Department of Agriculture, Denver, Colorado, introduced the Tri-National Consortium National Animal Identification System Project. This project covers multiple species including cattle (beef and dairy), sheep and goats, horses, elk, and swine (premises only). The main questions addressed in multiple pilot projects are to determine if Radio-Frequency Identification (RFID) tags are practical as to their retention, readability and economic impact, and if a private company would be able to distribute the premises ID, and the animal ID and ID devices, to manage
REPORT OF THE USAHA/AAVLD COMMITTEE

the associated database, and to maintain confidentiality in a consortium including several Indian Nations, the States of Colorado, Arizona and New Mexico, and the adjacent Mexican States of Sonora and Chihuahua. The pilot projects are capitalizing on already available resources, personnel (including ~ 60 brand inspectors) and marketing channels, as well as taking advantage of existing databases (i.e. brand database) and are to determine what and when to ID, which could be either at change of ownership, at shipping time, branding time or calving time (birth), or eventually at heifer Brucella vaccination time. The projects contain educational components at the local, state and regional level. The pilot projects are to establish if interstate and international traceability within defined guidelines can be assured.

Mr. Charles Anderson, Computer Aid, Inc., provided the Committee with a succinct overview of the concept and uses of Data Warehouses and Data Marts. A Data Warehouse contains data from multiple databases or other sources and includes tools for selectively extracting and analyzing information. Because it pulls together information from multiple sources, queries and analysis can generate knowledge not attainable from any single source. Data Marts are considered a subset or smaller version of a Data Warehouse and generally are focused on one specific subject matter area. Perhaps the single most important process involved in the Data Warehouse is the Extract, Transform and Load (ETL) procedure which applies user defined rules for validating data and translating data from different sources into formats that are compatible and cross linked. A Data Warehouse can provide many types of functionality including data consolidation, multi-source analysis, trend analysis, disease surveillance and monitoring and data layers of Geographic Information Systems (GIS) viewing and analysis. In addition, it can serve as the nexus for harmonizing and formatting data to be passed on to other information systems such as the federal Generic Data Base (GDB) thus avoiding time-consuming double entry of data into multiple systems. Part of the implementation of a Data Warehouse includes the development of meta-data and history tables to track the source of information and any alterations to the data over time. Maintenance of Data Warehouse systems has become less onerous with the development of self-regulated database software capable of automatically conducting internal checks and corrections, reducing the cost of overall database administration. Successful development, implementation and use of a Data Warehouse depends on many factors including support from the highest administrative levels, defining realistic expectations, avoiding loading data just because it’s available, choosing a financially stable vendor, not missing out on adding non-traditional data types (pictures, recordings, etc.) and, perhaps most importantly, choosing a project leader that is firmly grounded in the needs of the end-user.
Dr. Steve Weber, USDA-APHIS-VS-CEAH Center for Animal Disease Information Analysis, Ft. Collins, Colorado, gave an update on the activities of the Information Technology Issues Group (ITIG) which was organized as a result of the USDA Animal Health Safeguarding Review. Recommendations from this review concerning Information Technology (IT) have been grouped into issues areas including electronic commerce, updated technology identification and implementation, leadership in setting information technology standards, development of interfaces with other databases and systems, confidentiality of data, the increasingly important role of GIS in animal health programs and the identification of changes needed in the IT infrastructure of VS. Progress has been made on one of the key action areas - Confidentiality. As a result of the acceptance of the action plan recommended by the ITIG, the VS Management Team agreed to the formulation of a task force to identify issues related to the confidentiality, privacy and security of information that is requested and maintained by VS. That task force met once in 2004 and expects to develop specific recommendations during FY 2005. Action plans for all of the other issue areas will be completed and presented to the VS Management Team in January 2005, for prioritization. Notable advances made by VS and its collaborators during FY 2005 that support the Safeguarding Review Recommendations include completion of a Veterinary Accreditation System, completion of the NAHLN pilot system, expansion of the use of the Interstate Certificate of Veterinary Inspection (ICVI) to 6 states and the implementation of the National Premises Allocator component of the National Animal Identification System (NAIS).

During the business section of the agenda, the previously mentioned changes to the NAHRS UM&R, proposed and approved during the NAHRS Steering Committee meeting held September 13-14, 2004, were submitted for approval by the membership of the Committee. These changes were: 1. (Page 20) add the definition for ‘confirmed disease’ to read as follows: “Disease confirmed by Chief, State Animal Health Official utilizing NAHRS reporting criteria for the disease, which may include references to compatible clinical signs, the specified standard of laboratory testing, and any additional epidemiologic information; in the remainder of the UM&R, replace the word ‘clinical’ with the term ‘confirmed disease’ where indicated; 2. (Page 21 last paragraph) remove the word ‘only’ in the sentence “The contents of the report will be distributed only to the Chief Animal Health Official of each participating State and select APHIS personnel.” The sentence refers to the Annual Summary Report with no reference to individual States or farms; 3. B101 Bovine Anaplasmosis - remove the complement fixation test as an approved test from the reporting criteria and to follow the World Organisation for Animal Health (OIE) manual; 4. B201 contagious equine metritis - state in the reporting criteria that “This disease is a
foreign animal disease for the United States of America …” in order to be consistent with the wording in the reporting criteria of all other foreign animal diseases; 5. B205 equine infectious anemia - word the first sentence of the reporting criteria to read as follows: “Presumptive diagnosis may be based on serology using a USDA-approved test (SA-ELISA II, CELISA, Vira-CHEKTM ELISA or AGID) as outlined in the Equine Infectious Anemia (EIA) UM&R”; 6. B206 equine influenza - change the reporting criteria to read as follows: “Presumptive diagnosis may be based on compatible clinical signs plus serology (HI). Definitive diagnosis is based on demonstration of the agent (virus isolation);” 7. B211 equine viral arteritis (EVA) - change the reporting criteria to read as follows: “Presumptive diagnosis may be based on compatible clinical signs plus serology (SN titer of 1:4 or greater) as outlined in the EVA UM&R. Definitive diagnosis requires demonstration of the agent (virus isolation), an epidemiologic investigation by a State or Federal Veterinarian and the concurrence of the State Chief Animal Health Official and the Federal Area-Veterinarian-in-Charge.”

Motions for acceptance of these changes were submitted and seconded for each of the listed changes. Discussions followed on anticipated approval by State Veterinarians (change 2.), approval of the change on bovine anaplasmosis by the bovine commodity working group (change 3.), flexibility provided to the State Veterinarian for determination of presumptive or definitive diagnosis (changes 5. and 6), especially given the possibility of vaccine induced antibodies (change 6.). All proposed changes were unanimously approved by the committee and forwarded to the USAHA President as a recommendation.

A resolution on Federal Funding for the NAHLN was unanimously approved by the members of the Committee and forwarded to the Committee on Nominations and Resolutions for approval by the general membership.
REPORT OF COMMITTEE ON
ANIMAL WELFARE

Chair: Dr. Steven Halstead, Lansing, MI
Vice Chair: Ms. Ria de Grassi, Sacramento, CA

Dr. Wilbur B. Amand, PA; Dr. Joan M. Arnoldi, MI; Ms. Mary K. Batcher, WA, DC; Dr. Dale D. Boyle, VA; Dr. Tim Cordes, MD; Ms. Ria de Grassi, CA; Dr. W. Ron DeHaven, MD; Dr. Julie Drier, MD; Paul DuBois, KS; Ms. Debra S. Duncan, KS; Ms. J. Amelita Facchiano, TX; Dr. Nancy A. Frank, MI; Mr. Daniel M. Goodyear, PA; Dr. Scott R. R. Haskell, WI; Mr. Del E. Hensel, CO; Dr. Richard D. Hull, IL; Dr. Pam J. Hullinger, CA; Mr. Tom J. Hunt, MI; Dr. Arthur J. Kennel, MN; Mr. John H. Lang, WI; Mr. Jay C. Lemmermen, FL; Ms. Cathy A. Liss, DC; Dr. Calvin W.S. Lum, HI; Ms. Amy W. Mann, VA; Dr. Charles E. Massengill, MO; Dr. Thomas J. McGinn, III, NC; Mr. Terry R Menlove, UT; Mr. Joe Miller, DC; Dr. Raymond L. Morter, IN; Dr. John R. Ragan, MD; Mr. Steven Roach, IA; Ms. June M. Reed, PA; Ms. Nancy J. Robinson, MO; Dr. David D. Schmitt, IA; Dr. Dale F. Schwindaman, MD; Dr. Bruce N. Stewart-Brown, MD; Dr. Carolyn L. Stull, CA; Dr. Paul Sundberg, IA; Mr. George Teagarden, KS; Dr. Robert M. S Temple, OH; Dr. Kenneth L. Thomazin, CA; Mrs. Michele C. Turner, CA; Dr. Charles D. Vail, CO; Dr. Gary M. Weber, DC; Mr. Dave Whittlesey, CO; Dr. Elizabeth S. Williams, WY; Dr. Norman G. Willis, CAN; Dr. Richard W. Winters, TX; Mr. Richard W. Winters, Jr., TX; Dr. Ernie Zirkle, NJ.

The Committee met on Tuesday, October 26, 2004, at the Sheraton Four Seasons, in Greensboro, North Carolina. Chair Steven Halstead called the meeting to order at 12:30 p.m. with 26 committee members and at least 27 guests in attendance.

Cathy Liss, President, Animal Welfare Institute (AWI) reported on results from the recent meeting of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Increased protections were provided to the great white shark, humphead wrasse, Irrawaddy dolphin and the Yellow-crested Cockatoo. Proposals on bobcats and lions were withdrawn. Japan’s proposal to downlist certain stocks of Minke Whales was defeated. The Bald eagle was downlisted from Appendix I to II allowing commercial trade. Namibia secured approval of commercial trade in elephant hides and hair, but failed to get an annual quota of 2 tons of ivory. They did, however, get approval for noncommercial trade in ekipas (ornamental worked pieces of ivory). A quota of five hunting trophies from black rhinos was approved for Namibia and S. Africa and the downlisting of the Swazi white rhino (population 61 animals) was approved so animals can be traded live (7%) or as trophies (1%).
Cathy reported that AWI’s development of species-specific humane standards for farm animals is continuing. These standards, with input from scientists and farmers, would permit animals to engage in species-typical behaviors. Whole Foods Market is undertaking a parallel effort, developing Animal Compassionate Standards, and AWI is participating in that process.

Regarding laboratory animals, AWI and the Johns Hopkins Center for Alternatives to Animal Testing are offering twelve Animal Welfare Enhancement Awards of $6,000 each for projects to refine the housing, handling, and/or experimental situations for animals used for research. The primate dealer, LABS, Inc. has pled guilty to a felony for shipping wild-caught macaques in violation of Indonesian law. Fraudulent documents claimed the animals were captive-bred. Three shipments illegally contained nursing mothers and unweaned young. One thousand animals were shipped in batches of about 200. Sentencing is scheduled for mid-November. Charles River Labs has been charged with animal cruelty in District Court in Alamogordo, NM. The facility, previously run by the Coulston Foundation, houses 288 chimpanzees owned by NIH and cared for by Charles River (the company was given $42 million to care for the primates for ten years.) Three chimpanzees with wounds were left in the overnight care of security guards. Two of the animals died. Finally, USDA’s case against Class B dealer CC Baird for hundreds of apparent violations of the AWA has been scheduled for January 2005.

Cathy closed with an account of deaths from the Avian Influenza (AI) outbreak in Asia where more than 100 million birds have been killed. In Thailand, 53 tigers have died from AI at a private zoo and 30 additional animals are sick. This is the H5N1 strain which has also killed at least 30 people.

Ann Diamond, J.D., Chief, Litigation, Assistant Criminal District Attorney, Office of the Tarrant County, Texas Criminal District Attorney (DA) described the legal actions leading to the recent response by the DA’s office to defend current Texas law that bans commercially possessing or transporting horse meat for human consumption. Texas law does not prohibit horse slaughter.

According to Ms. Diamond, the DA’s office did not file charges against horse slaughterhouses. The slaughterhouses sued the DA to prevent the filing of criminal charges. However, criminal charges were imminent because the former Texas Attorney General ruled that the long-standing Texas law that prohibits the handling of horsemeat for sale for human consumption is still in effect.

The slaughterhouses filed the original lawsuit and the DA’s office is defending itself and the laws of the State of Texas. The DA’s office takes the position that everyone must follow the law until that law is repealed by the Legislature or thrown out by the Courts. The Texas
ANIMAL WELFARE

Attorney General ruled that the slaughterhouses were not in compliance with the laws of Texas. It is the DA's duty, according to Ms. Diamond, to defend the laws of the State of Texas, and the Tarrant County DA is doing that.

Nora Wineland, DVM, Program Leader for the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), National Animal Health Monitoring Systems (NAHMS), National Center for Animal Health Surveillance (NCAHS), Centers for Epidemiology and Animal Health (CEAH), gave a status report of the non-ambulatory animal study mandated by the 2002 farm bill. She distributed a draft brochure entitled, “An Opportunity to Help America’s Livestock Industries by Participating in the First-Ever National Nonambulatory Livestock Study”, and invited feedback from the Committee (nora.e.wineland@aphis.usda.gov). This study will provide the first statistically reliable estimates on the number of non-ambulatory cattle, goats, horses, pigs, and sheep in the United States and provide insight as to how these animals are handled on-farm and at market. The study is a collaborative effort among the USDA, National Agricultural Statistics Service (NASS), APHIS-VS, producers, and livestock market operators. For this study, non-ambulatory adult livestock are defined as animals that cannot stand or walk for any reason (no minimum length of time), and non-ambulatory young livestock are defined as animals that cannot stand or walk for at least 12 hours.

In January 2004, USDA-NASS enumerators interviewed approximately 40,000 cattle producers (both dairy and beef) across the U.S. to determine the number and disposition of non-ambulatory cattle and calves. The interview will be repeated in January 2005. Results will be published in spring 2005.

From April 1 through April 27, 2005, a detailed on-farm questionnaire will be administered on a sample of dairy operations (from major dairy states) that had non-ambulatory cattle in 2004. In addition, as a means of comparison, the questionnaire will be administered on a sample of dairy operations that did not have non-ambulatory cattle in 2004. Results will be published in late 2005.

In January 2005, USDA-NASS enumerators will interview U.S. producers regarding the number and disposition of non-ambulatory sheep and goats. The interview will be repeated in January 2006 with both results published in spring 2006.

Erika Voogd, Owner, Voogd Consulting, presented an overview of animal welfare audits from her corporate perspective of helping consumers feel good about the meat that they eat. Ms. Voogd, who has trained under and worked extensively with Temple Grandin, Ph.D., provided a review of existing humane slaughter oversight responsibilities under USDA, Food Safety and Inspection Service (FSIS) law includ-
REPORT OF THE COMMITTEE

ing recent directives 6900.1 calling for “humane handling of disabled livestock” and 6900.2 regarding “humane handling and slaughter of livestock.” Directive 6900.2 includes the Humane Interactive Knowledge (HIKE) and Humane Activities Tracking (HAT) programs, which respectively require that “regardless of the circumstances, the establishment must maintain a proactive approach to humane handling of livestock,” and “federally inspected facilities document inspection activities to ensure that livestock are humanely handled.” Ms. Voogd reviewed 3rd party audit programs and presented examples of improvements in facilities and in facility management philosophy consistent with the HIKE and HAT programs. Inconsistencies remain, however, in that regulatory oversight and application is not uniform, and mid- and small-sized plants not subjected to 3rd party audits may not or do not have the resources to apply these concepts. Ms. Voogd concluded by stating her belief that the emphasis on humane handling will begin to move “upstream” to truckers, terminal markets, auction houses, and farms.

Gail Golab, Ph.D., DVM, Assistant Director, Communications Division, American Veterinary Medical Association (AVMA), presented a review of the presentation AVMA President Dr. Bonnie Beaver delivered to the AVMA House of Delegates earlier this fall. In this presentation, Dr. Beaver challenged the AVMA to take a stronger leadership role in developing national animal welfare policy. Dr. Beaver called upon the AVMA to establish an Animal Welfare Division within the organization and staff that division with highly motivated scientists, educators, and communicators who are current on global aspects of animal welfare issues and the related science.

Dr. Golab continued with a review of the activities and issues before the AVMA Animal Welfare Committee during the previous year. Dr. Golab began with a review of the AVMA administrative and leadership structures to illustrate the origins and routing of AVMA policies and positions. AVMA members, governmental and non-governmental agencies, members of the public, or literature reviews may trigger AVMA’s consideration of issues. Current “hot” topics engaging AVMA are induced molting of chickens, gestation housing of sows, and foie gras production. Other issues of AVMA interest, and in support of an expanded AVMA focus on animal welfare, are non-ambulatory animals, equine slaughter, feral cats, puppy mills, wild animals as pets, and pain and distress in animals.

Dr. Golab and Dr. Larry Shuler, former state veterinarian of North Dakota, provided an overview of the World Organisation for Animal Health (OIE) Global Conference on Animal Welfare held in Paris, France in February 2004. Over 400 participants representing more than 60 countries met to begin developing standards that would become the reference framework for the World Trade Organization (WTO) for inter-
ANIMAL WELFARE

national trade considerations. This initiative came from the 2001-2005 OIE Strategic Plan that recognized animal welfare as a priority. Dr. Golab and Dr. Shuler attended this conference representing AVMA and United States Animal Health Association (USAHA).

Participants developed the general agreement that standards should be based on science recognizing that ethical and cultural differences will exist. At the same time, there was recognition that wide variation in emphasis and progress of OIE member countries regarding animal welfare expectation, guidelines, educational emphasis, and stakeholder roles. Differences in voluntary versus regulatory philosophy, and on what role animal welfare should play in trade negotiations were also identified.

Following the Paris Conference the following Guiding Principles were adopted:

1. A critical relationship exists between animal health and animal welfare.
2. The internationally recognized “five freedoms” (freedom from thirst, hunger, malnutrition; freedom from fear and distress; freedom from physical and thermal discomfort; freedom from pain, injury and disease; freedom to express normal patterns of behavior) provide valuable guidance in animal welfare.
3. The internationally recognized “three R’s” (reduction in numbers of animals, refinement of experimental methods, and replacement of animals with non-animal techniques) provide valuable guidance for the use of animals in science.
4. The scientific assessment of animal welfare involves diverse elements that need to be considered together, and selecting and weighing these elements often involves value-based assumptions that should be made as explicit as possible.
5. The use of animals in agriculture and science, and for companionship, recreation and entertainment, makes a major contribution to the well being of people.
6. The use of animals carries with it an ethical responsibility to ensure the welfare of such animals to the greatest extent practicable.
7. Improvements in farm animal welfare can often improve productivity and food safety and hence lead to economic benefits.
8. That equivalent outcomes (performance criteria) rather than identical systems (design criteria) be the basis for comparison of animal welfare standards and guidelines.

Additionally, post-conference comment deadlines have passed. Products of these comments will be presented to the OIE membership by May 2005. Comments submitted by USDA can be viewed at www.aphis.usda.gov/vs/ncie/oie/#terrestrial, and Proceedings of the Conference are available at www.oie.int
REPORT OF THE COMMITTEE

Elizabeth Goldentyer, DVM, Eastern Regional Director, USDA-APHIS, Animal Care (AC), presented the annual update on USDA-AC programs and enforcement activities. Highlights include the addition of staff in the past year resulting in a significant increase in inspections and facilities brought under USDA authority. Enforcement action resulted 205 warning notices and enforcement investigations, with $548,614 in penalties levied.

Concluding the general session, the USAHA Committee on Animal Welfare moved to the annual business meeting with the following actions:

The Committee on Animal Welfare adopted the following statement as the mission of the committee: “The USAHA Committee on Animal Welfare explores animal welfare concerns and seeks to present data in an honest, unbiased, science-based manner for USAHA membership to evaluate. In this capacity, the committee serves as a forum for promoting dialogue between the various animal welfare groups and industry and for promoting the development of broad-based animal welfare solutions.”

The Committee discussed a proposed resolution on dairy cow tail docking requesting the USDA recognize currently available scientific data on tail docking in U.S. dairy herds and opposing the practice of tail docking in developing regulatory policies and educational materials. Subsequent discussion of the issue questioned the sufficiency of information opposing tail docking as a routine practice. The Committee voted to not approve this proposed resolution. In further discussion it was suggested that the dairy industry should provide information detailing why and under what circumstances that they dock tails.

The Committee approved a resolution encouraging the U.S. animal agriculture sector to continue their efforts to develop and implement science-based animal care guidelines that will help ensure the humane treatment of animals and discouraging attempts to resolve these issues through legislative and regulatory mandates. It was forwarded to the Committee on Nominations and Resolutions for approval by the general membership.
REPORT OF THE USAHA/AAVLD COMMITTEE ON AQUACULTURE

Co-Chairs: Dr. Scott E. LaPatra, Buhl, ID  
Dr. Thomas J. Baldwin, Logan, UT

Dr. Deborah L. Brennan, MS; Dr. Gary L. Brickler, WA; Dr. Jones W. Bryan, SC; Dr. William W. Buisch, NC; Dr. John A. Caver, SC; Dr. Robert G. Ehlenfeldt, WI; Dr. Najam Q. Faizi, VA; Dr. James M. Foppoli, HI; Dr. Anthony M. Gallina, FL; Dr. Joe S. Gloyd, DE; Mr. Robert E. Good, FL; Dr. Larry M. Granger, MD; Dr. Christopher H. Hannafin, RI; Dr. Robert M. Harbison, AR; Dr. Scott R. Haskell, CA; Dr. Burke L. Healey, OK; Dr. Donald E. Hoenig, ME; Dr. Robert F. Kahrs, FL; Dr. Vader M. Loomis, PA; Mr. Larry D. Mark, VA; Mr. Daniel P. Marsh, MI; Dr. Robert B. Miller, VA; Dr. Charles Palmer, CA; Mr. Richard P. Peterson, CA; Dr. H. Graham Purchase, DE; Dr. John P. Sanders, Jr., WV; Dr. A. David Scarfe, IL; Dr. Roy A. Schultz, IA; Dr. Sang J. Shin, NY; Dr. Scott R. Syska, MO; Dr. Lewis P. Thomas, NV; Dr. Peter H. Timm, CA; Dr. Norman G. Willis, CAN; Ms. Ria de Grassi, CA.

Co-chair Scott LaPatra opened the Committee meeting at 12:30 pm. Attendees were welcomed and asked to introduce themselves.

Betsy Hart provided an update from the National Aquaculture Association (NAA), a producer organization. The diverse nature of the membership was emphasized, including representation of all aquacultured species. The NAA provides a unified voice for aquaculture, helping to assure the vitality of the various aquaculture industries. NAA committees represent various components of aquaculture, and through their governing board, assure a united stand on issues. The NAA offers a strong informational web site. Current issues facing organized aquaculture were reviewed, including the National Animal Identification Program and environmental issues.

Dr. Valerie Ragan, Associate Deputy Administrator United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) provided an update on the National Animal Identification Program (NAIP). NAIP is being developed for disease eradication, and is applicable to any disease and all livestock. They are currently assessing applicability to aquaculture and how to best implement an effective program; i.e. the program needs to be tailored to the animals in question. An aquaculture industry working group has been formed that is working with USDA-APHIS-VS on an acceptable plan for the use of the NAIP in the aquaculture arena.

USDA-APHIS-VS Deputy Administrator Dr. John Clifford and Dr. Jill Rolland, USDA-APHIS-VS gave an update from USDA-APHIS. USDA has found it important to work closely with the aquaculture in-
dustry in establishing programs and protocols related to aquatic animal diseases that could threaten the aquatic industry. The National Aquatic Animal Health Plan (NAAHP) is being developed, which is a guidance document, with three federal agencies involved: Commerce, Interior, and USDA. A partnership of these agencies with industry and professional representatives has been created to develop a transparent plan based upon consensus. They presented a summary of the NAAHP as well as an update on the response to recent outbreaks of infectious salmon anemia (ISA), spring viremia of carp (SVC), and white spot disease of shrimp. European Union-generated directives related to export of fish, fish products, and mollusks to the EU were reviewed. These presentations generated lively audience discussion related to USDA interactions with and impact upon producer groups and aquaculture-related commerce.

David Scarfe presented an update from American Veterinary Medical Association (AVMA) Aquatic Veterinary Medicine Committee (AVMC). The background and activities of the AVMA-AVMC, formerly known as the Aquaculture and Seafood Advisory Committee, were presented. The AVMC has addressed a wide variety of topics related to aquatic animal health, regulatory issues, and environmental concerns. These include national aquatic animal health programs, diagnostics, therapeutic agents, effluents, seafood safety, and promotion of the important role of veterinarians in the aquaculture industry.

Dr. Bob Kahrs discussed the Whitney Laboratory for Marine Science. The Whitney Laboratory in St. Augustine, Florida is affiliated with the University of Florida and developing a program in marine animal health that includes development of a Center for Marine Animal Health. Training and funding are available for graduate students and post-doctorates. Attendees were urged to contact the laboratory director for more information.

Co-chair Scott LaPatra gave an update from the Fish Health Section (FHS) of the American Fisheries Society (AFS). The AFS-FHS has continued its active involvement in fish health issues at all levels. The organization provides expertise to a variety of stakeholders, both public and private, in the aquaculture industries. The FHS provides professional certification, continuing education and regional and national meetings. They have recently developed a Standard Inspection Manual in collaboration with the United States Fish and Wildlife Service that is reviewed annually and has been provided to the National Aquatic Animal Health Taskforce.

Dr. Victoria Bridges discussed “Forecasting Disease Emergence in the Aquaculture Industry.”

A presentation from the USDA-APHIS-VS Center for Emerging Issues summarized their overall activities related to analysis of emerging animal diseases, surveillance systems for emerging animal health
AQUACULTURE

events, and tracking and trending of health events. A current project is focused on forecasting disease in the aquaculture industry. The goal is to develop a “disease emergence profile” for the food fish industry. This includes describing characteristics of disease emergence factors through analysis of current situations and the forces for change. Predictive, decision-making tools are the anticipated result of this work.

Committee resolutions from the 2003 Annual Meeting were reviewed and discussed, including their fate and USDA's response.

Dr. Stan Bruntz presented a request on behalf of the Committee on Animal Health Information Systems with respect to the National Animal Health Reporting System (NAHRS). This group is requesting appointment of a chair for the Aquaculture group. A motion was passed to appoint Jerry Heidel as the chair of the NAHRS Aquaculture Commodity Working Group and to have him contact existing members to assess their willingness in continuing their membership. In the absence of such willingness, the vacant positions will be filled with appropriate members.

The Committee discussed three proposed resolutions. Two were approved by the Committee and submitted to the Committee on Nominations and Resolutions for approval by the general membership.

The Committee discussed a proposed resolution on the listing of the paramyxean protozoan parasite Marteiliodes chungmuensis, known to infect oyster species including the Pacific oyster, Crassostrea gigas, and the Iwagake oyster, Crassostrea nippona, and possibly other bivalve species, as a Notifiable Disease in the World Organisation for Animal Health (OIE) International Aquatic Animal Health Code. The subject was introduced by Jerry Heidel on behalf of Ralph Elston and the Pacific Coast Shellfish Growers Association. After discussion, the proposed resolution was not approved. It was suggested that Dr. Elston directly contact Dr. Jill Rolland, USDA-APHIS, with a request for USDA-APHIS to consider listing of this parasitic disease. This would initiate a thorough review of the condition to determine if there is sufficient data to support this listing. Additionally, Dr. Elston should seek further producer support for diverse geographical areas of the United States. This proposed resolution was not approved.

A resolution introduced by Maine State Veterinarian Dr. Don Hoenig was approved. It requested USDA-APHIS to begin to work immediately to establish sufficient, annual funding for the long-term maintenance of the USDA-APHIS-VS program for ISA including indemnification for loss incurred by U.S. salmonid growers in the implementation of the program.

A resolution introduced by co-chair Scott LaPatra was also approved. It requested USDA-APHIS-VS determine if the data needed to perform credible risk assessments exists, to identify information gaps, and to fill in those gaps for the prevention of the introduction and the potential establishment of viruses of finfish of economic significance into the US commercial farmed fish industry sectors.
REPORT OF THE COMMITTEE ON BIOLOGICS AND BIOTECHNOLOGY

Chair: Mr. Robert W. Tully, Lenexa, KS
Vice Chair: Dr. Eric J. Neumann, Des Moines, IA

Mr. J. Bruce Addison, MO; Dr. Gary A. Anderson, KS; Dr. Joan M. Arnoldi, WI; Dr. Charles A. Baldwin, GA; Dr. Karen K. Brown, MO; Dr. Yung Fu Chang, NY; Ms. Mary Lou Chapek, NE; Dr. Vergil S. Davis, DE; Dr. James J. England, ID; Dr. William H. Fales, MO; Dr. Patricia L. Foley, IA; Dr. Robert W. Fulton, OK; Dr. Joe S. Gloyd, DE; Dr. Keith N. Haffer, SD; Dr. Larry L. Hawkins, GA; Dr. Rudolf G. Hein, DE; Dr. Richard E. Hill, IA; Mr. Joe N. Huff, CO; Mr. Majon Huff, CO; Dr. Robert F. Kahrs, FL; Dr. Hiram N. Lasher, DE; Dr. Lloyd H. Lauerman, WA; Mr. John C. Lawrence, Me; Dr. Randall L. Levings, IA; Dr. Stewart McConnell, TX; Dr. Chuck A. Mihaliak, IN; Dr. Robert B. Miller, VA; Mr. Mark J. Owens, IA; Dr. Marshall Phillips, PA; Mr. Bob E. Pitts, GA; Dr. Annette Rink, NV; Dr. Roy A. Schultz, IA; Mr. Donald A. Shane, WI; Dr. Sheila Tan, CAN; Dr. Deepanker Tewari, PA; Dr. Deoki N. Tripathy, IL; Ms. Mary Anne Williams, CA; Dr. W. H. Wohler, TX.

The Committee on Biologics and Biotechnology met on Wednesday, October 27, 2004, from 8:00 am to 12:00 pm. Four members and 15 guests were present. Chair Robert Tully welcomed the participants to Greensboro and the Committee meeting. The agenda for the meeting and last year’s Committee report were reviewed and attendees introduced themselves.

Dr. Richard Hill, Director, United States Department of Agriculture (USDA), Animal and Plant Health Inspection Services (APHIS), Veterinary Services (VS), Center for Veterinary Biologics (CVB) reviewed a number of CVB activities that have occurred over the last year. They include:

a) Review of CVB Output (see charts on next page)

b) Discussion of international harmonization efforts in a talk entitled “VICH – International Cooperation on Harmonization of Technical Requirements for the Registration of Veterinary Biologics.” (see http://vich.eudra.org/). VICH is a trilateral (EU-Japan-USA) program aimed at harmonizing technical requirements for veterinary product registration. VICH was officially launched in April 1996. Dr. Hill presented the background, objectives, history and process of the International Harmonization of Standards for Veterinary Biologics. He spoke about the 15th steering committee meeting in Berlin, Germany that he returned from this month. At this meeting the charter was re-authorized with some modifications to the VICH process and work plan after 2005. The next meeting will be in Washington, DC May 24-25 and 28, 2005.
He then reviewed accomplishments and problem areas VICH has experienced up to this time. He feels a major outcome at this point is that Japan is going to change regulatory direction of veterinary biologics by adopting the Master Seed Concept.

c) Dr. Hill presented an overview on licensing plant-derived vaccines in a talk entitled “CVB Licensing Guidelines for Plant Derived Biologics.” Dr. Pat Foley and Louise Henderson developed the presentation as a result of their involvement with the Food and Drug Administration (FDA) on this subject. This presentation was an update on dialogue between USDA-APHIS-CVB and FDA regarding development of regulatory guidelines and jurisdictional authority for future plant derived biotech products. This dialogue has occurred over the past 2 or 3 years. The presentation highlighted the differences, similarities and
challenges of applying this technology to commercial products while protecting animals, man and the environment.

Dr. Lawrence Elsken, Section Leader, Compliance with the Center for Veterinary Biologics-Inspection and Compliance (CVB-IC) reported that CVB-IC activities in fiscal year 2004 have resulted in continued compliance with the regulations and standards promulgated under the authorities in the Virus-Serum-Toxin Act (VSTA). CVB-IC monitors 122 active licensees and permittees at nearly 175 sites. CVB conducted 33 in-depth inspections, 2 follow-up inspections and 54 special inspections. The majority of special inspections were conducted for pre-licensing or new facilities and to inspect licensed manufacturers for compliance to the Select Agent regulations as part of the registration process under the Agriculture Bio-terrorism and Preparedness Act of 2002.

In Fiscal Year 2004, CVB processed 524 requests for Export Certificates (serial) and nearly 3,000 Certificates of Licensing and Inspection (product). Export activities by serial more than doubled this fiscal year and export activities by product reduced by approximately 24%. The reduction in product exports was due mainly to the positive case of Bovine Spongiform Encephalopathy (BSE) in the state of Washington. Serials reviewed and processed by CVB were reported and summarized as 16,214; 15,789 serials were released for marketing. In addition, a pilot study was conducted on the new Administrative Inspection Review program and was reported. This new inspection process will be implemented with all licensees and will reduce the administrative time required for licensees to gather information during an inspection and allow the licensees to conduct these reviews and submit information to CVB on a scheduled basis.

Quality Assurance (QA) activities were reported including assignment of QA Leads within each CVB-Product Evaluation and Licensing laboratory section and development of a QA Vision Statement by the CVB Directors. This vision statement will be reviewed annually and updated to reflect ongoing changes as appropriate. Interactive audits at the laboratory have also been conducted utilizing Inspection and Compliance Inspectors and have been extremely useful for the laboratories.

Compliance activities reported included updates on investigation numbers for CVB (35 opened, 42 closed). The breakdown of investigations opened was 12 for unlicensed entities and 23 opened on licensed biologics firms. The licensed firms investigations opened included false and misleading advertising, promotions and/or product labeling. In addition, information was provided on compliance concerns related to animal owner exemptions and autogenous products under 9 CFR Part 107. An update on pharmacovigilance activities was also provided and progress within VICH and publication of a proposed rule
BIOLOGICS AND BIOTECHNOLOGY

for CVB continues. Voluntary reports of adverse events continue to decrease due primarily to the dissolution of the Veterinary Practitioners Reporting network and unfamiliarity of reporting adverse events to CVB. 259 reports were received in fiscal year 2004. These reports were summarized by species and event type and provided to attendees.

Progress continues toward development of the Licensing, Serial Release and Testing Information System (LSRTIS). This is the CVB portion of the VS Ames Automated Information Management System. Phase I was completed in 2003 and progress is now beginning on phase II which will include the laboratory sample receipt and test result, as well as the serial release components.

A time-specific Committee paper entitled “Development of Plant Cell Produced Vaccines for Animal Health Applications” was presented by Charles A. Mihaliak, Dow AgroSciences. The complete text of this paper is included in these proceedings.

The Committee discussed revision to the Committee Mission Statement. Several years ago, the USAHA Committee on Biologics was combined with the USAHA Committee on Biotechnology to create the Committee on Biologics and Biotechnology. To complete this merger, a new mission statement was adopted in order to reflect the objectives of the new committee. That new mission statement is: “The purpose of the Committee on Biologics and Biotechnology is to monitor 1) new developments in veterinary biologics, 2) regulation of the manufacture, distribution and use of veterinary biologics, and 3) needs of the livestock industries for new biological products. The Committee has the responsibility of keeping abreast and advising USAHA of new biotechnology, products and regulations that may have profound economic implications on animal health. Further, the Committee provides a forum to focus on issues and developments in the field of biotechnology that are designed to provide protection to man, animals and the environment. Committee action may be in the form of recommendations to the USAHA President for action or, in the case of major issues, resolutions to be considered by the General Session.”

The Committee expressed their dissatisfaction with the scheduled meeting time. Scheduling of the Committee meeting late in the USAHA meeting schedule likely contributed to the poor attendance. Additionally, this year’s meeting time overlapped with the meetings of the Committee on Public Health and Rabies, and the Committee on Pharmaceuticals, both of which have the potential for agenda items that impact individuals on this Committee. The group encouraged the chair to work with the USAHA leadership to find a more suitable time for holding the Committee meeting.

A resolution was approved supporting USDA-APHIS-CVB to assume the jurisdiction for animal disease vaccines that also have a pub-
lic health benefit.

A discussion of the issues surrounding the worldwide availability of fetal bovine serum and previous USDA actions in 1992, 1994 and 1998 concerning Fetal Bovine Serum (FBS) was presented by Percy Hawkes. As a result of the discussion, a resolution was approved requesting USDA, APHIS, VS to re-propose the use of gamma irradiation for the importation of Fetal Bovine Serum from countries or regions that are free of BSE but that have restrictions because of other pathogens.

Both resolutions were forwarded to the Committee on Nominations and Resolutions for approval by the general membership.

DEVELOPMENT OF PLANT CELL PRODUCED VACCINES FOR ANIMAL HEALTH APPLICATIONS

Charles A. Mihaliak\textsuperscript{1}, Steven Webb\textsuperscript{1}, Timothy Miller\textsuperscript{2}, Matt Fanton\textsuperscript{2}, Dwayne Kirk\textsuperscript{3}, Guy Cardineau\textsuperscript{3}, Hugh Mason\textsuperscript{3}, Amanda Walmsley\textsuperscript{3}, Charles Arntzen\textsuperscript{3} and Joyce Van Eck\textsuperscript{4}

\textsuperscript{1}Dow AgroSciences LLC, Indianapolis IN, \textsuperscript{2}Benchmark Biolabs, Lincoln NE, \textsuperscript{3}Arizona State University, Tempe AZ, \textsuperscript{4}Boyce Thompson Institute, Ithaca NY

Rapid advancements in the field of vaccines made from plants over the past decade have provided evidence that the technology may be able to address numerous animal disease issues. Expression of recombinant proteins in plants has become a well-established practice leading to many commercially successful applications. Advances in recombinant DNA technology and plant cell transformation also allow introduction of antigen genes derived from viral and bacterial diseases into plant cells and provides the basis for new vaccine technology developments in Animal Health (Curtiss and Cardineau 1988).

Several laboratories have explored the production of immunogens in recombinant plant systems. Arntzen and colleagues demonstrated that the hepatitis B surface antigen produced in transgenic tobacco antigen was indistinguishable from the native antigen (Mason et. al, 1992). Several other antigens have subsequently been produced in plant systems including, E. coli heat labile enterotoxin (Haq et. al., 1995), the Norwalk virus capsid protein, (Mason et. al, 1996) and the rabies virus glycoprotein (McGarvey et. al., 1995). Since these early investigations, over 20 additional antigens have been expressed in a variety of plant systems, further demonstrating the feasibility of the approach and representing a basis for the development of commercial plant-made vaccines for the animal health industry (Walmsley and Arntzen. 2003).
BIOLOGICS AND BIOTECHNOLOGY

Plant cell produced vaccines have the potential to combine the convenience of existing vaccine products with improved efficacy and safety attainable through delivery of potent, mucosally active antigens without using animal origin materials during production. The potential for plant cell produced vaccines to deliver safe, convenient and efficacious products to improve disease control is unparalleled when compared with existing and emerging technologies. The plant cell produced vaccine production system is based on the use of a recombinant plant cell line. Vaccine production occurs when a recombinant cell line expressing an antigen is grown as a suspension culture in a conventional bioreactor system. Large quantities of vaccine can be produced in a bioreactor system in a relatively short time period (weeks). Minimal processing of the harvested cells is necessary to extract and prepare the antigen for formulation into the final vaccine.

The current study was undertaken to demonstrate the validity of the plant cell produced vaccine system for animal health applications. Proof of concept research for plant-cell produced vaccines has been conducted using a poultry model for Newcastle Disease Virus (NDV).

NDV is a global pathogen in poultry best controlled through vaccination. Effective vaccination programs are well developed for the control of NDV (Beard and Brugh, 1975) and are widely used in commercial poultry operations. In chickens, Newcastle Disease (ND) is characterized by lesions in the brain or gastrointestinal tract, morbidity rates near 100 percent, and mortality rates as high as 90 percent in susceptible chickens. A single, dominant viral surface antigen, haemagglutinin/neuraminidase (HN), is known to provide protection against NDV. A well-defined disease challenge model is established for NDV. This model is based on a standard challenge test defined by the United States Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services, Center for Veterinary Biologics (Torres, 1999) using the Texas GB strain of NDV. Standardized hemagglutination inhibition analyses have also been developed which allow for measurement of antibody titers as an indicator of disease protection.

Recombinant plant cell lines were generated via Agrobacterium transformation to express a gene encoding for the HN antigen. Proof-of-Concept studies were conducted to demonstrate the technical feasibility of the production system at laboratory scale. The study was designed to address critical questions during the technical proof of concept stage: including whether vaccine antigens be expressed in the plant cell lines and whether target animals immunized with the plant-made antigen be immunologically protected against a disease challenge.

A recombinant plant cell line which has been engineered to express the gene encoding for the HN protein from NDV has been created. Expression and in-vitro activity of the plant cell expressed HN
antigen were verified by Enzyme Linked Immunosorbent Assay (ELISA) and hemagglutination inhibition, respectively. A master seed established from the cell line was then used to produce vaccine containing the HN antigen. Vaccine was prepared from a pool of bulk antigen after growth of the plant cell suspension in a bioreactor culture derived from the master seed.

A disease challenge study was conducted to determine whether the plant cell expressed HN antigen could successfully protect chickens from an NDV disease challenge. Four dose levels of the vaccine were prepared as well as a control vaccine derived from non-transformed plant cells. Formulated vaccines were analyzed for HN concentration prior to each vaccination using an HN-specific ELISA. The reference antigen used was a semi-purified HN preparation derived from a LaSota NDV strain.

After an 8-day acclimation period, specific pathogen free chicks were assigned to each treatment group. On Day 0 of the trial, each chick was vaccinated subcutaneously into the loose skin of the neck area with 0.5 mL of either the plant cell produced vaccine or a control cell lysate. On Day 14, birds were vaccinated subcutaneously with a second dose of vaccine or control cell lysate. On Day 28 of the trial, all birds except for the unchallenged controls were challenged with NDV Texas GB strain by intramuscular injection into the right breast. Each 0.5 ml dose contained approximately 1x10² ELD50.

Individual blood samples were collected from each bird on Day 24. Antibody specific response to vaccination was determined by a standardized hemagglutination-inhibition assay using the LaSota NDV strain. Clinical observations were recorded daily for 14 days post-challenge to measure the ability of the vaccine to protect against disease challenge.

Results from this study demonstrated that birds vaccinated subcutaneously with a non-replicating, subunit HN antigen from NDV, derived from recombinant plant cell culture can protect against lethal challenge to NDV (Table 1). Serologic response to vaccination was measurable in birds from all treatment groups. The dose response capable of greater than 90% protection ranged between 3 and 33 mg/dose with overall protection of 95%. This study has demonstrated that plant-cell produced vaccines are capable of providing protective immunity against NDV. Further, these data positively answered the proof of concept objectives of demonstrating antigen expression in plant cells, serologic conversion and protection from disease challenge.
Table 1. Summary of results of a disease challenge trial to demonstrate potency at different dose levels of a plant cell derived HN antigen against a virulent Newcastle disease virus strain.

*a For the purposes of calculating the HAI average, titers of <8 were assigned a value of 1

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Antigen Dose (mg HN)</th>
<th>Challenge</th>
<th># of Birds/ # Protected</th>
<th>HAI Average</th>
<th>% Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>0.0</td>
<td>Unchallenged</td>
<td>14/14</td>
<td>&lt;8</td>
<td>100</td>
</tr>
<tr>
<td>Control</td>
<td>0.0</td>
<td>Challenged</td>
<td>0/14</td>
<td>&lt;8</td>
<td>0</td>
</tr>
<tr>
<td>Plant cell HN</td>
<td>33</td>
<td>Challenged</td>
<td>14/14</td>
<td>77</td>
<td>100</td>
</tr>
<tr>
<td>Plant cell HN</td>
<td>11</td>
<td>Challenged</td>
<td>12/14</td>
<td>19</td>
<td>86</td>
</tr>
<tr>
<td>Plant cell HN</td>
<td>5</td>
<td>Challenged</td>
<td>14/14</td>
<td>8</td>
<td>100</td>
</tr>
<tr>
<td>Plant cell HN</td>
<td>3</td>
<td>Challenged</td>
<td>13/14</td>
<td>3</td>
<td>93</td>
</tr>
</tbody>
</table>

Similar results have also been obtained in disease challenge studies using Avian Influenza and other poultry diseases after chickens were immunized with plant cell produced antigens. Preliminary studies have also provided promising data to suggest that mucosal stimulation is feasible with low doses of plant-cell produced vaccines.

The successful demonstration of the utility of plant cell produced vaccines positions this system to begin providing solutions to many of the existing and emerging animal disease challenges. Potent and effective plant cell produced antigens are demonstrated to be effective in protecting against disease challenge and are amenable to delivery via multiple routes. There is no risk of shedding or spreading of the disease, or of “environmental escape” of the vaccine vector. Once harvested, the entire production process occurs in fully contained facilities, the final product is non-replicating and the plant material can no longer replicate. No animal origin materials are required for vaccine production and studies have demonstrated that the vaccines can be prepared to be free of mycoplasma and other extraneous agents. Freeze dried preparations of the antigen can be stored for long periods (years) at room temperature. Plant cell produced vaccines also offer the opportunity to easily developed diagnostics which allow differentiation of diseased and vaccinated animals since only a single antigen is expressed. The vaccine is highly specific to the disease agent; thus, diagnostics tools can be tailored specifically for the purpose of differentiation.

Effective detection, control and prevention of animal disease are of
REPORT OF THE COMMITTEE

the utmost importance to maintaining the health of world poultry and livestock product markets. An ideal vaccine would induce mucosal immunity specific to the infection, have long duration, require minimal or no boosters, have impeccable safety, would not induce adverse reactions, and would be easy to administer. The desire to meet these criteria, and especially safety, necessitate development of vaccines that do not depend on the use of viable disease agents (Bowerstock and Martin, 1999). In addition, any new vaccine must be designed to allow for differentiation of vaccinated and infected animals (DIVA strategy). Plant-cell produced vaccines have the potential to meet the desired criteria of an ideal vaccine.

Therefore, it is highly desirable to employ vaccines which induce protective mucosal immune responses. A major barrier to inducing mucosal immunity is delivery of safe vaccines to the mucosal site. Practical difficulties in delivering mucosal vaccination have been primarily due to the limited availability of efficacious mucosal vaccines. As a result, most vaccines only stimulate production of circulating antibodies that do not necessarily cross to mucosal sites (Bowerstock and Martin, 1999).

References
REPORT OF THE COMMITTEE ON BLUETONGUE AND BOVINE RETROVIRUSES

Chair: Dr. James E. Pearson, Ames, IA
Vice Chair: Dr. William C. Wilson, Laramie, WY

Dr. T. Lynwood Barber, CO; Dr. Edward J. Dubovi, NY; Dr. James F. Evermann, WA; Dr. Najam Q. Faizi, VA; Dr. Adele Faul, South Africa; Dr. Robert W. Fulton, OK; Dr. Bob Gerlach, AK; Dr. Chester A. Gipson, MD; Dr. Christopher M. Grocock, NY; Dr. Robert B. Hillman, NY; Dr. Thomas J. Holt, FL; Dr. Brian R. Jamieson, CAN; Dr. Robert F. Kahrs, FL; Mr. Oscar Kennedy, VA; Dr. Jorge W. Lopez, Brazil; Dr. N. James MacLachlan, CA; Dr. Stewart McConnell, TX; Dr. James O. Mecham, WY; Dr. Lyle D. Miller, IL; Dr. Eileen N. Ostlund, IA; Dr. Theron G. Snider, Ill, IL; Dr. David E. Stallknecht, GA; Ms. Susan W. Tellez, TX; Dr. Mark C. Thurmond, CA; Dr. Thomas E. Walton, CO; Dr. George O. Winegar, MI; Dr. Andres de la Concha, TX.

The Committee met on October 26, 2004. There were 38 members and guests in attendance. James E. Pearson, Chair, and William C. Wilson, Vice Chair, conducted the meeting.

Dr. Jim MacLachlan University of California, Davis, discussed the 3rd International Bluetongue Symposium that was held in Taormina, Sicily October 26-29, 2003. The meeting was sponsored by Italian Ministry of Health, European Union, and the World Organisation for Animal Health (OIE) and organized by the Instituto Zooprofilattico Sperimentale dell'Abruzzo e del Molise “G Caporale” and Instituto Zooprofilattico Sperimentale della Sicilia “A Mirri”, Teramo Italy. The program was developed by Executive and Steering Committees representing all regions of the world. The format of the meeting was invited oral presentations and poster presentations of other scientific information. The areas addressed included the current global situation; epidemiology and vectors; bluetongue virus and bluetongue disease; diagnostics; control using vaccines; and control and trade issues.

Working Groups were designated, which developed the conclusions and recommendations for the meeting. The proceedings are being published in a special color edition of Veterinaria Italiana, Instituto Zooprofilattico Sperimentale dell'Abruzzo del Molise G. Caporale, Teramo, Italy. There were over 300 registered participants representing all regions of the world with 45 oral presentations and over 90 posters. The points of emphasis from the meeting included that the current diagnostic technology is adequate; that viremia is of limited duration in animals; that there is a need for better surveillance worldwide; that the concept of global ecosystems needs to be developed; that there is a need to better define the precise role of insects in the
BLUETONGUE AND BOVINE RETROVIRUSES

global ecology of bluetongue virus (BTV) infection; and that there is a need for new generation of vaccines. It is anticipated that the information from this meeting will serve as a basis for the revision of the OIE Terrestrial Animal Health Code (Animal Health Code).

A time-specific Committee paper entitled “Bluetongue control and vaccination: What bluetongue Standard should be adopted by Office International des Epizooties” was presented by Dr. Enzo Caporale, Director, Istituto Zooprofilattico Sperimentale, dell’Abruzzo e del Molise ‘G. Caporale’, Via Campo Boario, 64100 Teramo, Italy and President of the OIE Scientific Commission. There was an extensive discussion after the presentation by Dr. Caporale. It was recommended by the Chair that interested parties that had comments on the changes should provide them to Dr. Michael David, United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS).

Dr. Eileen Ostlund, USDA-APHIS-VS, National Veterinary Services Laboratories (NVSL), Ames, Iowa, gave a presentation entitled “Update on Diagnostic Observations for Bluetongue, Epizootic Hemorrhagic Disease (EHD) and Bovine Leucosis Virus (BLV) in the United States.”

In 2003, virus isolation attempts for BTV and/or EHDV were completed on 216 samples and 205 samples were tested by PCR. There were 195 submissions of imported fetal bovine serum for BTV safety testing by sheep inoculation requiring 345 sheep. None of the sheep inoculated with imported fetal bovine serum in 2003 developed BTV antibodies. The positive results from submissions to the NVSL are listed in the following tables:

<table>
<thead>
<tr>
<th>State</th>
<th>No.</th>
<th>Species</th>
<th>Type</th>
<th>VI</th>
<th>PCR</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA</td>
<td>1</td>
<td>Bighorn</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>CO</td>
<td>1</td>
<td>Sheep</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>FL</td>
<td>7</td>
<td>Cattle</td>
<td>2*</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>FL</td>
<td>1</td>
<td>Cattle</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>FL</td>
<td>2</td>
<td>Sheep</td>
<td>**</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>IL</td>
<td>3</td>
<td>Alpaca</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>OK</td>
<td>1</td>
<td>Cattle</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>OK</td>
<td>3</td>
<td>Sheep</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>TX</td>
<td>1</td>
<td>Deer</td>
<td></td>
<td></td>
<td>x</td>
</tr>
</tbody>
</table>

Table 1
BTV isolation (VI) / PCR positives, Calendar year 2003
Calendar year 2004 BT/EHD positive submissions (January 1 – October 25, 2004):

BTV has been detected by PCR from nine specimens originating from Alabama (1), Colorado (1), Montana (1), Nebraska (3), and Texas (3). All BTV-positive samples were from cattle. The three positive samples from Nebraska were pooled dried hemoglobin being tested for export certification. The PCR-positive hemoglobin samples were negative by BTV isolation. No BTV isolates have been made through October 25. To date in 2004, one EHDV isolate from an Iowa deer has been obtained. This isolate was identified as EHDV-type 2.

2004 BT Proficiency Exam:

Fifty-nine laboratories participated in the 2004 BT proficiency test. The panel consisted of 20 serum samples. The passing score was one or fewer samples missed. Fifty-four laboratories passed on the first attempt. Five laboratories failed the first attempt and all five passed a retest. Fifty-nine laboratories are approved to conduct official (export) BT serology tests as of October 25, 2004.

2004 BLV Proficiency Exam:

Sixty-one laboratories participated in the 2004 BLV proficiency test. The panel consisted of 20 serum samples and the passing score was one or fewer samples missed. Fifty-five laboratories passed on the first attempt. Six laboratories failed the first attempt but passed a retest. As of October 25, 2004, there are sixty-one laboratories approved to conduct official (export) BLV serology tests.

Dr. Brian Jamieson, Senior Veterinary Officer, Imports/Exports, Animal Health and Production Division, Canadian Food Inspection Agency, Ottawa, Canada, gave a presentation entitled “Bluetongue Regulatory and Research Efforts in Canada.”

---

**Table 2**

<table>
<thead>
<tr>
<th>State</th>
<th>No.</th>
<th>Species</th>
<th>Type</th>
<th>VI</th>
<th>PCR</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA</td>
<td>1</td>
<td>Mule deer</td>
<td>2</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>ID</td>
<td>6</td>
<td>Cattle</td>
<td>2</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>SD</td>
<td>1</td>
<td>Deer</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>TX</td>
<td>1</td>
<td>Deer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WA</td>
<td>2</td>
<td>Elk</td>
<td></td>
<td></td>
<td>x</td>
</tr>
</tbody>
</table>

Calendar year 2003 BTV isolation (VI) / PCR positives:

- CA: Mule deer (2 positive)
- ID: Cattle (2 positive)
- SD: Deer (1 positive)
- TX: Deer (1 positive)
- WA: Elk (2 positive)

Calendar year 2003 EHDV isolation (VI) / PCR positives:

- CA: Mule deer (2 positive)
- ID: Cattle (2 positive)
- SD: Deer (1 positive)
- TX: Deer (1 positive)
- WA: Elk (2 positive)
National BT Surveillance:
The triennial national serosurvey was delayed from 2002-2003 to 2004 to allow the implementation of the animal identification program. The number of samples tested was 15,105 and there were two C-ELISA positives; the samples had originated from the Okanogan Valley. The sentinel herd program in the Okanogan Valley has continued with no positives detected since 1998.

BT Research:
A collaborative project has been conducted between Agriculture Canada in Lethbridge, Canada and the USDA Agriculture Research Service (ARS) Arthropod Borne Animal Diseases Research Laboratory (ABADRL) in Laramie, WY. The objectives are to determine the prevalence, biting rate, and species abundance of Culicoides. The research included: monitor populations of Culicoides to determine seasonal abundance; determine the ovipositional status of females; monitor biting intensity every two weeks at three feedlots; develop a potential transmission model for BT based on the effects of temperature on longevity and feeding of western Canadian Culicoides and viral development in the vector; establish a colony of C. sonorensis wild populations; conduct laboratory studies to determine the relationship between air temperature, vector longevity and egg development; and conduct experiments on the duration of the extrinsic incubation of the virus at various constant and cycling temperatures.

The third year of a three year project is being completed; however, modelling work is ongoing with the final report is due by June 2005. The main findings are: Culicoides spp. were trapped at all 8 locations but ±90% were from one location (87-97%); over 90% of C. sonorensis trapped were from 1 site; timing of C. sonorensis activity/population peaks varied annually; majority of parous insects were uniparous, from 7-11% were biparous; there was a low infection rate of C. sonorensis from Alberta and northern Montana for BTV following virus challenge; and U.S. colony flies are more likely to take a second blood meal than wild Alberta flies. The conclusions from this research are: the proportion of C. sonorensis old enough to transmit the BTV is extremely low in southern Alberta; Alberta C. sonorensis are largely refractory to infection with BTV; flies from Alberta collection sites were not infected with BTV; and populations evaluated are largely incompetent as a vector of the BTV.

Regulatory Changes:
A new program has been established to allow year round importation. The following are some key components:

Breeding ruminants: seasonal testing required for importation into western Canada, importation into six eastern province is permitted with-
REPORT OF THE COMMITTEE

out testing, additional changes to import requirements will be depen-
dant upon findings of Lethbridge research

Restricted feeder cattle, importation for feeding and subsequent
slaughter; Canadian cattle co-resident in importing feedlots – return to
breeding herd, anaplasmosis concerns are one of the main challenges

Restricted Feeder Program: Thirty-nine source states recognized
as ‘minimal risk’ for bluetongue based on historical data, year-round
imports except from Okanogan Valley of British Columbia, importation
is into previously approved feedlots, feedlot management system has
been established to verify disposition of all animals, export certification
by USDA accredited veterinarian and unique animal ID is required.
Also required are a vector control program, water management, la-
goon shoreline management, provisions for Canadian cattle departing
feedlot to breeding herd, restrictions on movement of imported ani-
mals between feedlots, and a sentinel animal program within import-
ing feedlots.

Conclusions

1. BT remains an important disease for international trade con-
siderations and Canada must be able to demonstrate the ade-
quacy of its sanitary requirements for BT as well as ensuring
the protection of susceptible domestic and wildlife species.

2. New scientific information has allowed for extensive changes
in Canada’s import requirements for U.S. feeder cattle.

3. Canada will continue to explore every opportunity to facilitate
trade through the development of less restrictive import poli-
cies for BT.

Dr. David Stallknecht, Southeastern Cooperative Wildlife Disease
Study (SCWDS), Athens, Georgia updated the committee on hemor-
rhagic disease (HD) surveillance conducted by SCWDS. During 2003,
BTV and EHDV were isolated from four wildlife species in eight states.
EHDV-2 was isolated from white-tailed deer in Idaho (17 isolates),
Kansas (5 isolates), Texas (3 isolates), Washington (2 isolates), Geor-
gia (2 isolates), Missouri (2 isolates), South Carolina (2 isolates), and
Tennessee (2 isolates). EHDV-2 also was isolated from a mule deer in
Idaho. BTV-10 was isolated from a pronghorn and bighorn sheep in
Idaho and a white-tailed deer (penned) in Texas. BTV-13 was isolated
from a bighorn in Idaho and BTV-17 was isolated from white-tailed
deer in Idaho, Kansas, Texas, and Washington. To date during 2004,
EHDV-2 has been isolated from white-tailed deer in Illinois and BTV-
17 has been isolated from a mule deer and white-tailed deer in Idaho.
With the exception of Illinois, there have been very few reports of HD
this year.

Reports of HD in wildlife from 1980 to 2003 (obtained from an an-
annual survey of state wildlife agencies) were recently mapped to update the distribution of this disease within the United States. In deer and other wild North American ungulates HD can be caused by either BTV or EHDV. A strong spatial pattern is evident with HD occurring most frequently in a diagonal band extending from the Southeast through eastern Montana. With over 23 years represented in this survey, it is interesting to note that reports are rare to absent from the Northeastern United States, and despite the fact that deer are highly susceptible and abundant in this area; a confirmed case of HD has never been reported from any of these populations.

Jim MacLachlan, University of California, Davis, California presented a report entitled “An Update on Bluetongue Research University of California, Davis”. A program is underway to develop recombinant vaccines; this program is a joint program with the Instituto Zooprofilattico Sperimentale dell’Abruzzo e del Molise “G Caporale” and Instituto Zooprofilattico Sperimentale della Sicilia “A Mirri, Teramo Italy. Sequencing of global isolates of BTV is being conducted. Preliminary data from this sequencing study indicates that there is regionalization of BTV with little or no movement of the isolates between regions.

Dr. Bill Wilson, USDA-ARS-ABADRL made a presentation on “Early Warning Devices for Bluetongue”. Molecular biology of BT and related viruses has provided the foundation for the development early warning technologies for indigenous and exotic disease outbreaks. The phylogenetic analysis of two-conserved target genes, one that is highly expressed in infected mammalian cells the other highly expressed in infected insect cells, from BTV prototype strains indicated that a complex primer design will be necessary for a comprehensive gene amplification diagnostic test. Status of the application of real-time RT/PCR and other existing and developing technologies for early warning of an exotic BTV outbreak was discussed.

Dr. Richard Mayer, Research Leader, USDA-ARS, Laramie, Wyoming gave an update on ABADRL in Laramie, Wyoming. ABADRL is the only laboratory within the USDA mandated to perform research on livestock diseases transmitted by insects. The mission of the laboratory is to develop effective disease diagnostic, control and management strategies than can be transferred to the livestock industry, and regulatory agencies. Currently research involves BTV, EHDV, vesicular stomatitis virus, and West Nile virus (WNV). The laboratory is participating in several cooperative projects including one involving the University of Wyoming, Montana State University, the University of Montana, the Wyoming Game and Fish Department, Wyoming Public Health Department, and the Bureau of Land Management to assess the effects of coal bed methane wells on insect vector populations and vector-borne disease transmission.

ABADRL has also been developing more simplified and sensitive RT-PCR BTV detection methods including a one-step reverse transcription-PCR reaction that employs infrared dye labeled primers (C.
REPORT OF THE COMMITTEE

Kato and R.T. Mayer). This approach has also been successful for detection of WNV, EHDV, and St. Louis encephalitis. The advantages of this method are speed and sensitivity for BTV detection, and this method is highly adaptable for an immediate response to potential and emerging threats.

ABADRL has mounted an effort on vector (C. sonorensis) genomics and has focused on midgut and salivary gland tissues. Over 2,000 genes have been identified for a number of different functions including cell communication, cell cycle, cell death, cytoskeleton biogenesis, development, defense, metabolism, peritrophic membrane, protein metabolism, proteolysis, etc. The expression of specific genes in these tissues has verified by quantitative PCR and/or in situ hybridization. This data provides the foundation for ongoing vector biology research. These sequences are available to researchers via the GenBank national database.

In regard to facilities, ABADRL has had about $1.7 million dollars of security upgrades and renovation improvements made over the last 18 months. These expenditures have been made to meet BSL-3 certification and select agent regulations. These efforts will result in a smaller facility but will allow the ABADRL to pursue its research mandate over the short term. Long-term research goals will require new facilities. Two major reports have been published recently in regard to the threat of biological terrorism to poultry and livestock and recognized the national need for an expanded research effort on insect/arthropod transmitted diseases to prevent and protect the U.S. against naturally or purposely introduced exotic pathogenic agents. Critical infrastructure facilities with adequate biosecurity and capability to work with large animals are needed. As the only federal laboratory mandated to study insect/arthropod transmitted diseases, ABADRL will likely be more involved with this research. The current facilities cannot accommodate such expanded programs because of space limitations and the age of the facilities. The FY 2005 Senate Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Bill states that “The Committee has been made aware of the need for a state-of-the-art animal disease laboratory at Laramie, Wyoming. The Committee directs ARS to provide a prospectus on this project.” Such a facility would accommodate an expanded research program with sufficient over-capacity to accommodate state agency, university, and other federal agency cooperators. The estimated cost is $100 million. Direct benefits of a new facility would be expansion of staff and resources, expansion the research program, greater interaction with state, university, and other federal government collaborators, greater ability to respond to emergency situations, faster development of disease detection methods, better capability to develop and validate vaccines, increased capacity for development of vector control methods.

A Committee scientific paper, “Persistence of Bluetongue Virus in
BLUETONGUE AND BOVINE RETROVIRUSES

the Insect Vector and its Implications for Disease Control” by Mecham, J.O., White, D.M., Drolet, B.S. and W.C. Wilson was presented in an American Association of Veterinary Laboratory Diagnosticians scientific session and is published in these proceedings.

The Chair reported on the response to a resolution submitted at the 2003 Annual Meeting. That resolution urged USDA-ARS to develop a strategic plan to define the facilities needed to do the research on arthropod-borne diseases of livestock performed at ABADRL; to identify the costs of such facilities; and to identify the most appropriate location in the Western United States for such facilities dedicated to animal health research. ARS responded that they shared the concern of the Committee that the work of ABADRL not be impeded by substandard facilities; that emergency repairs to both of the off-campus biological containment facilities of the ABADRL were being completed; that in response to the expert panel report, the ARS Northern Plains Area Director had approved the concept of a phased plan that would result in a new facility by 2012; that the cost of rebuilding and the source of funds have not yet been determined; and that the location for rebuilding would ultimately depend on a number of factors, including where ABADRL can best fulfill its unique mission.

The Committee discussed bovine retrovirus. The Committee has had very few reports on disease or trade restrictions due to these viruses and the question was raised if they should continue to be included. There was also a question raised if other arboviruses should be addressed by the Committee. It was decided that this will be considered over the next year and discussed at the next meeting.

Dr. Caporale reported that a revised Bluetongue Chapter to the Animal Health Code has been proposed. The primary changes are: decrease the period of infectivity for BTV to 60 days from 100 days; the northern limit of BTV distribution is increased from 45° to 50°; a new Chapter in the Animal Health Code that addresses bluetongue (BT) surveillance and monitoring; that portion will be deleted from the current BT Chapter; allow the movement of vaccinated animals with few restrictions; allow the movement of vaccinated animals 30 days after vaccination; and change the designation of Culicoides to Culicoides likely to be competent BTV vectors.
The Committee on Brucellosis met on Tuesday, October 26, 2004, from 12:30 pm to 5:30 pm. There were 28 Committee members and 35 visitors in attendance. A total of 10 presentations were given at the meeting. There were 14 reports, resolutions, and proposals submitted to the Committee for action. The summary of presentations and actions of the Committee follows.

Drs. Debra Donch and Arnold Gertonson, United States Department of Agriculture (USDA), Animal and Plant Health Inspection Ser-
BRUCELLOSIS

vice (APHIS), Veterinary Services (VS), presented the cooperative brucellosis program status report for FY04. There were seven (7) cattle herds affected with brucellosis during FY04 with one (1) being disclosed in Missouri, two (2) in Texas, and four (4) in Wyoming. The State of Missouri was granted brucellosis Class Free status early in the year, prior to disclosure of the one (1) affected herd. Current regulations and program standards allow a state to retain class free status when one (1) affected herd is disclosed in the state within a two (2) year period, provided certain requirements are met to contain the outbreak and assure that spread to additional herds has not occurred. Thus, Missouri did not lose its Class Free status because of this single herd. The two (2) herds in Texas were separate and unrelated outbreaks and their disclosure did not affect the brucellosis status of the state. Three (3) of the four (4) herds disclosed in Wyoming were located in the western part of the state in close proximity to the elk winter feed-grounds. The fourth herd is located in the northeast corner of the state and is not associated with known affected elk populations. The investigation of this herd is ongoing at the time of this report. Because of multiple herd outbreaks during the year, the state was reduced from brucellosis Class Free to Class A status. With the exception of the herd in northeast Wyoming, the remaining six (6) herds have been depopulated. At the end of FY04, 48 states held brucellosis Class Free status with Texas and Wyoming continuing in Class A status. The complete text of this status report is included in these proceedings.

Dr. Pamela Ibarra, Director of the Brucellosis Campaign in Mexico, Secretariat of Agriculture, Livestock, Rural Development, Fisheries and Food, presented a status report on the program to eradicate brucellosis from livestock in Mexico. The herd infection rate reported for the year was 2.95% with a cattle infection rate 0.62%. There were 1,893 cases of human brucellosis reported with most being caused by Brucella melitensis.

Dr. Steve Olsen, Research Scientist, USDA, Agriculture Research Service (ARS), National Animal Disease Center (NADC), Ames, IA, presented a time specific presentation entitled, “Update on Bison RB51 Efficacy Experiments at NADC”. The text of his presentation is included in these proceedings.

Dr. Steve Olsen gave a second presentation on “Genotyping B. abortus Isolates.” Based on analysis of the Brucella abortus genomic sequence, variable regions that may be useful for epidemiologic investigation were identified. Although the B. abortus genome is very stable, these intergenic, non-coding regions containing repeated strings of nucleotides, are more apt to mutate than coding regions. An assay has been developed, the “HOOF-Prints” assay, which evaluates multiple loci containing these tandem repeats. The array of alleles identified by this technique creates a genotype for each isolate. For optimal
performance of this assay, multiple colonies from each animal must be obtained for analysis. Data collected from *B. abortus* strains passed in vitro suggests that patterns of an isolate are stable. Analysis of isolates from culture collections indicates that genotypes differ between outbreaks. Multiple isolates from an infected bovine herd suggest that multiple, closely-related genotypes may be present within individuals; however, a single genotype will predominate. Ongoing work is attempting to characterize rate of change in individual loci and develop a statistical model that will estimate the degree of relationship between isolates from different herds.

Dr. Max Coats, Texas Animal Health Commission (TAHC), gave a presentation on the status of the fluorescent polarization assay (FPA) test and standards for cut-off values for its use in livestock markets. Basically, this was a sharing of data and experience, since Texas is the only state presently using the FPA test in this way. First point testing for brucellosis at livestock markets is still a vital part of the Texas brucellosis program. The unavailability of the CITE test created a major problem in the evaluation of sero-positive cattle at Texas livestock markets. The TAHC selected the FPA test to replace the CITE test. Dr. Coats described the process through which the FPA test was adapted for use in market testing. He reported that at a cut-off point of 50 millipolarization (mP) units the FPA test virtually duplicates the CITE test in providing serologic data for accurately evaluating titered animals in market channels.

Mr. Rick Wallen, Wildlife Biologist, National Park Service, Yellowstone National Park (YNP), presented an update on the bison management plan for Yellowstone. This was a follow up to the bison management plan presented by Mr. Wallen at San Diego, CA, in October 2003. The complete text of this presentation is included in these proceedings.

Dr. Frank Galey, Dean, College of Agriculture, University of Wyoming and Chair, Wyoming Brucellosis Coordination Team, gave a report on the creation and activities of the Wyoming governor’s Brucellosis Coordination Team during the past year. As a result of several Wyoming cattle herds being disclosed to be affected with brucellosis during the past year, the Wyoming Governor and Legislature formed the Brucellosis Coordination Team comprised of 19 members and 10 technical advisors. The Team was charged with developing a list of issues, best management practices, and recommendations for four areas of concern. The areas of concern include managing brucellosis in cattle and minimizing transmission between species, how the state’s agencies should best respond to subsequent cases, human health implications, and how to reduce and eventually eliminate brucellosis from the state’s wildlife, paying special attention to the elk feed-grounds. The final report is expected to be presented to the Governor by January 2005. The complete text of this presentation is included in these pro-
Mr. Keith Aune, Montana Department of Fish, Wildlife, and Parks, gave an update on the progress of feasibility and environmental assessment studies being done for a bison quarantine facility just north of Yellowstone National Park. This report was a follow-up to the proposed feasibility study given in October 2003, in San Diego. The complete text of this presentation is included in these proceedings.

Dr. Thomas F.T. Linfield, Montana State Veterinarian for the Montana Department of Livestock, and current chair of the Greater Yellowstone Interagency Brucellosis Committee (GYIBC), gave a report on the activities of that organization during the past year relative to the brucellosis situation in wildlife in the Greater Yellowstone Area (GYA). The complete text of this presentation is included in these proceedings.

Dr. Max Coates, TAHC, presented a report on the two Texas herds of cattle disclosed to be affected with brucellosis during FY04. The two herds were unrelated and were proven to be affected with *B. abortus* by microbiological culture. The herds were depopulated.

Dr. Jim Logan, former Wyoming State Veterinarian, presented individual reports on the four Wyoming cattle herds disclosed to be affected with brucellosis during FY04. Three of the four outbreaks were bacteriologically confirmed and were depopulated. The fourth is still being evaluated. Dr. Logan shared some of the problems and frustrations that resulted when the state of Wyoming was declassified from brucellosis Class Free status to Class A. As a result of this flurry of outbreaks, the Wyoming Livestock Board has established statewide surveillance testing rules requiring a negative brucellosis test within 30 days prior to change of ownership or interstate movement of test eligible cattle.

Committee Chair Sam Holland, South Dakota State Veterinarian, gave an update on the status of brucellosis in the bison herd on Triple U Ranch at Pierre, South Dakota. This bison herd is thought to have been affected with brucellosis since the early 1960’s. This herd has been used as a study herd since early 2002 and is scheduled for a post-release assurance test in February 2005.

There were no charges referred to the Brucellosis Scientific Advisory Subcommittee during the year, therefore, no meeting was held and there is no Subcommittee report for this year. However, three (3) issues were raised by the Committee during this meeting and referred to the Subcommittee for consideration during the coming year. The three (3) charges for FY05 are:

1. Review the state of the science and determine the level of confidence of recently developed techniques for DNA fingerprinting (*genotyping*) *B. abortus*;
2. Review the feasibility and capabilities for establishing a bulk
REPORT OF THE COMMITTEE

milk brucellosis surveillance test for *B. militensis* in goats; and
3. Review the feasibility and capability of matching DNA from sero-positive blood to DNA from hair on corresponding back-tags of MCI reactors.

Vice Chair Dr. Claude Barton gave the report of the Brucellosis Subcommittee on Education in the absence of Dr. Brian Espe, Subcommittee chair. The Subcommittee report was approved by the Committee and is included in these proceedings.

Dr. Carter Black, Georgia Assistant State Veterinarian, gave the report from the Feral Swine Subcommittee on Brucellosis and Pseudorabies. He also gave the report from the joint working group to review brucellosis eradication and recommend policies for harmonization of the swine brucellosis uniform methods and rules and the pseudorabies program standards. The text of this report is included in these proceedings.

Seven (7) resolutions were presented for consideration by the Committee. Three (3) resolutions were approved and forwarded to the Committee on Nominations and Resolutions for approval by the general membership. They addressed:

1. Providing long-range funding for research, program support and field studies on feral swine.
2. Reduction and elimination of brucellosis in wildlife in the GYA.
3. Development of protocols to allow conduct of critical research related to Brucella species.

Two (2) recommendations were approved by the Committee. The first recommendation was that USDA-APHIS-VS should make changes to the Swine Brucellosis UM&R as soon as possible to harmonize definitions and testing schedules with the Pseudorabies Program Standards. There are differences in the definitions between the PRV Program Standards and the Swine Brucellosis UM&R and also differences in the testing schedules for PRV Qualified Herds and Swine Brucellosis Validated Free Herds. Advancement of state status in the Swine Brucellosis Program should be based on the commercial production operations and not be affected by feral and/or transitional herds. The definitions of feral, transitional and commercial swine herds, as used in the Pseudorabies program standards needs to be included in the Swine Brucellosis UM&R. The recommended changes for the Swine Brucellosis UM&R were:

Part I Definitions
Feral or wild swine
Swine that have lived all (wild) or any part (feral) of their lives as free-roaming animals. Those swine that are free-roaming.
Commercial production swine - Those swine that are continuously
managed and have adequate facilities and practices to prevent exposure to either transitional or feral swine.

Transitional production swine - Those feral swine that are captive or swine that have reasonable opportunities to be exposed to feral swine.

Part V Validated Swine Brucellosis – Free Herds
A. Initial Validation or Revalidation
4. Swine growout premises on which no adult breeding swine are maintained may be validated or revalidated as Swine Brucellosis free if all samples are tested Swine Brucellosis negative when establishing a Qualified Negative growout premises on which no adult breeding swine are maintained.

Part VII Program Stages
State II
2. During the 2-year period prior to the request for Stage II status, the State’s commercial breeding swine population..................
3. States must develop and adopt a management plan that adequately separates and addresses control of the interface of feral and transitional production swine and commercial swine. The plan is to be reviewed by the National Center for Animal Health Programs staff.

Stage III (Free)
A. Establishment of status
2. Herd Infection Rate
   (Change) During the 2-year qualification period, no more than one SB-infected commercial breeding swine herd was identified;.....................(no change)
4. States must develop and adopt a management plan that adequately separates and addresses control of the interface of feral and transitional production swine with commercial swine. The plan is to be reviewed by the National Center for Animal Health Programs staff.

C. Termination of status
4. Infection is disclosed in a commercial swine herd with evidence of spread to other commercial swine herds.

The second recommendation approved by the Committee included 3 parts:
1. USDA-APHIS-VS, should encourage states in the Greater Yellowstone Area (GYA) to distribute information on the technology and diseases status of brucellosis in the GYA.
2. USDA-APHIS-VS should continue to educate the livestock industry and legislators at both state and national levels on the importance of surveillance for brucellosis and continued support to complete the eradication effort.
3. USDA-APHIS-VS should appoint a team to review brucellosis
REPORT OF THE COMMITTEE

handout materials used in various states to determine general availability and need for additional current information.

The following statement was suggested for use as a guide in following up on recommendation 2:

**Brucellosis in the Greater Yellowstone Area (GYA)**

**Brucellosis in Cattle**

The knowledge of brucellosis in cattle is extensive, based on over 65 years of a cooperative state-federal program to eliminate the disease from the domestic cattle and bison from the United States. Currently, the disease has been eliminated from all states except for Texas and more recently Wyoming.

We understand how the disease is spread within herds, how the prudent use of vaccine can reduce the risk of exposed animals becoming infected, and how other management tools to minimize the risk of a herd becoming affected.

What we know about the disease and the tools needed must continue to be practiced in GYA where there is a risk of exposure to the disease.

**Brucellosis in Bison**

Brucellosis in captive domestic herds of bison has been eliminated, but the disease is still prevalent in the Yellowstone National Park bison. It has been shown that up to 50 percent of the Park bison may be affected with the disease. These bison represent an apparent threat to domestic cattle operations when they migrate from the park and on rare occasions could mix with cattle on traditional cattle grazing lands near the park.

The knowledge of the disease in bison is much more limited. Effective vaccines are being developed, but even if developed, administration will be a major hurdle to overcome.

Experimentally it has been shown that infected bison can spread the disease to susceptible cattle, but natural occurrences of this are difficult to document.

**Brucellosis in Elk**

Infected elk in the GYA are probably the most serious threat to the domestic cattle population, as they range over a larger geographic area and are able to commingle with cattle throughout the year.

The amount of infection varies widely in these elk, with the highest infection rates in those elk which are routinely fed in the winter one or more of the elk feed grounds. The concentration of animals on these feed grounds is conducive to the spread of brucellosis, particularly if there are infected animals aborting.

Over the years vaccine has been used in a few feed grounds and it has been show to lower the spread of the disease in the vaccinated groups. Development to better vaccines and delivery method, while an
admirable goal, the chance of a significant lowering the incidence of the disease will require vaccination of very large numbers of elk, which will be difficult at best.

Elk have been implicated in recent findings of brucellosis in cattle herds in Wyoming. The initial cattle herd found in 2004 was adjacent to an elk feed ground and there was apparently contact between cattle and elk.

There are no easy solutions to the problems of brucellosis in the GYA, but as long as the disease persists in the area, domestic cattle herds remain at risk and must utilize all known management tools to minimize this risk.
The Education Subcommittee on Brucellosis met on October 24, 2004. Five members and visitors were present. Dr. Espe was unable to attend. The meeting was conducted by Dr. Barton, Vice Chair of the Committee on Brucellosis.

Dr. Espe had drafted and forwarded an informational release on brucellosis in the Greater Yellowstone Area (GYA) for consideration by the Subcommittee. The document, with minor additions, was adopted for use in informational outreach activities and is included in this report.

It was noted that Dr. Arnold Gertonson, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), has been assigned to be the liaison official between USDA and the three states in the GYA. In this position Dr. Gertonson will be a key link for the distribution of current information on brucellosis in the area.

Additionally, the following recommendations were selected for submission to the Committee on Brucellosis:

1. Continue to encourage states in the GYA to distribute information on the technology and disease status of brucellosis in the Yellowstone area.

2. Continue to educate the livestock industry and legislators at both state and national levels on the importance of surveillance for brucellosis and continued support to complete the eradication effort.

3. Appoint a team to review brucellosis handout materials used in the various states to determine general availability and need for additional current information.

**Brucellosis in the GYA**

**Brucellosis in Cattle**

A massive amount of knowledge about brucellosis in cattle has been gained in more than 65 years of cooperative state-federal efforts to eliminate this serious disease from domestic cattle and bison in the United States. Currently, the disease — which causes abortions and lowered milk production — has been eliminated from all states except for Texas and, more recently, Wyoming.

We have learned how the disease is spread within herds, how the prudent use of vaccine reduces the risk of exposed animals becoming infected, and how other management tools can be used to minimize the risk of a herd becoming affected.
BRUCELLOSIS

All of the knowledge gained must be employed in the GYA where there is a high risk of exposure to the disease from wildlife.

Brucellosis in Bison

Brucellosis in captive domestic herds of bison has been eliminated in the United States, but the disease is still prevalent in the bison in YNP and Grand Teton National Park. It has been shown that up to 50 percent of the Park bison may be infected with the disease. These bison represent a clear threat to domestic cattle operations when they migrate from the Park and occasionally mix with cattle on nearby traditional cattle grazing lands.

There is less knowledge of the disease in free-ranging bison than in domestic cattle. Effective vaccines for bison are being developed; but even if developed, administration of such vaccines will be a major hurdle to overcome.

Experimentally it has been shown that infected bison can spread the disease to susceptible cattle, but natural occurrences of this are difficult to document.

Brucellosis in Elk

Infected elk in the GYA are probably the most serious threat to the domestic U.S. cattle population. Elk range over a larger geographic area and are more likely to commingle with cattle throughout the year.

The amount of infection varies widely in these free-ranging elk herds. The highest infection rates are usually found in those elk that are routinely fed in the winter on one of the elk feed grounds. The concentration of animals on these feed grounds makes the spread of brucellosis more likely, particularly when infected animals abort.

Over the years, vaccine has been used in elk on most feed grounds. Spread of the disease has been lower in vaccinated groups. Development of better vaccines and methods of delivery is an admirable goal. However, the likelihood of significantly lowering the incidence of brucellosis will require continued and long-term vaccination of very large numbers of elk. Doing this thoroughly over time would be difficult at best and expensive.

Elk have been implicated in recent findings of brucellosis infection of cattle herds in Wyoming. The initial infected cattle herd found in November of 2003 was adjacent to an elk feed ground and the disease spread appears to be by contact between cattle and elk.

There are no easy solutions to the problems of brucellosis in the GYA. But as long as the disease persists in the area, domestic cattle herds remain at risk and herd owners must utilize all known management tools to minimize this risk.
The subcommittee was called to order at 1:00 pm on October 24, 2004 with 36 attendees.

Dr. Phil Elzer, Research Scientist, Louisiana State University, reported on his work with *B. abortus* RB51 and *B. suis* VTRS1 vaccines. The VTRS1 vaccine is a rough strain of *B. suis* and like RB51 there is no O chain polysaccharides. VTRS1 adequately colonizes pigs and protects sows better than RB51 when challenged. VTRS1 vaccine appears to be superior to RB51 vaccine in swine.

Dr. Lowell Miller presented information on his work, which is sponsored by United States Department of Agriculture (USDA) that deals with immuno-contraception in domestic and feral swine. The Wildlife Research Center is working on a vaccine to stimulate antibodies to GnRH. GnRH is a small peptide hormone which, when injected into females, will stop estrus. The center is investigating an oral vaccine application.

Ned Hahn provided an update on his ongoing effort to fingerprint feral pig pseudorabies (PRV) isolates. The goal is to fingerprint pseudorabies virus DNA from recent outbreaks, to improve the data base and to develop a method to determine the source of infection. The main work is with glycoprotein C. There appears to be several strains of PRV virus circulating between and among feral and domestic populations.

Dr. Joe Corn, Southeastern Cooperative Wildlife Disease Study (SCWDS), presented an outstanding paper on their work in describing the distribution of feral swine in the United States and the distribution of PRV and brucellosis in feral swine. The SCWDS has developed a map of feral and domestic swine populations in the United States. By overlaying the two maps, the area of risk for feral and domestic swine interface may be assessed and may facilitate the development of strategies for preventing commingling. These areas may be considered as rational targets for disease surveillance.

Seth Swafford spoke on the mission of USDA Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS) and related their feral swine activities. Feral swine damage includes the negative impact on endangered species, property damage, crop damage and damage to livestock, as well as negative effects on domestic swine. From the agency’s contacts, most public concerns relate to disease transmission. A new focus for USDA-APHIS-WS is cooperative regulatory disease management.

Dr. John Korsland, National Swine Programs Liaison, spoke on “The
BRUCELLOSIS

View from USDA, VS. Dr. Korsland reported that all states are at Stage III for swine brucellosis except Texas. There were two infected transitional herds last year, one in California and one in Hawaii. Dr. Korsland suggested that it is time to update the Swine Brucellosis Control/Eradication Uniform Methods and Rules. Further, only three states had not yet achieved stage 5 in the pseudorabies eradication program and that only Texas had not been recognized as a free state in accordance with the swine brucellosis Uniform Methods and Rules (UM&R).

Dr. Carter Black spoke to the issue of changes to the swine brucellosis UM&R necessary to harmonize the Swine Brucellosis Control and Eradication UM&R with the PRV Eradication Program Standards. After some discussion the changes were evaluated and were unanimously recommended to the Brucellosis Committee as urgently needed changes to the to the Swine Brucellosis Control and Eradication UM&R and further, there was consensus that the appointed Harmonization Working Group should continue their assessment of the need to make additional changes to the UM&R if necessary to complete the harmonization of the two swine program documents and provide their recommendations at the next meeting of the committee.

There was a unanimous desire of the Subcommittee to forward the changes in the form of resolutions to the Committee on Brucellosis and the Committee on Pseudorabies and to recommend their favorable consideration.

A PROPOSED FEASIBILITY STUDY OF BISON QUARANTINE: UPDATE

Keith Aune, Montana Department of Fish, Wildlife and Parks, Bozeman, MT

Dr. Jack Rhyan, Veterinary Service, Fort Collins, CO

Introduction

There has been a long history in North America of restoring wildlife populations by capturing animals from robust populations and transplanting them to new habitats or augmenting existing populations near extinction. In the Greater Yellowstone Ecosystem, there is an extensive history of capturing, holding, transporting and relocating wildlife as a species conservation strategy. Yellowstone elk were routinely captured and widely distributed in the mid 1900’s to restore wild elk throughout North America. Bison and antelope have been captured and moved from Yellowstone to augment populations elsewhere. Yellowstone has even been a recipient of such transplanted wildlife for restoration including rocky mountain wolves from Canada and bison from Texas and northern Montana.

As it applies to the bison management dilemma surrounding Yellowstone National Park (YNP), there have been many discussions
about quarantine procedures and using this growing population to establish other free-ranging bison herds. Several quarantine options have been considered, and USDA-APHIS has established a protocol that would apply to this situation (Interagency Bison Management Plan, Appendix B). Federal funding was appropriated for this activity but has not been expended. Despite frequent discussions of quarantine proposals and the acquisition of federal funding for this activity a specific plan has not yet been developed and approved.

Concurrent with the discussion of quarantine in the GYA, there have been frequent discussions and meetings regarding bison conservation strategies in North America and the potential for restoring the species to grassland ecosystems. The World Conservation Union (IUCN)-Bison Specialist Group of North America supported a project to examine the status of bison, which presents several conservation recommendations (Boyd, 2003). This project outlines the current status of bison and identifies the few free-ranging and genetically pure bison herds in North America. There are about 8,300 plains bison classified as such in only 13 conservation herds and they present the best source stocks for restoration efforts. Nearly 2/3 of these bison are from diseased herds while the remainder is found in small fragmented populations with limited potential as a reliable source for restoration efforts.

YNP could become a source of genetically pure bison to be reintroduced into historical habitats thereby contributing to the continued conservation of this species. Currently, the bison population in YNP is above the management trigger level for aggressive removals and there have been annual habitat and weather dependent movements of bison out of YNP causing conflict and concern in the states of Montana, Idaho and Wyoming. The major elements of this conflict include the presence of brucellosis, a nationally regulated disease in YNP bison, and managing the population size and distribution of Yellowstone bison. As we attempt to manage brucellosis, many bison are routinely hazed or captured, tested and slaughtered to minimize the risk of transmission to cattle. Despite the successful management of the risk for transmission of brucellosis and the spatial-temporal separation of bison and cattle accomplished under the current management plan, there are no strategies in place to restrain the base population of bison.

We propose that some bison migrating from YNP could be placed through a quarantine program to restrain population growth and ultimately be used for the restoration of this species in other portions of North America. This selected removal program along with other population regulating tools such as a limited hunting program, as well as natural mortality, could operate in consort to remove an annual increment of bison from the herd to help maintain a relatively stable population and curb range expansions in a confined ecosystem. In addition, such a program could be constructed and implemented to conserve
BRUCELLOSIS

the genetics of YNP bison in these newly established populations or even enhance the genetic diversity of existing managed bison herds in North America.

This approach to bison conservation will require many government and private sector partnerships including cooperating participants from the Montana sporting public, various conservation groups, Native Americans, and the affected state/federal agencies. The overall mission of using animals from this robust Yellowstone bison population to restore other populations in North America has benefits as well as challenges.

Project Goal

There are three main project goals described below in this proposed feasibility study for bison quarantine.

1. Develop quarantine procedures, using the best available science and adaptive management strategies, that will allow bison from YNP to be accepted for translocation and utilized for the establishment of new public and Native American bison herds or to augment existing populations in North America.

2. To conserve the genetics of free-ranging Yellowstone bison through the creation of additional bison herds in other habitats in North America without transmitting brucellosis onto these landscapes.

3. To examine the feasibility of quarantine protocols and the reintroduction of bison to large grassland systems as a conservation strategy that may benefit the management of bison in the GYA where populations are expanding beyond social tolerance limits.

The overall project goals are consistent with historical conservation strategies applied to wildlife restoration efforts in North America and previously validated for several species of ungulates (elk, bison and antelope) found within the Yellowstone Ecosystem. The proposed project will also contribute to the conservation of a genetically diverse bison population in which, to date, no cattle genes have been detected (Halbert 2003). In so doing it will lead to the establishment of new herds of similar genetic composition to reinforce the long-term conservation of wild bison genes at locations beyond the borders of the Yellowstone Ecosystem. Recent work by Halbert (2003) has confirmed the diverse genetics of bison from YNP and present significant genetic concerns for many other Department of Interior bison herds. The bison processed through the quarantine program could also be utilized for periodic introduction into existing public bison herds to remove animals with domestic cattle genes and improve genetic diversity to further ensuring conservation of the species.

The proposed study will encourage bison conservation without risk of disease transmission to the landscapes upon which bison will be
REPORT OF THE COMMITTEE

introduced. This research will test the feasibility of implementing quarantine procedures that meet and exceed the existing approved quarantine standards established by USDA-APHIS. The project will develop and implement additional adaptive procedures to improve these quarantine standards and carefully quantify the risks associated with utilizing improved test protocols. Finally, this project will explore the feasibility of using quarantine and translocation as a population regulation tool supplemental to traditional sport hunting and natural processes. It is increasingly clear that bison populations in the GYA are growing and expanding despite the limitations of the landscape to support these populations. A suite of tools including limited hunting, quarantine and translocation, and occasional agency removal will be necessary to regulate population growth and influence bison distribution.

This research project is designed to remain consistent with the existing Interagency Bison Management Plan (IBMP) during all phases. Population triggers established in the plan determine the availability of negative calves for quarantine procedures—Phase I. The program maintains the availability of habitats west of the Yellowstone River for wild free-ranging bison by concentrating quarantine activities on the east side of the Yellowstone River. This geographic compartmentalization of various management activities minimizes management conflicts for implementing the IBMP.

Project Status

The Quarantine Feasibility Study proposal has been in a review process for the past year and several elements of the study design have been modified based upon input from various scientists and stakeholder groups. The final draft has been put out for one last scientific review and the Environmental processes for Phase I is completed and Phase II will be started very soon.

As currently proposed, this research project will detain up to 200 sero-negative bison calves (100 in each test group brought into Phase I each year for two years) captured during management actions in the GYA in accordance with the IBMP and EIS for up to 3 years to determine if latent infection occurs and if the current USDA-APHIS protocol for quarantine would efficiently screen for brucellosis. The sero-negative bison calves selected for this research will be contained at an existing bison research facility leased by USDA-APHIS near Corwin Springs, MT for the first year (Phase I). Approximately half of these bison kept during Phase I will be euthanized and specific target tissues will be collected and submitted for culture. The remaining live bison will be available to advance through additional phases of the protocol. During each progressive phase of the study additional facilities (Phase II—Dome Mountain and Phase III—at an undetermined location) are to be developed. Bison will be bred in Phase II and then
moved to Phase III for calving once a pregnancy is established. If a suitable Phase III site cannot be acquired then these test groups will be rotated back into the Phase I facility. Bison will be maintained in quarantine through the completion of one successful calving and after repeated negative serologic tests.

A detailed analysis and review of the quarantine procedures and testing protocols will be performed at the end of Phase I for use in further environmental and decision processes relative to advancing the study to Phase II and III. The a priori hypothesis for Phase I research is rejected if there is evidence of sero-conversion in 5% of each quarantine test group or Brucella abortus is cultured from more than 5% of the test animals euthanized during Phase I. Rejecting the Phase I hypothesis could terminate the project or would result in modifications of the subsequent research steps.

The Phase I environmental impact analysis has been released and is under public review. The comment period for the Montana Environmental Policy Act Assessment closes on November 12, 2004 after which comments will be evaluated and a final record of decision will be posted by the end of November. National Environmental Policy Act compliance was satisfied through the publication of a final IBMP/EIS in 2000 and a determination for categorical exclusion produced by USDA-APHIS. A decision to proceed with phase I could result in bison placed under quarantine this winter as they become available. A second Environmental Analysis will begin soon to evaluate the impacts associated with Phase II of this study. A decision to move forward to Phase II will be made next summer after serologic and culture results are available from the first test group and an impact study has been completed for the phase II site at Dome Mountain.

COOPERATIVE STATE-FEDERAL BRUCELLOSIS ERADICATION PROGRAM
STATUS REPORT - FISCAL YEAR 2004
“Prove the Negative”

Debbi A. Donch, National Brucellosis Epidemiologist, Riverdale, MD
Arnold A. Gertonson, Yellowstone Brucellosis Coordinator, Fort Collins, CO
Michael J. Gilsdorf, Director, National Center for Animal Health Programs, Eradication and Surveillance Team, Riverdale, MD

Fiscal Year (FY) 2004 for the Cooperative State-Federal Brucellosis Eradication Program proved to be a year reflective of adages of final eradication activities for a program nearing its goal. Accomplishment of the goal of total eradication was challenged by findings of last remaining vestiges of disease, recrudescence of disease, and spill-over of disease from wildlife reservoirs. After having met all requirements
and being designated as a Class Free state for brucellosis, Missouri found a singleton brucellosis affected herd. Testing in Texas disclosed brucellosis in a herd that had been clean for several years. And, Wyoming discovered brucellosis affected herds whose most likely source of exposure is the infected wildlife in the same geographic area. The finding of the brucellosis-affected herds in all these situations exemplifies both the effectiveness of the surveillance program and the commitment to the goal of total eradication. The overall status of the Cooperative State-Federal Brucellosis Eradication Program in the United States for FY 2004 stands at 48 states designated as Class Free for brucellosis and two states, Texas and Wyoming, designated as Class A for brucellosis. Puerto Rico and the Virgin Islands also maintain their Class Free status for brucellosis.

Seven (7) new brucellosis affected cattle herds were disclosed in FY 2004. This compares to only two (2) new brucellosis affected cattle herds disclosed in FY 2003, nine (9) new affected herds in FY 2002, six (6) in FY 2001 and fourteen (14) in FY 2000. Two (2) of the seven (7) FY 2004 brucellosis affected herds were found in Texas, a Class A status state. One (1) brucellosis affected herd was found in Missouri three months after receiving Class Free state status. The other four (4) brucellosis affected cattle herds were found in Wyoming which was a Class Free state at the time of the finding of their first affected herd, but was reclassified to Class A status subsequent to the finding of additional brucellosis affected herds.

The first of the two (2) brucellosis affected herds disclosed in Texas in FY 2004 was identified through first-point testing at a livestock auction market. Subsequent culture confirmation on December 17, 2004 identified Brucella abortus biovar 4 in the market reactor beef cow. This animal originated from a herd with premises in Comal and Hays counties in central Texas. The herd of origin premises were depopulated as well as a fence line contact adjacent herd. No additional brucellosis affected herds were identified in the epidemiologic investigation, traceback and area herd testing conducted in this investigation. The second brucellosis-affected herd in Texas in FY 2004 was found in Leon County located in eastern Texas. This finding was also subsequent to a market reactor. The herd owner has opted to remain under quarantine and complete the necessary testing. The epidemiological investigation continues as well as the testing of the index herd and area herds. At this time it is thought that the most likely sources of infection for the two brucellosis-affected herds in Texas in FY 2004 are the purchase of infected replacement heifers or a potentially long-standing low-level infection in the herd.

Missouri attained Brucellosis Class Free status on February 26, 2004. On May 5, 2004, a new brucellosis affected cattle herd was disclosed in Bates County, Missouri. This herd was discovered through
BRUCELLOSIS

market cattle inspection (MCI) slaughter surveillance testing. All animals on this index premises were depopulated. A Task Force of state and federal veterinary staff was immediately convened to conduct adjacent herd and area herd testing in a timely manner. All herds located within two miles of the affected premises tested negative. Herds located within one mile of the affected premises will be retested within one year. Whole herd (adult) vaccination was utilized in the high-risk area (one mile). Animals having been moved out of the affected herd since January 2002 were traced. No additional brucellosis affected animals or herds were identified. Per 9 CFR, Part 78, a Class Free State may retain its status if only one brucellosis affected herd is found within a 24 month period, provided the affected herd is immediately depopulated and an appropriate epidemiologic investigation is conducted within the prescribed 60-day timeframe. The epidemiological investigation must confirm that brucellosis has not spread from the affected herd. A review of the epidemiological investigation and herd testing for this case was conducted in July 2004. The review concluded that all requirements to maintain Class Free state status had been fulfilled.

In Wyoming, the traceback of four MCI reactor animals that went to slaughter in late November 2003, led to the finding of a brucellosis affected beef herd in Sublette County (western Wyoming). Bacteriologic culture results reported out in December 2003 confirmed Brucella abortus biovar 1 infection in this herd. The most likely source of infection for this herd was determined to be infected elk on adjacent feed grounds. Wyoming took immediate actions and depopulated the herd (in accordance with the 9 CFR, Part 78) to maintain its Class Free status. However, on January 21, 2004, a second brucellosis-affected herd was confirmed in Washakie County. This herd, a terminal feedlot, was disclosed pursuant to epidemiological trace-outs of cattle from the index herd in Sublette County and was depopulated as well. With the discovery of the second herd, Wyoming no longer met the standards for Class Free status. Docket No. 04-009-1, “Brucellosis in Cattle; State and Area Classifications; Wyoming” was published in the Federal Register on February 20, 2004. This Docket amended the brucellosis regulations concerning interstate movement of cattle by changing the classification of Wyoming from Class Free (attained October 1, 1983) to Class A, effective February 13, 2004. Since that time, two additional brucellosis-affected herds have been found in Wyoming. In June of 2004 a reactor cow was identified during a herd test for interstate movement. Brucella abortus biovar 4 was confirmed by bacteriologic culture. This herd, located in Teton County, was depopulated. Although the source of infection has not definitively been determined, the epidemiology investigation reveals no contact with infected cattle, however the index herd did have contact with elk and bison, thus wildlife is
thought to be the most likely source of infection. The fourth brucellosis affected herd is currently still under investigation. This herd is located in Campbell County in northeast Wyoming. In June of 2004 this herd sent approximately 50 head of cattle to a livestock auction market in South Dakota. Two cows tested suspect for brucellosis. Subsequent bacteriologic culture results were reported as Brucella abortus biovar 1 infection in these two animals. All remaining animals on the index premises tested negative as did all adjacent and area herds. No discernable source of infection has been identified in the epidemiologic investigation in this case. Additional activities, including testing of elk in this area of the state are underway. The index herd remains under quarantine and additional herd testing is scheduled. The final classification and status of the herd quarantine is pending.

USDA-APHIS is amending the regulations for the Brucellosis program (9 CFR Part 78) “by adding the Fluorescent Polarization Assay (FPA) to the lists of confirmatory and official tests for determining the brucellosis disease status of test-eligible cattle, bison, and swine.” The FPA has proved to “provide an efficient, accurate, automated, and cost-effective means of determining the brucellosis status of test-eligible cattle, bison, and swine.” The proposal to amend the regulations by adding the FPA to the list of official tests for determining the brucellosis disease status of test-eligible cattle, bison, and swine was published in the Federal Register on May 6, 2004. Comments were solicited until July 21, 2004. Comments received have been reviewed. The posting of the final rule is imminent.

USDA-APHIS is also amending the regulations for the brucellosis program (9 CFR Part 51) to allow the payment of “indemnity for sheep, goats and horses destroyed because of brucellosis. This action makes it easier to eliminate affected herds/flocks and infected animals as sources of infection by encouraging herd and flock owners to cooperate with our brucellosis eradication program. This action is intended to help reduce the incidence of brucellosis and the likelihood of it spreading within the United States.” The final rule was published in the Federal Register on July 13, 2004 with an effective date of August 12, 2004.

Brucellosis in the Greater Yellowstone Area (GYA):
USDA-APHIS continues to recognize the importance of cooperating with the federal and state agencies in management of the wild bison and elk in the GYA. USDA-APHIS will respond to the Governor of Idaho’s request for assistance in addressing issues regarding elimination of brucellosis from the GYA.

A new Greater Yellowstone Interagency Brucellosis Committee Memorandum of Understanding (MOU) has been drafted and is currently under review by the Secretaries of USDA and Department of Interior, and the Governors of Montana, Wyoming and Idaho. The pre-
BRUCELLOSIS

vious MOU has expired.

The agencies are continuing to evaluate research regarding the safety and efficacy of *Brucella abortus* strain RB51 vaccine in bison, elk and other species. As per the Interagency Bison Management Plan (IBMP), when the agencies determine that RB51 vaccine is safe for use in bison, the vaccine will be subcutaneously injected, by hand, to calves and non-pregnant yearlings that are captured outside of Yellowstone National Park (YNP). YNP vaccinated over 100 head of bison captured at the Stephens Creek capture facility during the spring of 2004. This research may require the use of outdoor research facilities to accommodate statistically significant numbers of animals in the experimental and control groups.

YNP vaccinated over 100 head of bison captured at the Stephens Creek capture facility (northern boundary area) during the spring of 2004. It is expected that the Montana Environmental Protection Act (MEPA) process regarding brucellosis of bison in the western boundary area will be completed late 2004 or early 2005. It is expected that vaccination of bison will begin in the western boundary area in early 2005.

YNP is evaluating methods for remote delivery of vaccine to wild bison. The National Environmental Protection Act (NEPA) process to evaluate remote delivery has been started by YNP.

USDA-APHIS and the State of Montana are currently evaluating sites and protocols for a bison quarantine feasibility study. The purpose of this feasibility study is to determine if bison that are captured outside of YNP can be released onto Native American and public lands after they have completed an extensive and conservative quarantine protocol. Two sites have been selected for the first and second phases of the study. Up to 100 head of bison, if captured, may be placed in the first phase of the study. It is expected that the first phase of the study will begin early in 2005. NEPA and MEPA processes are expected to be completed by the end of 2004. Before APHIS and the State of Montana release bison from quarantine, the agencies will be confident, using the best science and tests available at the time, that the bison are not infected with brucellosis.

The Record of Decision (ROD) for the management of bison that nomadically move from YNP into Montana continues to be utilized by the agencies that signed the ROD. The management actions prescribed in the IBMP are meant to minimize the risk of brucellosis transmission from bison to cattle in the GYA. The IBMP is not a plan to eliminate brucellosis from bison in YNP or bison and/or elk in the GYA.

During the 2003 – 2004 bison management season in the western boundary area, 59 hazing operations resulted in approximately 1,434 bison hazed back into YNP and 82 were unsuccessfully (in the first attempt) hazed. Twenty bison were captured in the western boundary
area in 4 capture operations. Eight bison were tested brucellosis seronegative and release into YNP. Twelve bison were tested brucellosis seropositive and were slaughtered. Two bison were lethally removed.

During the 2003 – 2004 bison management season in the northern boundary area, YNP captured 464 bison. One hundred eleven bison were vaccinated, 264 bison tested brucellosis seropositive and were sent to slaughter, and 198 bison tested brucellosis seropositive and were released into YNP. One bison died in the capture facility. Numerous hazing operations were also performed with YNP and one hazing operation outside of YNP resulted in 14 bison successfully hazed back into YNP.

The hazing, capture and lethal removal operations were cooperative joint agency operations as per the IBMP. The agencies are still in Step 1 of the IBMP because a remote vaccine delivery system is not yet available and cattle are still present on the Royal Teton Ranch.

Four brucellosis affected cattle herds in Wyoming were identified during FY 2004. Three herds were depopulated and one herd owner elected to test out of quarantine. Contact and surrounding cattle herds were brucellosis tested and found negative. Testing of contact and surrounding cattle and elk herds will continue this fall. The most likely source of the brucellosis infection in these cattle herds is believed to be brucellosis infected elk.

**Surveillance Activities:**

The surveillance statistics for the cattle brucellosis eradication program are based on data available as of October 1, 2004. Normal reporting time allowances for states to gather and submit monthly data and priority emergency disease response activities precluded the ascertainment of all data for FY 2004. Therefore, the following FY 2004 annual statistics regarding the cattle brucellosis eradication program contain estimated data.

As of September 30, 2004, 48 States, Puerto Rico, and the Virgin Islands continue to maintain Brucellosis certified Class Free status. Two states, Texas and Wyoming, are Brucellosis designated as Class A status. Approximately eighty-four percent of all beef and dairy cattle in the United States are located in Class Free States and approximately sixteen percent are located in the two Class A States.

There were seven new brucellosis affected herds found in FY 2004. As previously detailed, the first two new affected herds in FY 2004 were found in Texas and Wyoming in December 2003. Texas found another brucellosis affected herd in August of 2004. Wyoming subsequently found additional brucellosis affected herds in January and July of 2004. Missouri found one brucellosis affected herd in May of 2004.

Brucellosis milk surveillance detected no brucellosis affected dairy herds in FY 2004. Based on available data, 200 suspicious brucellosis ring test (BRT) laboratory reports resulted in 65 herds
BRUCELLOSIS

being blood tested for a herd blood test rate (HTR) of approximately 32.5 percent. Repetitive brucellosis ring testing was conducted in the majority of the herds not blood tested. Negative repetative brucellosis ring tests and epidemiological investigations revealing no evidence suggestive of infection in the herd lead to successful case closures on these cases. Other herd suspicious BRT’s were the result of Strain 19 vaccination titers.

There were approximately 8.3 million MCI blood tests conducted in FY 2004. Of these, approximately 5.5 million samples (66.3 percent) were collected at slaughter plants and approximately 2.8 million (33.7 percent) were collected during first point testing at livestock markets. First point testing at markets is primarily conducted in the Central and Southern regions, where the majority of the states that have recently attained Class Free status and the two Class A states are located. Market testing has been the primary surveillance method which has identified newly affected herds.

The total number of cattle tested for brucellosis in FY 2004 was approximately 9.1 million. Of these, approximately 770,500 (8.5 percent) were sampled on farms or ranches and approximately 8.3 million (91.5 percent) were tested under the MCI program. The MCI surveillance continues to be effective in finding reactor animals.

There were approximately 4.04 million calves vaccinated for brucellosis in FY 2004. Approximately 10,100 head of adult cattle were vaccinated in FY 2004 pursuant to the finding of affected herds in the area.

Five brucellosis affected herds were depopulated in the U.S. in FY 2004. Additional adjacent fence-line contact herds were depopulated as well. MCI reactor cattle were also purchased for further diagnostic testing to resolve reactor classified titers. Approximately $400,000.00 was spent in indemnity monies in FY 2004. Depopulation continues to be the preferred method of handling affected herds as recommended in the Brucellosis Emergency Action Plan.

The United States continues to face challenges in the final phases of eradication of brucellosis. As demonstrated by the finding of brucellosis affected cattle herds in Wyoming, the brucellosis situation in the GYA poses a significant threat to cattle herds in the area. The development of the National Animal Identification System and the National Surveillance Unit will greatly increase our capabilities to find the last remaining cases of brucellosis in our nation’s cattle herd and to remain diligent in our quest to find infection early on. Now is the time to prove the negative.
Wyoming has experienced several new cases of brucellosis (due to \textit{Brucella abortus}) in cattle in the past year. The cases of most interest are in the Greater Yellowstone Area. One case was directly traced to an elk origin whereas the other is very likely due to elk or bison due to reported commingling of animals.

As a result of these cases, the Governor and Legislature of the State of Wyoming formed a Wyoming Brucellosis Coordination Team, which I was asked to chair. This team consists of 29 individuals including 19 members and 10 technical advisors. We were charged with developing a list of issues, best management practices, and recommendations for four topics. Those topics include managing brucellosis in cattle and minimizing transmission between species, how the state’s agencies should best respond to subsequent cases, human health implications, and lastly, how to reduce and eventually eliminate brucellosis from the state’s wildlife paying special attention to the elk feeding grounds.

The team was given one year to complete this task. We have covered the first three topics in detail and are currently working on the last topic (wildlife brucellosis). General recommendations developed by the team and current progress on the recommendations related to wildlife will be reported.

THE GREATER YELLOWSTONE INTERAGENCY BRUCELLOSIS COMMITTEE - 2004 ANNUAL REPORT

Dr. Thomas F. T. Linfield, Montana State Veterinarian, Helena, MT

The Greater Yellowstone Interagency Brucellosis Committee (GYIBC) was formally established in 1995, when a Memorandum of Understanding (MOU) was signed by the Secretaries of Interior and Agriculture and the Governors of Montana, Wyoming, and Idaho, in an effort to collectively address the problems caused by brucellosis in elk and bison in the Greater Yellowstone Area (GYA). Member agencies represented in GYIBC include the State and Federal agencies responsible for management of wildlife, livestock, and lands in the GYA. The GYIBC has an Executive Committee, a Technical Subcommittee, and an Information and Education Subcommittee. The Goal of the GYIBC is to protect and sustain the existing free-ranging elk and bison populations in the GYA and protect the public interests and economic viabil-
BRUCELLOSIS

ity of the livestock industries of the States of Idaho, Wyoming, and Montana. A major focal point of the GYIBC is to facilitate the development and implementation of brucellosis management plans to control and eventually eliminate brucellosis from the wildlife in the GYA.

In 2003, the Executive Committee recognized an annual report would be a valuable means to inform numerous and diverse stakeholders of GYIBC activities. This annual report is intended to provide the reader the highlights of GYIBC activities for 2003 calendar year and includes the Goal, Mission, and Objectives of the GYIBC, as well as discussion on MOU review and revisions, research activities, management activities and plans, necessary environmental analysis, and information and education efforts.

The members of the GYIBC Executive Committee recognized the need to revise and update the original MOU. The most significant changes proposed were to more aggressively address elimination of brucellosis from the GYA and to include Tribal representation on the GYIBC. Tribal representation is addressed by including the Chairman of the Board of Directors of the Inter-Tribal Bison Cooperative (ITBC) as a representative of Native American Tribes.

The final year of a three-year study was conducted to determine the environmental persistence of Brucella abortus (strain RB51) in infected fetal tissues. It was found that Brucella abortus bacterium remained viable on fetuses placed out during February for 80-90 days versus 20-30 days for fetuses placed out in mid-May. Preliminary results indicate that UV-B and temperature work in a complex fashion to kill the bacterium present on fetal tissues. Similarly, the final year of a three-year study was conducted to monitor the disappearance of bison fetuses placed within and adjacent to Yellowstone National Park (YNP). Those fetuses placed in YNP were scavenged more rapidly than those placed in adjacent environs. On average, fetuses were scavenged within 18 days, although disappearance ranged from one to 78 days. Approximately half of the fetuses moved more than 100 feet, with one fetus moving two miles, across a frozen lake.

As part of the Interagency Bison Management Plan (IBMP), a study was proposed to determine the feasibility of a quarantine process for seronegative bison calves from YNP. If successful, “disease-free” bison may be considered for YNP bison conservation efforts and potential restoration projects on suitable State, Federal, and Tribal lands. The proposed study is a 3-phased project, with the initial phase potentially beginning, with up to 100 seronegative bison calves, in January 2005.

The first report of brucellosis caused by Brucella abortus in Rocky Mountain bighorn sheep was discovered at the Wyoming Game and Fish Sybille Wildlife Research facility near Laramie, WY. Nine (4 female, 5 male) captive, adult Rocky Mountain bighorn sheep were in-
In November 2003, four Market Cattle Inspection (MCI) suspects were traced to a Wyoming premise, which, following herd testing, was determined to be an infected herd. Ultimately, the source of infection was determined to be from infected elk, which were fed on a feedground adjacent to the cattle herd. An additional cattle herd in Wyoming was subsequently determined to be infected in early 2004, ultimately causing Wyoming to lose its Class Free status.

As part of the IBMP, ninety-eight hazing operations were conducted during the year ending in June of 2003; 12 at the North boundary and 86 at the West boundary. The IBMP is a cooperative State-Federal effort aimed at minimizing the risk of brucellosis transmission from infected bison to cattle while maintaining a wild, free-ranging bison population. Most efforts are directed at maintaining spatial and temporal separation of bison and cattle. Adjustments to the IBMP, such as initiation of vaccination programs, are considered annually and the plan may be modified based on the concept of adaptive management.

The 2003 Montana Legislature authorized the Montana Fish, Wildlife and Parks (MT FWP) Commission to consider initiating a bison hunt. MT FWP, in cooperation with the Montana Department of Livestock, began scoping for an environmental review of a proposed bison hunt. The environmental review is scheduled for completion in the fall of 2004. If the State decides to move forward with a bison hunt, it could begin as early as Fall 2004.

Under the Idaho Brucellosis Management Plan, the Idaho Fish & Game Department hired a veterinarian in October 2003. This veterinarian has completed a work plan addressing the issues and goals of the Governor’s Brucellosis Task Force report. The objective is to plan and implement management practices to maintain separation between elk and cattle, decrease and eventually eliminate elk dependence on supplemental winter feed and conduct brucellosis surveillance in elk.

As part of the Wyoming Game and Fish Department’s integrated Brucellosis-Feedground-Habitat (BFH) program, a total of 570 elk were trapped and tagged at six feedgrounds this past winter. A total of 227 test-eligible female elk were bled for brucellosis evaluation. A total of 2,569 elk calves were vaccinated at 19 state feedgrounds. The strain 19 vaccination program was initiated for the first time during 2003 since 1989-1991 on the National Elk Refuge. Implementation of habitat improvements projects was greatly impeded last fiscal year due to incomplete environmental assessment of the projects and severe drought conditions, which prevented the necessary prescribed burns.

As part of Montana’s Elk-Brucellosis Management Plan, active surveillance was conducted through hunter-harvested elk from elk management units of the GYA. Based upon these surveys, Montana elk
BRUCELLOSIS

are relatively free of brucellosis with seropositive rates of 1-4%.

Work continued on the Bison and Elk Management Plan for the National Elk Refuge (NER) and Grand Teton National Park. Three problems have emerged as key resource issues needing attention: (1) nonendemic infectious diseases, (2) degradation of native habitats, and (3) brucellosis. The year 2003 was spent primarily analyzing seven different proposed alternatives. Several options for controlling brucellosis are being addressed that would not require reductions in winter feeding or numbers of elk on the NER.

There were many Information and Education Subcommittee activities in the GYIBC in 2003. As part of their regular April meeting in Jackson, WY, the GYIBC held a public open house and panel discussion featuring the Governors from the three states and Undersecretaries from the Departments of Agriculture and Interior. Among other activities, a commitment was made to revitalize the GYIBC website as a vehicle for disseminating brucellosis-related information to the public. As a result, the GYIBC website was resigned and brought up to date on many facets. The revised website can be viewed at: http://gyibc.com.

IMPLEMENTATION OF THE INTERAGENCY BISON MANAGEMENT PLAN BY YELLOWSTONE NATIONAL PARK

Rick Wallen and Glenn Plumb
Yellowstone National Park, WY

Introduction:

Much of the controversy surrounding bison management at Yellowstone revolves around the fact that some (approximately 50%) bison are known to have been exposed to brucellosis. While brucellosis has been known from this population since early in the last century (USDI and USDA 2000), the proportion of bison that are infectious at any time of the year is unknown.

The use of spatial and temporal separation of bison from cattle on private and public lands surrounding Yellowstone National Park (YNP) provides a significant assurance to prevent the transmission of brucellosis from wild bison to domestic livestock. To further minimize the risk of transmission, cattle that occupy Special Management Areas (SMA) are being vaccinated for brucellosis. Implementation of the Interagency Bison Management Plan (IBMP) demonstrates a commitment to eventual eradication of brucellosis from the Yellowstone bison population. The interagency partners have agreed to work within their respective authorities and areas of jurisdiction to implement deliberate, stepwise measures that manage the risk of transmission while building a foundation for the eventual elimination of brucellosis in the bison population.
Nearly all Yellowstone bison select habitats within YNP during the summer months. However, the winter landscape makes forage less available to bison because of snow depth and snow structure characteristics. Thus, the area available to bison during the most difficult months of winter are extremely reduced relative to year around distribution. Special management areas along the north and west boundaries of YNP have been designated to direct our management program which will in turn protect the brucellosis class free status for the state of Montana. Three separate zones are defined within each special management area.

Zone 1 = An area within YNP where bison are managed more intensively to assure that bison do not commingle with cattle on lands immediately outside the park.

Zone 2 = An area immediately outside YNP where bison will eventually be provided winter habitat, for use from 1 November through either early or mid May.

Zone 3 = An area immediately outside zone 2 whereby bison will be intercepted and hazed back in to acceptable tolerance areas, or removed if necessary.

Interagency Bison Management Plan (IBMP):

YNP is collaborating with two other federal and two state agencies to implement the IBMP. The management plan has two main objectives, to protect a free ranging wild population of bison and manage the population in a way that will avoid the risk of brucellosis transmission from bison to cattle (USDI and USDA 2000).

The key principles of the management strategy include the spatial and temporal separation of bison from cattle, a core area of suitable bison winter range outside the Park boundary which will be phased in to use by bison being tied to an increasing increment of bison and cattle vaccinated against brucellosis over time, and finally a minimum population size to protect the conservation value of this unique and valuable genome. Bison that enter the SMA and challenge the area of tolerance are subject to a moderately complex management decision process. This decision process is what generates the vast majority of conflict between constituencies and the interagency partnership. Hazing is considered as a management tool for implementing the spatial and temporal separation of bison and cattle. Should hazing become ineffective at managing bison distribution, bison will be captured. The decision regarding how to handle captured bison is an agency specific decision depending on which SMA bison are captured. At present, the options are only two fold. In early winter, disease management is the primary focus. In late winter, if the population is greater than 3000 bison, agencies have the option to initiate population control measures by cropping bison, only if they are captured in the SMA, or continue...
testing bison captured to further pursue disease management goals. The IBMP has been implemented for four years now. The status of the accomplishments is currently being reviewed by an interagency review team and will be incorporated into the IBMP administrative record. Hazing of bison to manage distribution on the winter range has been initiated in both SMA's during each of the four winters of operation. Patterns that have evolved in the west SMA show that groups of adult male bison are generally 10 or less and hazing occurs from late September until early June. While generally, movements into the special management zones by groups of adult females begin in late winter and occurs well in to the parturition period. Movement of bison into the northern SMA, by groups of adult females, occurs earlier than at the west SMA and ceases prior to parturition. Movements by adult males into SMA's constitute a lower proportion of the hazing events at the northern SMA. Over the last few years population abundance has leveled off around 4000 animals. In three of those four years more than 200 bison per year have been removed from the population by management actions. The results of the status review will provide the interagency managers information regarding whether to move to the second step in our adaptive management procedures. While some challenges still exist, the plan is moving forward in accomplishing both of the established goals. Spatial and temporal separation of bison and cattle has been successful.

The IBMP also directs the National Park Service (NPS) to initiate a program to vaccinate bison. The contingency was that vaccinating bison at the SMA's would be initiated once a safe vaccine has been identified. A review of the literature describing the bio-safety parameters of RB51 was completed and signed in to the administrative record by the YNP superintendent. In the spring of 2004, 113 calf and yearling bison were vaccinated at the north SMA (Table 1).

Table 1. Demographics of bison vaccinated at the Stephens Creek capture pen in Feb and March of 2004.

<table>
<thead>
<tr>
<th></th>
<th>Males</th>
<th>Females</th>
<th>% of estimated subgroup in the population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calves</td>
<td>32</td>
<td>46</td>
<td>~ 23 %</td>
</tr>
<tr>
<td>Yearlings</td>
<td>18</td>
<td>17</td>
<td>~ 10 %</td>
</tr>
</tbody>
</table>

In addition to in-chute parenteral vaccination of bison at the north SMA, the NPS also has a responsibility to develop a strategy for deliv-
erating vaccine to wild free-ranging bison that never go to the SMA's. In order to move forward with remote vaccination, the NPS must complete an environmental planning process to evaluate the alternatives. The purpose and need for this planning process are five fold:

- Meet the NPS mission to preserve native wildlife species as a component of a naturally operating ecosystem and protect them from exotic organisms;
- Address the NPS responsibility to implement the IBMP;
- Decrease the probability of individual bison shedding *Brucella* organisms;
- Demonstrate systematic progress in further reducing the risk of disease transmission from bison to livestock; and
- Decrease the percentage of Yellowstone bison infected with Brucellosis.

We anticipate this planning process to take 18 months with an expected decision document being issued in January of 2006.

Remote delivery of a brucellosis vaccine presents many challenges. Delivery tools are currently very limited with ballistic delivery of vaccine in bio-absorbable bullet packages showing the most promise. Olsen et al. (2002) suggested that ballistic delivery of RB51 vaccine may require a greater dose than would be recommended through syringe injection delivery. Likewise, Roffe et al. (2001) identified the short distances required for the BTI pneumatic delivery system to be successful. YNP has studied those challenges to evaluate the feasibility of success in developing a remote delivery vaccination program. A partnership with Colorado State University has resulted in new ideas for encapsulating the RB51 vaccine. Photo encapsulation of vaccine has been shown to be successful in the laboratory. A relatively high percentage of the live bacteria in the vaccine dose survive the photo polymerization process. In addition, the ballistics of the hydrogel delivery package are very comparable to the traditional bio-bullet system. Field trials are currently in progress to compare the efficacy of this encapsulation methodology with the traditional lyophilization and compaction method (S. Olsen, pers. comm.).

Field evaluations of bison behavior have led to greater confidence in approaching bison to close distances on a consistent basis. A park based program is in place for gaining new knowledge about movement patterns using a system of randomly placed radio transmitting devices to monitor individual animal movements. In addition, aerial surveys by park biologists combined with ground based monitoring aid in documenting abundance of the population and seasonal distribution.

An interagency surveillance program to monitor brucellosis prevalence is also in place led by Montana/APHIS at the west SMA and by NPS at the North SMA. Blood samples are collected from bison cap-
BRUCELLOSIS

tured at the SMA’s and serology tests are conducted to determine exposure to Brucella abortus. A small sample of bison are randomly captured by NPS field staff throughout the park and tested for brucellosis exposure as well.

Conclusion

The IBMP protects the state of Montana interests by maintaining the Brucellosis class-free status designated by APHIS and when fully implemented should systematically reduce the incidence rate of brucellosis infected animals. The IBMP also concurrently achieves the NPS Mission by conserving Yellowstone Bison population and providing for suitable core winter range areas outside of YNP. The interagency partnership continues to implement the IBMP in a very deliberate manner utilizing transparent decision trees and a documented administrative record.

Literature Cited


NADC STUDIES ON BISON BRUCELLOSIS VACCINES AND MOLECULAR TECHNIQUES FOR BRUCELLA EPIDEMIOLOGIC TRACEBACKS

Dr. S.C. Olsen and Dr. B.J. Bricker, Agricultural Research Service, National Animal Disease Center
Ames, IA

The regulatory programs for elimination of brucellosis within the U.S. began in 1934 as a State-Federal cooperative program to reduce the cattle population during severe drought conditions. As the Brucellosis Eradication Program for cattle nears completion in the United States after 70 years of regulatory efforts, the persistence of Brucella abortus in wildlife reservoirs remains a concern for reintroduction of brucellosis to cattle. In the Greater Yellowstone area, sero-prevalence in bison is approximately 50% , whereas sero-prevalence in female adult elk over-wintering on feedgrounds is estimated at 35%. Within the last year, Brucella-infected cattle herds in Wyoming were identified which lead to the loss of that state’s Brucellosis-Free status. Molecular
tools for epidemiologic tracebacks on infected herds have previously not been available for brucellosis.

Based on analysis of the *Brucella abortus* genomic sequence, scientists at the United States Department of Agriculture, Agriculture Research Service, National Animal Disease Center (NADC) identified variable regions that may be useful for epidemiologic investigations (Bricker et al. 2003). Although the *B. abortus* genome is very stable, these intergenic, noncoding regions containing repeated strings of nucleotides, are more apt to mutate than coding regions. An assay has been developed, the “HOOF-Prints” assay, which evaluates multiple loci containing these tandem repeats. The array of alleles identified by this technique creates a genotype for each isolate. For optimal performance of this assay, multiple colonies from each animal must be obtained for analysis. Data collected from *B. abortus* strains passed *in vitro* suggests that patterns of an isolate are stable. Analysis of isolates from culture collections indicates that genotypes differ between outbreaks. Multiple isolates from an infected bovine herd suggest that multiple, closely-related genotypes may be present within an individual, however, a single genotype will predominate. When combined with epidemiologic work, data from the HOOF-Prints assay suggest that a wildlife reservoir, most likely elk, were responsible for transmitting *B. abortus* to the Wyoming cattle. The HOOF-Prints assay looks very promising for use in future epidemiologic traceback efforts. However, additional data is needed, including characterization of the rate of change in individual loci and comparisons of isolates from sequential herds in a single outbreak. It is anticipated that a statistical model will be developed that will numerically estimate the degree of relationship between isolates from different herds.

A major component of the Brucellosis Eradication Program for cattle has been calfhood vaccination. In 1996, the *Brucella abortus* strain RB51 vaccine (SRB51) was approved by the Animal and Plant Health Inspection Service as a brucellosis vaccine for bovine calves between the ages of 4 and 12 months of age at dosages between 10 and 34 billion colony-forming units (CFU). Since that time, SRB51 has essentially replaced the *B. abortus* strain 19 vaccine which had been the official brucellosis vaccine for cattle in the United States since the 1940’s.

Ongoing studies at NADC continue with the objective of developing a safe and efficacious brucellosis vaccine for free-ranging wildlife. The remainder of this report will summarize our work in bison (*Bison bison*).

We have previously reported that parenteral vaccination of bison with $1 \times 10^{10}$ CFU of SRB51 is clinically safe, induces immune responses that are similar to responses of cattle, and is efficacious in preventing abortion or fetal infection following experimental challenge with a virulent strain of *B. abortus* (Olsen et al. 1997, Olsen et al. 1998,
Other studies suggested that alternate methods of delivery of brucellosis vaccines to bison, such as bio-bullets, may influence immunologic responses (Olsen et al. 2002).

At this time, we have completed 7 efficacy studies evaluating vaccination of bison with RB51. These studies included 47 hand vaccinated, 21 ballistic vaccinated, and 25 non-vaccinated bison that were experimentally challenged in mid-gestation with *Brucella abortus* strain 2308 in accordance with the standard bovine challenge model. Bison were sacrificed at the time of abortion, or approximately 24 hours after parturition when observations on calf viability had been completed. Twenty-nine maternal or fetal tissue or fluid samples were collected for bacteriologic evaluation with additional samples obtained for histologic evaluation.

Abortion was defined as the birth of a *Brucella*-infected, nonviable fetus. Infection was defined as recovery of a single CFU from any tissue. Control and vaccinated bison were statistically compared to determine if differences in abortion or infection occurred. In addition, as brucellosis transmission is associated with infection in reproductive or mammary gland tissues, statistics were used to compare treatment groups for differences in infection within these tissues.

Data from our studies indicates that hand or ballistic vaccination with RB51 statistically (P<0.05) reduced abortions, uterine/mammary infections, and maternal infections. The reduction in abortions or uterine/mammary infections was a trend that was consistent across all studies. Our data suggests that regardless of parental or ballistic delivery, RB51 protects bison against *Brucella* infections or abortions. Although it doesn’t provide absolute protection in bison, our data suggests that RB51 is a viable vaccine candidate for use in bison.

### References


of bison to ballistic or hand vaccination with *Brucella abortus* strain RB51. *Journal of Wildlife Diseases* 38: 738-745.

REPORT OF THE COMMITTEE ON CAPTIVE WILDLIFE AND ALTERNATIVE LIVESTOCK

Chair: Dr. Robert A. Cook, Bronx, NY
Vice Chair: Dr. Michele A. Miller, Orlando, FL

Dr. Wilbur B. Amand, PA; Mr. John R. Behrmann, PA; Mr. Alan G. Clark, UT; Dr. Wayne E. Cunningham, CO; Dr. John C. Doyle, OK; Dr. Mark L. Drew, ID; Dr. John R. Fischer, GA; Dr. Michael J. Gilsdorf, MD; Dr. Chester A. Gipson, MD; Dr. Sam D. Holland, SD; Dr. David L. Hunter, MT; Dr. Dave Jessup, CA; Dr. Patrice N. Klein, MD; Dr. Jim Logan, WY; Dr. Calvin W. S. Lum, HI; Mr. Daniel P. Marsh, MI; Dr. Thomas P. Meehan, IL; Mrs. Phyllis Menden, WI; Dr. Lyle D. Miller, IL; Dr. Janet B. Payeur, IA; Mr. Shawn P. Schafer, ND; Mr. Tom A. Scheib, WI; Dr. David D. Schmitt, IA; Dr. Dale F. Schwindaman, MD; Mr. Charly Seale, TX; Mr. J. Gary Shoun, CO; Dr. Joe Starcher, WV; Dr. Pamela K. Swift, CA; Dr. Scott R. Syska, MO; Dr. Robert M. S. Temple, OH; Dr. Charles O. Thoen, IA; Dr. John B. Thurston, IN; Dr. Samuel J. Vainisi, WI; Dr. Kenneth Waldrup, TX; Mr. Dave Whittlesey, CO; Mr. Richard W. Winters, Jr., TX; Mr. Steve Wolcott, CO; Ms. Jill Bryar Wood, TX; Dr. Glen L. Zebarth, MN.

The meeting of the Committee was called to order by Chairman Bob Cook at 12:30 pm on October 24, 2004. There were approximately 150 people in attendance of which 81 signed in and 25 were Committee members. In his opening remarks Dr. Cook welcomed attendees.

Dr. Chester Gipson, Deputy Administrator of the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Services (APHIS), Animal Care (AC), presented an update on AC program activities. Information on several of these issues are available on their website (www.aphis.usda.gov/ac). During FY 2004, 4,361 inspections were performed at 2,542 exhibitor facilities. There are 9,424 facilities total and 15,134 total inspections were either performed or attempted, including unlicensed and pre-licensing inspections, by approximately 100 field inspectors.

AC issues in the spotlight include large exotic cats, elephants, transportation, bears and birds. AC continues to work with states regarding permits/licenses to allow private ownership of large exotic cats. Issues involving tuberculosis (TB) in captive elephants, the philosophy regarding management practices for zoo elephants, and responsible care and treatment of elephants in captivity continue to involve AC staff. New regulations have been enacted for foreign air carriers and how they care for animals in transit. A memorandum of understanding (MOU) has been signed between the Federal Aviation Administration (FAA)
and AC regarding incidents related to pets in transit. Captive bear issues have continued to receive attention and investigation by AC staff. There is ongoing development of standards for birds not used in research that will eventually be covered under the Animal Welfare Act (AWA).

Under the “E-GOV” initiative, AC continues to make more of their reports and information available electronically. Electronic annual reports are filed from the research community; on-line applications/renewals for licensure will become available; and traveling exhibitors will eventually be able to provide their itinerary on-line rather than by FAX.

Electronic Freedom of Information Act (E-FOIA) requires Federal agencies to make certain documents available to the public electronically, including inspections reports. This system became functional in October 2001. After Sept 11, 2001, there were concerns about confidentiality of some of the information in the inspection reports. In order to address these concerns, there is a delay in placing the reports online for 30 days to allow the facility to review and ensure the information is accurate. AC is working with the United States Department of Justice to determine what information can be made available on-line while still protecting people and facilities. It is important to determine how to address these security issues while still meeting the federal obligations to provide information.

Information that can be accessed on the AC website includes: current issues and notices; AWA, regulations, policies; lists of licensees and registrants; links to related sites; order forms; fact sheets; ability to submit annual report.

AC training events that were held during FY04 included the National Work Conference, Research Issues for Veterinary Medical Officers, Basic Training for new inspectors, Foreign Animal Diseases Awareness, and Horse Protection Act Training. Additional outreach efforts were Canine Care Workshops, Attending Veterinarian Workshops, and Big Cat Symposia. Preceptorships for AC staff were available in research, transportation and special field certification. This permitted AC staff to work with people in industry. Special topics training also covered exhibitor/exotic/wildlife and nutrition/emerging issues. Canine Care Workshops – 7 workshops were held this year throughout the country and averaged 100 attendees. Attending veterinarian workshops – 2 were co-organized with the University of Missouri. Big Cat Symposia – Various aspects of Big Cat care and maintenance were presented in several workshops offered around the country. Other topics covered were nutrition, veterinary care, training, and transportation. These workshops used outside experts and experienced USDA employees as instructors, with an average of 100 attendees per workshop.

Regulatory Activities of Interest – Amendments to the AWA that affect how rats, mice and birds, not used in research will be regulated.
CAPTIVE WILDLIFE AND ALTERNATIVE LIVESTOCK

Amendments to regulations that impact public contact programs with marine mammals are still being worked on. Other regulations are being developed that may look at using new technology in the Horse Protection Act.

Dr. Amy Glaser, Cornell University, presented “How to Get an Ante-mortem Diagnosis, Some Vaccine Titer Data, and an Update on West Nile Virus (WNV) Zoo Surveillance System.” Preliminary studies have examined vaccination in non-equine species using the Ft. Dodge equine WNV vaccine (funded by Ft. Dodge). The vaccination protocol was 2 vaccinations using inactivated whole virus vaccine, 3 weeks apart; each dose was 1 ml IM. Serum was collected pre- and 42-60 days post-vaccination. All animals were antibody negative at the beginning of the respective vaccine trails. Three zoos participated in the initial study (Dickerson Park Zoo; Gladys Porter Zoo; Woodland Park Zoo). A wide range of species were vaccinated. Overall, there was a relatively low rate of seroconversion. Flamingos, raptors, and parrots seroconverted. Titers of birds that seroconverted were relatively low, although some did have higher titers near the end of the trial (ex. a few birds had titers >1:640). Since no challenge studies were performed, there is no data on protection.

Ante-mortem diagnosis of WNV varies between birds and mammals. Birds generally have high levels of viremia but may not be antibody positive at the onset of clinical signs. Multiple samples can be used for diagnosis – whole blood (EDTA, citrate, heparin); oral pharyngeal swab/cloacal swab and blood feathers can be used to test for the presence of virus. Mammals generally have low viremia but may not be antibody positive at the onset of clinical signs. Multiple samples can be used for ante-mortem diagnosis – serial blood samples (serum); cerebral spinal fluid; +/- EDTA blood, can be used for virus identification by PCR or virus isolation, however, it is much harder to find virus in mammals.

The WNV surveillance working group started in 2001. The program objectives were: to build an affordable/reliable WNV testing schedule for zoos and offer a novel extensible data source for national surveillance; to enhance relationships between public health agencies and zoos; to design and implement analyses and reporting that enable characterization of outbreaks from disparate data; and to enable monitoring and prediction of epidemic outbreaks and detection of anomalies. Multiple zoos are involved in sending samples to Cornell University Animal Health Diagnostic Laboratory. Serum and plasma are tested for virus and or antibody, depending on history. Tissues are tested by reverse transcriptase polymerase chain reaction (RT-PCR) and virus isolation. Serum/plasma are tested for WNV/St. Louis Encephalitis virus antibody by plaque reduction neutralization test.

Initial accomplishments were that the project created/strengthened
REPORT OF THE COMMITTEE

relationships between zoos and local/state health officials for the de-
tection/reporting of a zoonotic disease threat; provided data to public
health system; and has given zoos an avenue for testing valuable rare
species. Current directions of the project include creation of an infra-
structure that is extensible to other biologic threats of concern (ex.
avian influenza); expansion of the program to create regional diagno-
sic centers; and creation of a web-based data entry, analysis and re-
porting system.

Features of the new database are that it is simple and extensible
(for example, another infectious disease can easily be added); con-
tains institution’s information; diagnostic lab testing information flex-
ibility (multiple sample submissions from any institution; tracking of
multiple samples from same animal; track multiple tests performed on
same sample); animal history and status can be entered; data entry
can be made through standardized web forms; and reports will be
available through the web to program participants. Future develop-
ment will include web access and reports; automated comparative re-
ports, and advanced algorithms for establishing patterns of outbreaks
and trends.

In summary, extensibility to other infectious diseases is the crux of
the database and analysis design. The database is a rich data source
on zoo species as sentinels of WNV (more than 10,000 tests have
been analyzed to date). The method of data analysis allowed identifi-
cation of associations between predictors (state, sex, species, time,
etc.) and positive outcomes. Visual mining of strong associations will
allow easy detailed analyses by conventional methods.

Dr. Bob McLean, Wildlife Disease Manager at USDA-APHIS-Wild-
life Services (WS) National Wildlife Research Center (NWRC), pre-
sented “West Nile Virus in North America: Overview and Update.” Exotic
WNV was introduced into New York City in 1999. In the Old World,
WNV cycled through mosquito vectors and avian reservoirs. In the
United States (U.S.), WNV became more virulent and caused mortal-
ity in crows and humans. American crows experimentally infected with
WNV demonstrated a much higher viremia than those infected with
St. Louis Encephalitis virus. Guidelines for 2000 WNV surveillance
were published in Centers for Disease Control and Prevention (CDC)
These included enhanced passive surveillance for dead corvids and
active surveillance with sentinel chickens and wild birds; mosquito sur-
veillance and enhanced passive veterinary and human surveillance.
Information was fed into the state public health database then updated
by CDC’s database as part of “ArboNet”. Maps were updated weekly.
However the missing part of surveillance system was the lack of live
bird testing. Enhanced passive surveillance of WNV resulted from re-
porting, sampling and testing of sick or dead equines with compatible
signs, or clinical human cases or deaths with compatible signs. Mosquito surveillance was performed by monitoring populations and WNV infection rates. Bird surveillance consisted of samples from captive sentinel and zoo birds as well as free-ranging birds (live and dead bird testing). The American crow became the public health sentinel for WNV; it is highly susceptible to WNV infection and virus titers in tissues were high enough to allow delayed testing. Submission of dead birds by public and local agencies for testing allowed detection and tracking of WNV; however, testing of dead birds required a Biosafety Level-3 lab for testing. A test developed for mosquitoes (rapid swab test) was found to be useful in birds; due to high viral loads in tissue, an oral swab could detect virus in corvids. Using dead bird surveillance, this method provided earlier detection by weeks before sentinel birds, horses or human events. Within 6 years of introduction, WNV had reached the west coast of the U.S. Currently, WNV is endemic within the U.S. In 2004, there were more human cases west of the Rockies than in the east U.S. (ex. 583 cases in Calif.) The WNV events are probably weather driven. There were 951 total equine cases in 2004. Canada had its first WNV case in 2001. Mexico saw increased WNV activity in 2004; WNV first appeared in Yucatan in 2001. WNV appears to be disseminating south through Central America and north along the western coast of Canada. There is also a concern about mosquitoes going to Hawaii.

WNV equine vaccine was introduced in 2001. Since 2001, there has been a decrease in the number of equine WNV cases and deaths. The number of avian species that have died or been infected with WNV is now 278. It is estimated that several million birds have died in the U.S. from WNV. In 2003, 73,861 dead birds were reported; 22,455 were tested (30%). Of the tested birds, 52% were WNV positive (11,597 positive birds); corvids accounted for 84% of the affected birds. American crows and blue jays are the most commonly affected avian species. Trend data are too insensitive to detect regional population effects or effects are compensated for by immigration of unaffected birds from surrounding localities because of patchy distribution of WNV. The extent of mortality in regional and national crow populations and other species and the overall significance and impact to bird species are unknown but recent evidence suggest some significant local impact and possible long-term effects.

NWRC studies are underway to look at methods to improve surveillance. One study is sampling of cliff swallow nestlings for WNV infection as an early warning surveillance for predicting human risk. An oral swab is taken from nestlings in June. This provided early warning of risk in 2003 and helped target mosquito control. Another study examined the role of small mammals in WNV transmission. Samples were collected from 20 species (600 mammals). WNV antibody was detected in 8 species of wild mammals from several regions (highest
prevalence occurred in eastern grey squirrels, fox squirrels, and Virginia opossums). Experimental infection of sage grouse with WNV resulted in 100% mortality within 3-4 days of infection. This has led to research on a vaccination to protect the captive breeding program.

Dr. W. Ray Waters, Veterinary Medical Officer and scientist in the Bovine Tuberculosis (TB) Research Group, USDA Agriculture Research Service (ARS), National Animal Disease Center (NADC), presented an update on elephant tuberculosis serology. *Mycobacterium tuberculosis* (*M. tb*) has been isolated from 30 captive elephant within 14 herds in the U.S. (1994-2004); all Asian elephants. *Mycobacterium bovis* (*M. bovis*) has been isolated from 1 African elephant. Multiple drug resistance has been reported. The only approved diagnostic test is culture of trunk wash samples. There are several challenges with elephant TB diagnosis. Culture of trunk wash has relatively poor sensitivity. Skin test is not validated in elephants and there is no confidence in these results. A gamma interferon (gamma IFN) test is currently in development. Serologic tests are appealing because: samples can be stored for future analysis; archived samples can be analyzed; various assay platforms can be directly compared; and these assays are amenable to serial analysis (i.e. to monitor therapy). There is a multiple antigen Enzyme-Linked Immunosorbant Assay (ELISA) currently in use for experimental testing in elephants.

Dr. Waters reported on a study that used archived samples from elephants with known clinical status and trunk wash culture data to compare three assays: immunoblot, multiple antigen print immunoassay (MAPIA), and rapid test.

Immunoblot assay used whole cell *M. tb* sonicate as the antigen. This preparation lacks secreted antigens (i.e. ESAT6). Using serum from one elephant that was infected with *M. tb*, positive bands were detected from serum collected in 1996. This elephant did not have a positive trunk wash culture until 2000. Antibiotic treatment was started in 2000, and a decrease in the number and intensity of bands was observed in the immunoblot. Several other *M. tb* infected elephants showed similar patterns using immunoblot.

MAPIA – In this assay, a machine prints specific antigens horizontally on a nitrocellulose membrane which can be cut into strips and used in Western blot. Strips are incubated with serum samples, then incubated with anti-Ig conjugate and color developer. Using MAPIA, similar to the immunoblots, an antibody response to multiple bands was observed in serum from the *M tb* infected elephant. After treatment, antibody response waned to certain antigens. No antibody response was detected to any antigens in non-infected elephant sera. Using a densitometry, the antibody response to ESAT6 remained relatively high, but other antibody responses (to 16kD and Mt48) decreased with therapy. Therefore, an increase in antibody response to
any of these antigens post-therapy may indicate reactivation of infection.

Rapid test – This test uses lateral flow technology and can be used in the field with whole blood or serum. If a band is present in the test strip, it indicates a positive reaction. Rapid test detected antibody 4 years prior to positive culture in the first elephant tested. Results are similar to those seen with MAPIA. A decreased antibody response to nMPB83 and Mtbc48 antigens was observed with antibiotic therapy but antibody to ESAT6 remained high. MAPIA using serum from an *M. bovis* infected elephant showed lighter bands.

MAPIA can be used on other species. Serum was obtained from a gazelle that became infected with the same *M. tb* strain as the elephant. Using MAPIA, the serum showed a similar banding pattern to the infected elephant serum. MAPIA can also be used to indicate which antigens will show the strongest reaction in the rapid test.

A panel of sera from healthy and TB infected elephants showed good correlation between the MAPIA and the rapid test. However, one Asian elephant with chronic nail infection, joint disease, and osteomyelitis was positive on the rapid test but negative on MAPIA.

In summary, elephants produce a robust antibody response to TB infection. Of the antigens tested, ESAT6 and CFP10 are the most immunodominant. The rapid test format appears promising as a screening test in elephants. MAPIA will be useful as a primary or confirmatory test. MAPIA may be used to measure waning response upon therapy and relapses post-therapy.

**Recommendations:**

Recent advances need to be presented to the National TB Working Group for Zoo and Wildlife Species. Discussion should center on whether further studies are needed for validation. Additional evaluation of archived samples could be used but funds will be needed for testing. Serologic testing could be used in combination with trunk washes for a period of time but may have the potential to replace trunk wash culture as the screening test with antibody positive animals being tested more rigorously by culture. These tests can also be used to monitor therapy and as an indicator of relapses. Additional investigation of its use with other zoo species (i.e. rhinos, hoofstock) should also be done.

Dr. Candace McCombs, Sequella Inc., presented “Developing a New TB Test for Non-human Primates.” The development of the new test uses lateral flow technology ELISA and has been a collaborative effort between Sequella Inc., Chembio Inc, Univ. of South Alabama and Tulane National Primate Center. TB is the most important bacterial disease of captive primates, although it is rare in wild primates. It can be caused by either *M. tb* or *M. bovis*. A single bacterium has been shown to cause infection in rhesus macaques. TB is usually spread
REPORT OF THE COMMITTEE

by airborne contagion and can spread rapidly through a colony. Non-human primates (NHP) with TB will cough and produce infective aerosol. Current TB testing in NHP uses the tuberculin skin test. This test requires anesthesia and intradermal injection into the eyelid. It is prone to false positives and false negatives. Sensitivity is considered very poor; therefore, serial testing is usually performed (ex. 3 serial negative tests required in quarantine). Primagam is a blood-based assay that has received provisional USDA approval. On day 1, whole blood is incubated with antigens in vitro; on day 2, gamma IFN is quantitated by ELISA. The assay is more technically and logistically difficult; it requires that fresh blood must be mixed with antigens within 12 hrs; and the assay requires special laboratory equipment. Therefore, it is apparent that there is an urgent need for the development of TB diagnostics in NHP.

Rapid test for NHP for TB diagnosis – This test is stable for 1 year at room temperature. It is technically easy to perform and interpret. A sample is added to the well – if one line appears, it is negative; if two lines appear, the test is positive. The assay uses one-step, lateral flow technology. A unique cocktail of TB-specific antigens are mixed with one drop of blood, serum, or plasma. Results can be obtained within 20 minutes. This test can be used in the field while an animal is still in a cage.

Diagnostic sensitivity of the rapid test was evaluated in 6 studies and the rapid test detected a total of 46/51 infected monkeys (overall 90.2% sensitivity). Most of these monkeys had been experimentally infected while the remainder were naturally infected. The majority of animals became positive by 6-8 weeks post-infection. Animals had small granulomas and probably were not yet infectious at this point in time. In an evaluation of 7 studies, 154/157 negative monkeys were correctly classified by the rapid test in 4 different primate species (overall specificity of 98.1%).

Current studies are being performed with potentially cross-reactive mycobacteria. Rhesus monkeys are being infected with strains of *M. avium*, *M. kansasii*; and squirrel monkeys are being infected with *M. kansasii, M. gordonae*, and *M. scrofulaceum*. The studies will use the rapid test to follow serologic responses to determine if cross-reactivity occurs in skin test, Primagam, and rapid test.

A request for collaboration was made; samples are needed from TB infected primates and control samples from healthy animals. Test kits can be provided for on-site testing. Contact Konstantin Lyashchenko (kl@chembio.com) for more information.

In summary, the rapid test for TB in NHP is a novel quick point of care diagnostic with high specificity and sensitivity. More positive and negative samples are needed for USDA approval.

Dr. Mitch Palmer, Veterinary Medical Officer and lead scientist in
CAPTIVE WILDLIFE AND ALTERNATIVE LIVESTOCK

the Bovine TB Research Group, USDA-ARS-NADC, presented “Experimental Infection of Reindeer (Tangifer tarandus) with Mycobacterium bovis: Pathologic and Immunologic Findings.” TB in reindeer is extremely rare. There is one report of a case in the London Zoo in 1930. TB has never been diagnosed in reindeer in the U.S. or Canada. However, mycobacterial testing in reindeer falls under USDA regulations for cervids. False positive results are common and may result in quarantine and slaughter of reindeer. To date, all necropsied reactor animals have been negative for TB. Studies performed in Alaska using comparative cervical testing (CCT) on sensitized reindeer showed 62-100% sensitivity and 80% specificity. Changes in CCT classification during the study was common. The objectives in this study were to evaluate tuberculin skin testing and in vitro blood based assay (Cervigam) using experimentally infected reindeer; evaluate use of recombinant proteins (ESAT6, CFP10, and ESAT6:CFP10), with the Cervigam assay; and describe tuberculous lesions in experimentally infected reindeer. Dr. Palmer’s complete paper is included in the Scientific Papers section of these proceedings.

Treatment groups consisted of 12 uninfected control reindeer and 13 M. bovis-infected reindeer (10^5 cfu administered intratonsillarly). Blood was collected for serology and Cervigam, and a CCT was performed at 3 and 8 months.

Scattergrams for cervids and bison/cattle were used to compare experimental groups. At 3 months, all infected reindeer had CCT responses in the infected zone using either scattergram. Controls were negative except for 1 suspect, using the cattle/bison scattergram. Using the cervid scattergram, only 2 controls were considered negative, 1 positive, and all the rest were suspect. If these same control reindeer were placed on the proposed reindeer scattergram, it would only require retesting of one control animal (suspect).

At 8 months, only 4 control animals remained. All infected animals were far into the reactor zone. Using the cervid scattergram, there were 2 negative controls and 2 positive reactors. Using the bison/cattle scattergram, 2 negative and 2 suspect controls. If the proposed reindeer scattergram is used, controls would be classified as 2 negative, 1 suspect, and 1 positive. Therefore, use of either the cattle/bison or reindeer scattergram provide increased specificity over traditional cervid scattergram.

The Cervigam assay was modified to incubate whole blood with purified protein derivative (PPD) or specific antigens or fusion protein. Infected animals showed increased gamma interferon (IFN) production over controls to PPD bovis, except in a few cases (during summer months due to increased reactivity to PPD by controls). If fusion protein was used for stimulation, increased gamma IFN production in infected animals was observed with very little background response by
controls.

The most common site of infection in reindeer was the medial retropharyngeal lymph node. White-tailed deer often have more severe and extensive lesions/infection than reindeer. The type of lesion is similar to that observed in other cervids. Pulmonary lesions were not very severe.

In conclusion, all CCT scattergrams identified infected reindeer. The CCT scattergram modified for reindeer provides increased specificity as compared to the standard form 6-22D. The Cervigam assay should prove useful and requires only a single handling event. Use of recombinant ESAT6:CFP10 may decrease the number of false positives detected with the Cervigam assay. Lesions can range from caseonecrotic to abscess-like. Lesion distribution may be less widespread than that seen in white-tailed deer.

Dr. Pam Dennis, Ohio State University and co-chair of the American Association of Zoo Veterinarians (AAZV) Infectious Disease Committee, reviewed “Disease Surveillance in American Zoo Association (AZA)-Accredited Zoos.” Disease surveillance in zoos occurs on a national, institutional and species/taxon level. Examples of specific disease monitoring programs that occur on a national level in zoos are WNV, TB, and Chronic Wasting disease (CWD). The WNV surveillance data from zoos has been incorporated into the national public health database through the combined effort of multiple groups including Centers for Disease Control, USDA, United States Geological Survey, state and local public health and wildlife agencies, Cornell University, AZA, and AAZV. There are a number of reasons that zoo populations are useful as potential disease sentinels: collections may contain a variety of susceptible species; it is usually a stationary population; often animals can be serially sampled; zoos are located in both rural and urban locations spread over the U.S.; and often zoos are in close proximity to human populations. In the case of WNV surveillance data, in 2001, there were 1,500 zoo animals tested in 64 zoos (30 states + Washington D.C.). In 2002, there were 6,629 animals tested in 157 institutions, representing 1,163 different species. In 2003, over 10,000 animals were tested in over 185 institutions.

The National TB Working Group for Zoos is another example of how the zoo community provides disease surveillance. This advisory group is working to help establish intradermal skin testing standards for different non-program species and provide recommendations for secondary testing. It is also provides guidance for the zoo and regulatory communities for assessing and managing risk groups. Currently, the group is prospectively collecting data from zoos that are testing different species using a centralized reporting mechanism to establish prevalence, incidence, and provide information about appropriate testing and interpretation of results in different non-program species. A
subgroup has also served as an advisory group for control of TB in elephants. They have helped standardize testing, management and treatment guidelines for these species.

The zoological community has also proactively developed guidelines to mirror programs being developed for CWD. These guidelines recommend CWD testing via a certified laboratory of all cervid species that die. These data may eventually help identify which cervid species are susceptible to this disease.

Zoos continuously provide disease surveillance at an institutional level through their preventive medicine programs, review of medical records, monitoring wildlife, and retrospective evaluation of tissue/serum banks. During quarantine, incoming animals are screened for disease and baseline data is collected. Routine exams provide follow-up diagnostic screening for disease surveillance. Necropsy of collection animals provides information on cause of death but also may provide additional information about diseases and tissue/serum for future testing. Monitoring of local wildlife aids in detection of diseases of concern occurring in the area and potential sources of pathogens.

There are also programs based on surveillance on a species or taxonomic group level. These are usually administered on a national level by veterinary advisors or species advisory groups. These advisory groups provide recommendations for health monitoring, pre-shipment, quarantine, necropsy and research protocols. Disease surveillance is usually an important part of in situ conservation programs for many of these same species.

As the zoological community continues to increase its ability to provide disease surveillance, it will also need to strengthen collaborative efforts with regulatory, public health, wildlife, and other groups to share information and expertise.

Peter Butchko, director of Wildlife Services in Michigan, USDA-APHIS-WS, presented “Eradication of a Bovine TB-Positive Captive Cervid Herd in Northeast Michigan.” Bovine TB was detected in a deer found on a 1,500 acre commercial hunting facility in northeast lower Michigan in December 1997. Gross lesions were present in the lung. At the time, there were an estimated 600 animals present on the ranch, mostly white-tailed deer, with a few sika deer and elk also present. Deer had been enclosed by fencing the area and then bought from the state when the ranch started. Challenges of eradication in this population were the goal of 100% depopulation; dealing with a heavily forested habitat; and verification of complete depopulation. The initial strategy used selective sharp shooting at night from vehicles and baited blinds. Occasionally, hunters would pass by the herd if they thought that they couldn’t shoot all the deer to avoid educating deer to the shooting. Additional removals occurred by client hunts and ranch personnel, which had been allowed by agreement with the state. Fencing
was constructed to restrict deer to open areas of the ranch. Shooting started February 1998 with an expected date of completion in the winter 2001. Most shooting occurred in winter months when leaves were off the trees. Results from the initial phase – 286 deer removed by January 1999.

Second phase – a helicopter was brought in to shoot the remaining deer. Additional fencing was erected to exclude deer from heavy cover. Four deer were captured and radio-collared to help locate additional deer. Radio-collared deer were removed once all other deer were removed (March 1999). These deer were effective in leading hunters to other deer but eventually learned helicopter avoidance.

The verification phase started in March 1999. Ground personnel and the helicopter conducted systematic sweeps of fenced units for deer sign; no deer sign was found. Fresh snowfall aided in verification; no tracks were seen. In May 1999, deer dogs from South Carolina were deployed to confirm depopulation; again, no deer sign was found. In February 2000, a systematic ground search for deer sign revealed no deer. The 12 month quarantine period was completed.

Accomplishments – 325 deer were removed, eliminating a potential source of infection. This provided for a significantly earlier resumption of commercial activity by the ranch. A successful partnership was formed with the helicopter company, Michigan Department of Natural Resources, Michigan Department of Agriculture, and USDA-APHIS-VS.

In conclusion, a successful depopulation plan resulted from the use of selective sharp shooting, strategic use of fencing, and aerial gunning using “Judas” deer. Depopulation can be expedited by using a helicopter in the operation.

Dr. Arnold Gertonson, Yellowstone Brucellosis Coordinator, USDA-APHIS-VS, provided a “Greater Yellowstone Brucellosis Update.” In 2003-2004, the bison hazing operations in Montana (cooperative effort between state and federal agencies) consisted of 59 operations in the western boundary area (1,516 bison) and 1 operation in the northern boundary area (14 bison). Bison captures in the western boundary area during this same time period occurred in 4 operations; 8 seronegative bison were released and 12 seropositive animals were sent to slaughter. Of the 464 bison captured in the northern boundary area during 2003-04, 264 seropositive bison were sent to slaughter, 198 were released, and 111 seronegative nonpregnant yearlings were vaccinated and released. There were 2 lethal operations that involved 2 bulls.

The brucellosis vaccination program is expected to be expanded in the future. The Montana Environmental Protection Act process should be completed in early 2005. Vaccination was started in Yellowstone National Park (YNP) in 2003. The vaccine will be delivered remotely.
and is currently under research and development. There is consideration of incorporation into a biobullet or possible oral delivery.

There is a three-phase quarantine feasibility study. This will occur at 3 different sites. The intent is to determine if latent infections are present in bison. Animals will be held at the first site until they are yearlings. They would move to a second site to be bred and continued to be tested. The third site has not yet been identified. Seronegative bison would eventually be released to Native American tribes and onto other public lands. This will be a soft release process and testing will continue for a period after release.

Fluorescent polarization assay (FPA) is in the final rule form. Publication in the Federal Register is expected soon. The FPA test for brucellosis has been validated for use in cattle, bison and swine. Work is being done to get this test validated for cervids.

Greater Yellowstone Interagency Bison Committee MOU draft has been sent forward by the executive committee. Signers are the Secretaries of USDA and Department of Interior, and the Governors of Wyoming, Montana, and Idaho. Idaho Governor Kempthorne requested assistance from USDA-APHIS in August 2004. There is concern about brucellosis transmission from wildlife to livestock in the Greater Yellowstone Area (GYA). APHIS will work with the States and other federal agencies in addressing the elimination of brucellosis from the GYA. Grand Teton NP and National Elk Refuge are developing elk and bison management plans; the draft for public comment is expected out next year.

Wyoming has lost class free status due to detection of Brucellosis in livestock herds. The first livestock herd was detected in December 2003. The second livestock herd was a trace-out from the first herd. Wyoming lost its class free status in February 2004. A third herd was detected in May 2004. The fourth herd was detected in June 2004. A Wyoming Brucellosis Coordination Team was appointed by the governor of Wyoming. They have been meeting since early last spring. Completion of their report is expected in December 2004.

Currently YNP estimates their bison population to be approximately 4,000 head. There are 700-800 in Grand Teton National Park. Weather will play a huge role in future developments. 1996-97 was the last severe winter.

Dr. Dean Goeldner, Coordinator of the CWD Program, USDA-APHIS-VS, gave a presentation on “Chronic Wasting Disease—APHIS-VS Program Update.” CWD was first recognized as a clinical syndrome in mule deer in a research facility in Colorado in 1967. Currently eight states have CWD in wild cervids and eight states have the disease in farmed cervids. There have been 34 positive herds; most have been depopulated. There are currently 5 known CWD positive captive cervid herds; 3 elk herds in CO and 2 white tailed deer herds in WI.
Transmission is most likely horizontal. Environmental contamination may play an important role. Vertical transmission does not appear to be important. Minimum incubation period is 15 months (mule deer) and 12 months (elk) in experimental infections. Maximum incubation period is unknown; 25 months (mule deer) to 34 months (elk) in high dose oral inoculation. Time from infection to shedding is unknown. There is evidence of transmission in both directions across fence-lines (between captive and free-ranging cervids). Movement of infected animals is the primary means for spread of disease in the captive cervid industry.

Challenges associated with a CWD program are that the disease occurs in multiple species, both free-ranging and captive; there are multiple regulatory authorities and fragmented jurisdictional frameworks; farmed cervids are a relatively new livestock industry; there are critical gaps in disease knowledge; limited diagnostic tools; and the impacts of public/media perceptions.

USDA-APHIS goals for CWD are to eradicate CWD from captive cervids and assist states and Tribes in addressing CWD in free-ranging cervids. In FY 2003, $14.8 million was added to APHIS budget for CWD; this was the first time CWD was a line item for funding. In FY 2004, $18.5 million was budgeted (including $2.25 million earmarked).

The FY 2004 Farmed Program will pay for surveillance testing for all farmed cervids. It will also cover indemnity, depopulation, disposal and testing for positive/exposed herds and trace animals. Approximately $1.2 million in cooperative agreement assistance was provided to 17 state farmed cervid programs. Each year the number of captive cervids tested has increased; in FY 04, 15,172 captive elk/deer were tested.

Immunohistochemistry (IHC) continues to be considered the gold standard diagnostic test for CWD. Four ELISA–based test kits are currently licensed for wild cervids; they are licensed for specific species and tissues. For captive cervids, IHC will continue to be used since there is sufficient capacity to meet need; test results can be highly contentious and may result in regulatory action; APHIS may consider use of alternative tests in the future. Test kits are used for free-ranging species because it allows for faster testing of large numbers of samples. Confirmatory IHC testing is still required for positives. Tonsillar biopsy is used by some states. There are 26 labs in the contract group. Online sample submission applications are available for samples from farmed cervids, which will direct samples to labs based on capacity; wildlife agencies can use any contract lab.

VS memo 574.2 was signed Aug 17, 2004; this sets procedures for defining areas where CWD is established in wildlife. It also makes purchase and depopulation an option for captive/farmed herds in these areas based on available funding.

The proposed APHIS CWD herd certification program was published in the Federal Register Dec 24, 2003. The goal is to eliminate CWD from captive cervids in the United States. This is a voluntary...
CAPTIVE WILDLIFE AND ALTERNATIVE LIVESTOCK

program for captive/farmed elk and deer. There are fencing require-
ments, animal ID and herd inventory, and surveillance of deaths over
16 months. Herd status will be based on years of surveillance. Inter-
state movement of cervids will be allowed only if participating in a herd
certification program. Surveillance requirements will be “ramped up” to
5 years. Qualifying State programs will be “grandfathered”. After 5 years
of compliance with no evidence of disease, herds will be designated
“low risk” for CWD. Slaughter and shooter animal surveillance would
no longer be required. This facilitates interstate movement and trade.

Some changes are being developed based on 105 substantive,
multi-faceted comments to the proposed CWD rule. Since this is a
significant rule it requires additional clearances. BSE has also slowed
the process. Therefore, the final rule is still in process.

The CWD Uniform Methods and Rules (UM&R) internal review has
been completed. It will require adjustments to comply with changes in
the final rule. The current plan is to post the draft UM&R on the website
after the final rule clears the Office of General Council.

A new web-based, user-friendly database has been developed for
CWD. This will soon to be piloted at the state level. They are working
with U.S. Geological Survey to determine how summary data will be
shared with NBII CWD Data Clearinghouse.

APHIS is working with states and federal agencies and tribes to
implement CWD plan (June 2002). They helped pay for some of the

Research support to USDA-APHIS-WS National Wildlife Research
Center continues in areas of research on transmission, barriers, cens-
sus techniques, vaccine, scavengers and predators, and decontami-
nation. APHIS has been in discussions with the Environmental Pro-
tection Agency on a variety of CWD issues including – defining prions
as pests; CWD waste from diagnostic labs; Federal Insecticide, Fungi-
cide, Rodenticide Act sec. 18 exemptions for using bleach, sodium
hydroxide and Environ LpH for prion disinfection; landfilling of CWD
carcasses.

Dr. Beth Williams, University of Wyoming, presented “Update on
Chronic Wasting Disease Research.” Research is on-going in many
areas due to increased interest and funding. These include surveil-
lance/geographic distribution of disease; improved diagnostic meth-
ods/strain typing – similarities to scrapie, molecular techniques to ex-
amine banding patterns from CWD tissue; host range studies – intrac-
erebral inoculation; transgenic mouse models – developed to express
prion proteins to understand natural history but also bioassays; patho-
genesis/genetics – to determine if there are genetically resistant strains
similar to those that occur with scrapie; epidemiology (local and land-
scape) – to understand transmission; spatial modeling – what factors
influence occurrence of CWD; behavior – males tend to have higher
incidence of infection/clinical effects; control methods – fencing, de-
creasing population in hotspots, barriers; and vaccines/therapeutics. Diagnostic IHC comparing samples from different species indicate that multiple samples may be required. In elk, CWD was detected in 69% of cases when both lymph node and brain were examined; 19% LN only; and 12% brain only. In mule deer, 84% of cases were detected if both lymph node and brain were tested, and 16% were detected if only lymph node was tested. No cases were detected when only brain was tested. Therefore, there is a need to test both LN and brain to pick up positive tissues in elk. CWD susceptibility of cattle was examined by exposing them to CWD infected tissue orally; 7 years post-oral inoculation, none of the cattle showed evidence of CWD. Cattle were also exposed to infected deer on range; 7 years post-exposure contact, there was no evidence of CWD in these cattle.

Preliminary genetic analysis have shown 1 polymorphism in mule deer, 3 polymorphisms in white-tailed deer, and 1 polymorphism in elk that may play a role in CWD. No genotype has been identified that is completely CWD resistant.

Mule deer pathogenesis studies were performed using oral CWD inoculation. By 3 months Post Innoculation, homozygous animals were positive for CWD in lymph nodes. The heterozygous animals seemed to have slightly more prolonged incubation of CWD in lymph node and brain, as well as clinical signs when experimentally infected in preliminary study. Other studies examined transmission by direct or indirect contact or contact with carcasses. After one year of contact with CWD infection was detected by tonsil biopsy. When deer were in direct contact with infected animals, 2/10 contact animals showed evidence of CWD infection by tonsil biopsy. When deer were in indirect contact with infected animals, 1/9 contact animals showed evidence of CWD infection. If animals were in contact with CWD infected carcasses, 3/12 animals showed evidence of CWD infection.

A test and cull program using tonsil biopsy is being used in Estes Park; animals are darted and collared, then culled if they are biopsy positive.

Dr. Tom Meehan, Brookfield Zoo, Chicago, IL presented an update on shigatoxigenic E. coli in contact animals at AZA-accredited zoological institutions' petting zoos. Screening included samples from 36 different institutions (976 animals); 4 zoos with Salmonella (7 animals); none positive on follow-up testing; no 0157 E. coli in contact setting.

One resolution was approved by the Committee and submitted to the Committee on Nominations and Resolutions for approval by the general membership. The resolution requested federal agencies with responsibility for implementation of Homeland Security Presidential Directive-9 to include state fish and wildlife management agencies in planning activities, add representation from these state agencies to the Food and Agriculture Sector Government Coordinating Council, and to provide funding to these state agencies to assist them with homeland security activities.
REPORT OF THE USAHA/AAVLD COMMITTEE ON
DIAGNOSTIC LABORATORY AND VETERINARY
WORKFORCE DEVELOPMENT

Co-Chair: Dr. Bennie I. Osburn, Davis, CA
Co-Chair: Mr. Robert E. Frost, Lincoln, CA

Dr. J. Lee Alley, AL; Dr. Alex A. Ardans, CA; Dr. Thomas W. Bates, CA; Dr. Judith Bossé, CAN; Dr. John R. Clifford, DC; Dr. W. Ron DeHaven, DC; Dr. Brian R. Evans, CAN; Dr. Peter J. Fernandez, DC; Dr. Bret D. Marsh, IN; Ms. Barbara M. Martin, IA; Dr. Richard H. McCapes, CA; Dr. Donald O'Toole, WY; Dr. Gary D. Osweiler, IA; Col. Gerald Parker, DC; Dr. Willie M. Reed, MI; Dr. Alfonso Torres, NY; Dr. Lyle P. Vogel, IL; Dr. Richard D. Willer, AZ; Dr. José Angel del Valle Molina, MEX.

The Committee met on Monday, October 25, 2004, from 7:00 pm to 9:00 pm. There were 24 people in attendance. Co-chairs Dr. Bennie Osburn and Mr. Bob Frost welcomed Committee members and guests to the inaugural meeting of the Committee and all were given an opportunity to introduce themselves.

There were no formal presentations made during the Committee meeting.

The Committee discussed funding for National Animal Health Laboratory Network (NAHLN). Barbara Martin, United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), NAHLN Coordinator reported that 43 laboratories in 37 states are currently participating in the NAHLN, but only 12 laboratories are funded as part of the initial pilot project. Willie Reed, AAVLD President reported that a one-time appropriation of $85 million is needed to fully fund the NAHLN and $30 million per year is needed to provide ongoing maintenance and support.

The concept of a North American Laboratory Network was then discussed. Dr. Brian Evans, Chief Veterinary Officer for Canada, discussed the status of diagnostic animal health programs in Canada and stated the need for interagency and cross-jurisdictional cooperation to provide a hemispheric response to global threats to animal health. Dr. Jose Angel del Valle, Chief Veterinary Officer for Mexico, discussed the status of animal health programs in Mexico and stated a strong desire to work with the U.S. and Canadian diagnostic laboratories to improve standardization and quality control. Dr. John Clifford, USDA-APHIS-VS Deputy Administrator, reported that USDA-APHIS is working with Canada and Mexico on a number of issues and expressed a commitment to continue the emergency response coordination. Co-chair Bob Frost stated a need to develop a North American Laboratory Network to improve harmonization and standardization among the diagnostic
laboratories. The Committee expressed consensus to support the concept of a North American Laboratory Network and a commitment to increase collaboration among the diagnostic laboratories.

The Committee then discussed building capacity in veterinary medical education. Co-chair Dr. Bennie Osburn reported that a number of studies have demonstrated critical shortages of veterinarians in public practice areas, including public health, regulatory veterinary medicine, biomedical research and academia. Drs. Willie Reed and Donal O’Toole stated there was a shortage of veterinarians pursuing post-DVM training in pathology and toxicology and severe competition with private industry in recruiting board-certified diagnosticians to work in state and federal diagnostic laboratories. Dr. Evans stated a need to increase the number of veterinary pathologists and link the diagnostic laboratory infrastructure with expertise in the veterinary medical colleges. Dr. Osburn reported that the Association of American Veterinary Medical Colleges (AAVMC) was working to have new legislation introduced in Congress to authorize a program of competitive grants for the veterinary medical colleges to build capacity and increase the number of veterinary students. The Committee approved a recommendation that United States Animal Health Association (USAHA) support and join the AAVMC in seeking federal funding to build capacity in veterinary public health, public practice and biomedical research.

As a result of the discussion on the NAHLN, the Committee approved a resolution to request federal funding for NAHLN. The resolution was forwarded to the Committee on Nominations and Resolutions for approval by the general membership.
REPORT OF THE COMMITTEE ON ENVIRONMENT

Chair: Dr. Gavin Meerdink, Urbana, IL
Vice Chair: Dr. Randall A. Lovell, Martinsburg, WV

Mr. L. Wayne Godwin, FL; Dr. John P. Honstead, CO; Dr. Gary D. Osweller, IA; Dr. John C. Reagor, TX; Dr. Jane F. Robens, MD; Dr. Paul F. Ross, IA; Dr. Manuel A. Thomas, Jr., TX; Dr. Larry J. Thompson, GA; Dr. Gary M. Weber, DC.

The Committee on the Environment met on October 23, 2004 in conjunction with the American Association of Veterinary Laboratory Diagnosticians (AAVLD) Veterinary Analytical Toxicology and Mycotoxins Committee. There were forty-eight in attendance including seventeen visitors.

The mycotoxin occurrence in crops is discussed annually. Mycotoxins, particularly aflatoxin, have not been an issue for the 2004 harvest, in general. Over most of the grain belt, weather conditions have been ideal and record yields were commonplace. However, deoxynivalenol (DON) or "vomitoxin" was a problem in some upper Midwest locales in wheat grain and straw. Isolated incidences of elevated T-2 toxin and aflatoxins were reported in the Midwest and Southwest, respectively.

Dr. Emmett Braselton, Animal and Population Health Diagnostic Laboratory, Michigan State University, presented a time-specific Committee paper entitled, "Inductively Coupled Plasma-Atomic Emission Spectroscopy (ICP-AES) in the Diagnostic Lab: Then, Now and Hot off the Press." ICP-AES is an analytical instrument that is capable of analyzing for several elements at one time (including but not limited to: Ca, Cd, Cu, Fe, Hg, K, Mg, Mn, Mo, Na, P, Pb, S and Zn). Dr. Braselton has been a pioneer in the implementation of this method for use in diagnostic medicine. Dr. Braselton reviewed the history, the strengths and weaknesses of the ICP-AES. Improvements over the years have added to the value of this instrument. The ICP-AES multi-element analysis instrument has become a useful tool in diagnostic and research laboratories. It has enabled diagnosticians to detect unexpected elemental findings and opened unanticipated avenues for research. Dr. Braselton’s paper is included in its entirety elsewhere in these proceedings.

Elizabeth Tor, California Animal Health and Food Safety Laboratory System, University of California, Davis, presented “Algal toxin analyses—methodologies.” Blue green algae grow in waters and produce cyanotoxins commonly throughout the world. With the appropriate combination of nutrients, light, temperature and wind direction, “blooms” that concentrate the toxin can occur and result in animal disease and
death. For example, *Microcystis* spp., *Anabaena* spp., *Aphanizomenon* spp., *Lyngbya* spp. and *Nodularia* spp. produce toxins including, microcystins, anatoxin A, saxitoxins, and nodularin. The World Health Organization has established guidelines for some of these toxins in water, however, methods for their detection and accurate quantitation have been limited.

Bioassay, colorimetric, Enzymed Linked Immunosorbent Assay and High Performance Liquid Chromatography procedures have been used. All have time, sensitivity or specificity limitations. Also, standards for instrument calibration are expensive or not available. Method development with the addition of mass spectroscopy is in progress for use in other matrices.

Dr. Randall Lovell, Division of Animal Feeds, Center for Veterinary Medicine, Food and Drug Administration (FDA), presented a time-specific paper entitled “Dioxin Levels in Animal Feeds.” This paper is included in these proceedings.

Dr. Andrew Moore, Canadian Food Inspection Agency, Food Microscopy Laboratory, Guelph, Ontario, presented “FT-Infra-red/scanning electron microscopy (IR/SEM) – a useful tool in veterinary toxicology and forensic food science.” Several case examples were used to demonstrate the use of IR/SEM in the veterinary diagnostic laboratory. Food contaminants can be often readily identified with this discrete method of microscopy. Small particulate materials can be identified as insect parts, metal fragments, medications (tablets), crystals, etc. Materials reflect unique infra-red spectra and measurement of these wavelengths can lead to their identification. In one instance, the infra-red technology was useful in the identification of an insecticide that was intentionally disseminated in a city park and killed a number of dogs. The rapid determination and subsequent premises search removed the public hazard.

Michael Filigenzi and Dr. Birgit Puschner, California Animal Health and Food Safety Laboratory System, University of California, Davis discussed “Perchlorate – methodology in milk.” Perchlorate (a chlorine atom with four attached oxygen atoms) is a very reactive compound. It is commonly found as a contaminant in water (i.e., rivers). Perchlorate is used in air bags (automobile), rocket fuel and in a number of other applications. There has been media attention following the recent discovery of perchlorate in milk (”milk contains rocket fuel”). Methods for the determination of perchlorate in water and food products were reviewed.

Ion chromatography (IC) has been the method of choice for this agent, although problems with selectivity and matrix effect influences are inherent, particularly in milk. A method developed using High Performance Liquid Chromatography–tandem mass spectrometry (MS/MS) appears to be an improvement over IC. A detection of limit of 0.8
ENVIRONMENT

225 ppb has been achieved with this new method.
Milk from several sources, including organic milk, has been tested.
So far, all milk samples have been found to contain traces of perchlorate. A method for forages is being developed.
No resolutions or recommendations were discussed by the Committee.

INDUCTIVELY COUPLED PLASMA-ATOMIC EMISSION SPECTROSCOPY (ICP-AES) IN THE DIAGNOSTIC LAB: THEN, NOW AND HOT OFF THE PRESS

W. Emmett Braselton, Animal and Population Health Diagnostic Laboratory, Michigan State University, Lansing, MI

Introduction
Rapid and accurate diagnosis of animal disease problems associated with either toxic concentrations of heavy metals, or deficiencies in trace minerals is often predicated on analytical determination of a number of major, minor and trace elements. At the time the Michigan State University (MSU), Animal and Population Health Diagnostic Laboratory, Toxicology Section was being developed in the late 1970's, these determinations were being conducted in veterinary toxicology laboratories using a variety of analytical methodologies, most of which employed time consuming single element determinative steps.1,2 Furthermore, completely separate sample preparation procedures were often required. The laboratory established an initial objective of doing simultaneous, multielemental analysis, at the sensitivity necessary for toxicology and nutrition studies in biological tissues. Several techniques for simultaneous quantitative multielemental analysis were becoming available, including neutron activation, spark source mass spectrometry, x-ray fluorescence (XRF) and atomic emission spectroscopy.3 Emission spectroscopy had been used for years for mineral analysis, but the older arc, spark and flame emission sources were unreliable because of interferences, so people turned to atomic absorption (AA), especially in biological sciences. In 1962 Velmer Fassel (Ames, IA) and Stanley Greenfield (England) began experimenting with the inductively coupled plasma (ICP) as source, and in the mid-70s they became commercially available (see review by Fassel).4 Although ICP's were being utilized extensively in areas such as geochemistry, food, plants and soils analysis and clinical chemistry by the late '70s, their use in veterinary toxicology and nutrition had been relatively unexplored. With support from the Michigan State University Agricultural Experiment Station in 1979, the AHDL Toxicology Section began to investigate the capability of the ICP as a diagnostic tool for veterinary cases
REPORT OF THE COMMITTEE

involving suspected heavy metal poisonings, mineral deficiencies, or storage disease.

Methods and Procedures

Theory: Inductively coupled plasma-atomic emission spectroscopy (ICP-AES) is an instrumental technique that allows quantitative analysis of as many as 40 elements in solution simultaneously. The technique involves nebulization of the liquefied sample into an argon plasma that is sustained by a high frequency oscillating magnetic field. Elements are atomized and elevated to excited states in the high temperatures (5,000 to 10,000 K) of the plasma, and emit characteristic photons as they decay back to lower energy states. Wavelengths are dispersed by a diffraction grating and simultaneously measured in a direct reading polychromator or sequentially in a scanning monochromator. The advantage gained by the ICP over other methods for emission spectroscopy resides in the inductively coupled plasma itself. Plasmas are gases in which a significant fraction of their atoms or molecules are ionized. Argon plasmas generated by high frequency R.F. form an annular plasma shape, which incorporates a highly efficient introduction of sample into the hottest portion of the plasma, and provide a long residence time (2-3 milliseconds) for the mix of elements in the viewing region. The plasmas achieve a high temperature of 5,000-10,000° Kelvin resulting in excitation of atoms into a large number of energy states which often leads to a number of available emission lines for each element. The argon plasma also provides an inert atmosphere which eliminates self-reversal, leading to high sensitivity. Absence of self-reversal further leads to high linearity of emission intensity versus concentration, up to 6 orders of magnitude, achieving greater accuracy of measurement. Accuracy is also enhanced by high spectral resolution (10-20 picometers) in modern ICP spectrometers. Radial viewed geometry allows background noise separation from the desired emission line signal and therefore enhanced signal to noise and improved detection limits. Because of this unique special distribution of analyte emission and background found in the ICP discharge, the spectral background intensities are 100x smaller and 3x more stable than with other emission sources. In addition to sensitivity and accuracy, analysts are interested in maximizing precision. Direct reading polychromators or eschelle spectrometers interfaced to an ICP source utilize a minimum number of moving parts, are thermally controlled, and are usually equipped with a vacuum or purged optical bench, all of which contribute to excellent instrument stability and therefore precision. Armed with the theoretical capabilities discussed above the MSU lab set forth the following objectives to derive the maximum benefit from the multielemental analyzer: 1) develop one standardized workup for biological samples; and 2) determine 19 elements simultaneously
ENVIRONMENT

under a single set of operating conditions.

Operation: There are certain limitations on the samples to be introduced into the ICP: 1) They must be in liquid or gaseous form; 2) dissolved solids must be low; and 3) viscosity should be <20% mineral acid which limits the ability to analyze a concentrated digest. The lab investigated several alternatives to sample preparation, including dilute and shoot, dry ashing (muffle furnace), hydride generation (selected elements) and wet ashing. A wet ashing procedure which utilized sealed heavy walled Teflon containers was developed from the method described for mercury analysis by H.M. Stahr. Biological materials including tissue, feeds and serum were digested with conc. HNO₃ overnight at 90°C. Nearly complete mineralization was achieved under these conditions, and viscosity differences were corrected for by use of yttrium as internal standard.

Validation of Results: Having worked out problems with samples themselves, it was necessary to determine the accuracy of the results obtained. Accuracy was assessed in several ways, including: 1) dynamic profiling of each spectral emission line about the peak to determine if the peak was present at the proper wavelength and if there was evidence of spectral overlap or background interferences; 2) confirm concentration by the standard additions method; 3) compare with certified standards such as NIST Bovine Liver SRM 1577a and other NIST certified reference materials appropriate to the matrix being analyzed; 4) compare results with an independent method such as AA in another laboratory; and 5) participate in national or international check sample reference programs.

Selected Studies:

Then: By early 1981 the MSU laboratory had developed an argon plasma ICP atomic emission spectroscopy method for determination of 8 elements in serum and determination or monitoring of 19 elements in tissues and feeds. It was clear that the method provided a diagnostic advantage with its rapid screening ability, and at that early stage had confirmed suspected metal poisonings, confirmed mineral deficiencies and storage disease, and identified unsuspected etiologic factors in other cases.

Biopsy mineral analysis: ICP-AES became the routine method for determination of serum elements in live animals and for liver and kidney elements in post-mortem cases but, it was clear that for certain elements liver concentration would be a more useful measure of nutritional status in live animals. This is particularly true of bovine copper. However, because liver biopsies of sufficient size for copper analysis were inconvenient to obtain, serum or plasma coppers were most often used as monitors of bovine copper status. The commercial availability of the ultrasonic nebulizer (USN) made possible the analysis of
very small samples such as Tru-Cut tissue biopsies. The USN provides a much smaller and more uniform liquid droplet size than conventional nebulizers and allows a greater concentration of analyte to be introduced, resulting in approximately a 10-fold enhancement of sensitivity. To demonstrate the feasibility of the method, biopsies were obtained from a single post mortem bovine liver, dried, digested overnight in conc. HNO₃ and diluted to volume. It was determined that Cu, Ca, Fe, Mg, Mn, Mo, P, Zn, Na, S and K were present in normal bovine liver in concentrations that could be quantified on samples as small as 5 mg dry weight. Element concentrations in biopsy samples taken in triplicate from the five lobes of the bovine liver were compared to those from triplicate wedge sections (1 gram) taken adjacent to the biopsies and analyzed by conventional ICP-AES. Precision between biopsies was equal to or better than precision between wedge samples. Cu concentrations determined by the biopsy procedure differed statistically from those determined by the wedge procedure, but differences were not sufficient to influence clinical interpretation of data. The element concentration frequency distribution profile of the 11 elements above plus Cd was compared to profiles of the elements in fat, muscle, vena cava, kidney, and clotted blood. The profiles could be used to confirm the authenticity of blind liver biopsy samples from live animals.

**Ethylene glycol/cholecalciferol:** Early on it was found that the ICP mineral screen revealed unexpected etiologies and one of these was that high kidney Ca (>5,000 parts per million (ppm) wet weight) indicated possible ethylene glycol toxicity. The question then arose "in that case what about cholecalciferol toxicity?" The AHDL ICP data base of canine kidney Ca and P (1985-1998) was compared to known cases of ethylene glycol poisoning and cholecalciferol poisonings. It revealed that canine kidney Ca in unaffected animals was generally less than 800 ppm, Ca in cholecalciferol poisoned animals was between 2,000 and 3,000, and in ethylene glycol poisoning, greater than 5,000 ppm; P in unaffected and ethylene glycol poisonings from 100 to 3,500 ppm, while in cholecalciferol toxicity, P was greater 4,000 ppm. The Ca/P ratio was between 0.4-0.8 in cholecalciferol toxicity, whereas it was greater than 2.5 in ethylene glycol toxicity. The Ca/P ratio has become a useful addition to diagnosis of these toxicities.

**Mercury by ICP:** One of the “needs” identified in the initial development of the ICP procedure was for a rapid, multielemental screen for heavy metals, including Hg. Conventional wisdom indicated that Hg was not a good element to determine by ICP-AES, but the laboratory set up a series of experiments to validate the ICP-AES determination of Hg by comparison with the established procedure of cold vapor-AAS. Feathers, livers, kidneys, and brains were obtained from wild loons, and kidneys obtained from rats treated with mercuric chloride. Hg was determined by cold-vapor AAS and by ICP-AES and results
compared using regression analysis and Bland and Altman ‘limits of agreement’ tests.\textsuperscript{12} Regression analysis of loon feathers with Hg concentrations of 1.7-48.6 ppm showed $[\text{Hg}_{\text{ICP}}]=0.924[\text{Hg}_{\text{CVAAS}}]+0.641$, $r=0.996$. Bland/Altman ‘limits of agreement on the $[\text{Hg}_{\text{CVAAS}}]/[\text{Hg}_{\text{ICP}}]$ ratio against the mean gave a mean ratio of 1.002, with limits from 0.886-1.118. Analysis of rat and loon tissues with Hg concentrations of 2.2-73 ppm showed $[\text{Hg}_{\text{ICP}}]=0.553[\text{Hg}_{\text{CVAAS}}]+0.423$, $r=0.9998$, and Bland/Altman ‘limits of agreement on the $[\text{Hg}_{\text{CVAAS}}]/[\text{Hg}_{\text{ICP}}]$ ratio against the mean gave a mean ratio of 1.019 with limits from 0.915-1.122. It was clear that ICP-AES was an acceptable alternative for determination of Hg in feathers and tissues at a concentration of 2 ppm and above.

\textit{Iohexol clearance:} In addition to multielemental screening procedures, the ICP-AES has proven useful as a tool for element specific methods. A method for measurement of iodine in serum to enable the clinical determination of glomerular filtration rate by iohexol clearance in small animals was needed to replace the less sensitive XRF method used in human medicine, where larger volumes of blood could be safely taken over time. Initial experiments indicated that the most sensitive I emission line, at 178.276 nanometer (nm), was seriously overlapped by the P line at 178.287. The ICP was set up to measure I in the P channel by offsetting 0.011nm, and correcting for the P interference by measuring P at a second emission line, 214.914 nm. Iohexol could be measured in serum at 15-600 ppm I, regression line $y=0.3217+0.9951x$, with $r^2=0.9995$. The ability to measure down to 15 ppm (XRF detection limit was 40 ppm) allowed measurement of glomerular filtration rate in dogs and cats by using a single compartment model for plasma clearance of iohexol with three samples drawn 3 to 7 hr after treatment.\textsuperscript{13} The method has been validated by comparison with the conventional procedure of urinary exogenous creatinine clearance\textsuperscript{14} and has proven useful in clinical studies\textsuperscript{15} as well as a routine clinical diagnostic procedure.

\textit{Now, Wild Animal Data Base:} Extensive use of the ICP-AES method utilizing serum in diagnostic cases involving live animals and tissues, particularly liver and kidney, post mortem, allowed the development of a data base of expected serum and tissue concentrations in a variety of domestic and wild species. This data is presently being collated into useable tables of tissue and serum mineral concentrations, and may be used as an estimate of expected ranges for species with little or no literature values available.

Table 1 is an outline of the number of species with data available in various class, order and family groupings throughout the animal king-
Table 2 gives an example of the type of data available and its arrangement in the database. Since many elements show a skewed distribution the median and the 5% to 95% ranges are given to indicate where the expected range might fall.

*Hot off the Press:* New technologies available in the past 10-15 years have made possible enhanced sensitivity (axial plasma viewing) and enhanced resolution (eschelle polychromators coupled with semiconductor chip detector arrays). The MSU laboratory has been working with an axial plasma instrument with eschelle polychromator/semiconductor chip array interfaced with an ultrasonic nebulizer to obtain maximum sensitivity. The goal was to develop a method to determine marginal, normal and elevated concentrations of serum Mn and Mo, with quantification limits of 5 parts per billion (ppb) Mn and 10 ppb Mo. Results indicated that the instrument detection limits (3xSTD of the noise) were 0.006 ppb and 0.048 ppb for Mn and Mo respectively. The theoretical limits of quantification (LOQ, 3.3x detection limits) in serum were 0.20 ppb and 1.6 ppb for Mn and Mo respectively. These were well below the original goal of 5 and 10 ppb respectively. Since a certified reference material for Mn and Mo in serum is not available, confirmation of accuracy was conducted by standard addition experiments on a pool of commercially available bovine serum. Results indicated that Mn in the serum determined without standard addition, 6.65 ppb (STD DEV 0.78), was very close to the number confirmed by standard addition, 6.47 ppb (STD DEV 0.74). Likewise, Mo in the serum determined without standard addition, 14.1 ppb (STD DEV 0.75), was very close to the number confirmed by standard addition, 13.0 (STD DEV 0.95). Mn and Mo are now quantified with this method in clinical cases on a routine basis.

<table>
<thead>
<tr>
<th>Class</th>
<th>Order/Suborder</th>
<th>Family/Subfamily</th>
<th>Genus/Species/Breed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fish</td>
<td>5</td>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td>Amphibia</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Reptilia</td>
<td>4</td>
<td>13</td>
<td>16</td>
</tr>
<tr>
<td>Aves</td>
<td>18</td>
<td>28</td>
<td>46</td>
</tr>
<tr>
<td>Mammalia</td>
<td>2</td>
<td>17</td>
<td>18</td>
</tr>
</tbody>
</table>

*1*Not completed

Table 1. Wild Animals Data Base, 1985-2003.
Table 2. Raptors Liver.

Total data base, including Bald eagles (33), Golden eagles (2), Osprey (3), Hawks (40), Falcons (6), Vulture (1)

<table>
<thead>
<tr>
<th></th>
<th>Ca</th>
<th>Cu</th>
<th>Fe</th>
<th>Mg</th>
<th>P</th>
<th>Zn</th>
<th>K</th>
<th>Na</th>
<th>Mn</th>
<th>Mo</th>
<th>Cd*</th>
<th>Pb*</th>
<th>Hg*</th>
<th>Se*</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>85</td>
<td>85</td>
<td>85</td>
<td>85</td>
<td>85</td>
<td>85</td>
<td>85</td>
<td>85</td>
<td>69</td>
<td>20</td>
<td>19</td>
<td>13</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>MEAN</td>
<td>91.1</td>
<td>8.3</td>
<td>853</td>
<td>189</td>
<td>3064</td>
<td>51.4</td>
<td>2362</td>
<td>1441</td>
<td>3.5</td>
<td>0.45</td>
<td>0.24</td>
<td>11.8</td>
<td>3.28</td>
<td>3.26</td>
</tr>
<tr>
<td>STDEV</td>
<td>74.2</td>
<td>9.72</td>
<td>756</td>
<td>38.4</td>
<td>449</td>
<td>40.9</td>
<td>627</td>
<td>401</td>
<td>1.4</td>
<td>0.41</td>
<td>0.14</td>
<td>12.8</td>
<td>1.06</td>
<td>1.48</td>
</tr>
<tr>
<td>MIN</td>
<td>33.5</td>
<td>2.8</td>
<td>77.7</td>
<td>121</td>
<td>1710</td>
<td>13.4</td>
<td>923</td>
<td>764</td>
<td>0.94</td>
<td>&lt;0.1</td>
<td>&lt;0.1</td>
<td>&lt;0.5</td>
<td>&lt;2.0</td>
<td>&lt;2.0</td>
</tr>
<tr>
<td>5%</td>
<td>45.7</td>
<td>3.04</td>
<td>153</td>
<td>139</td>
<td>2318</td>
<td>18.5</td>
<td>1512</td>
<td>1028</td>
<td>1.77</td>
<td>&lt;0.1</td>
<td>0.1</td>
<td>0.61</td>
<td>2.21</td>
<td>2.05</td>
</tr>
<tr>
<td>MEDIAN</td>
<td>71</td>
<td>5.53</td>
<td>627</td>
<td>190</td>
<td>3130</td>
<td>32.8</td>
<td>2330</td>
<td>1330</td>
<td>3.1</td>
<td>0.41</td>
<td>0.21</td>
<td>8.65</td>
<td>3.02</td>
<td>2.79</td>
</tr>
<tr>
<td>95%</td>
<td>165</td>
<td>21.3</td>
<td>2100</td>
<td>250</td>
<td>3826</td>
<td>145</td>
<td>3304</td>
<td>2054</td>
<td>6.2</td>
<td>1.02</td>
<td>0.43</td>
<td>36.1</td>
<td>5.08</td>
<td>6.39</td>
</tr>
<tr>
<td>MAX</td>
<td>609</td>
<td>68.1</td>
<td>3680</td>
<td>318</td>
<td>3930</td>
<td>200</td>
<td>4550</td>
<td>3390</td>
<td>8.17</td>
<td>2.6</td>
<td>0.65</td>
<td>43.5</td>
<td>5.36</td>
<td>7.01</td>
</tr>
</tbody>
</table>

*Values were below detections limits (0.1, 0.5, 2.0, 2.0 ppm for Cd, Pb, Hg, Se respectively) for the majority of animals tested.
REPORT OF THE COMMITTEE

In summary, ICP-AES has provided a useful multielemental screen for diagnostic purposes, has served as a valuable tool for research collaborators, and opened unexpected avenues for investigation of animal health.

References:
12. Bland, JM, Altman, DG.: Statistical methods for assessing agreement between 2 methods of clinical measurement. Lan-
ENVIRONMENT


*Standard Reference Materials Program, Bldg. 202, Room 204, National Institute of Standards and Technology, Gaithersburg, MD 20899
Veterinary Laboratory Association Quality Assurance Program, Diagnostic Chemicals Limited, West Royalty Industrial Park, Charlottetown, PE, Canada C1E 1B0
Association of American Feed Control Officials Check Sample Program, 4760 Hammermill Road-Suite 104, Tucker, GA 30084

DIOXIN LEVELS IN ANIMAL FEEDS

Dr. Randall Lovell, Veterinary Medical Officer, Division of Animal Feeds, Center for Veterinary Medicine, Food and Drug Administration (FDA)

<table>
<thead>
<tr>
<th>GRAINS</th>
<th>ppt TEQ [ND=0]* (17 D/F congeners) (mean ± stdev)</th>
<th>ppt TEQ [ND=0]* (3 PCB congeners) (mean ± stdev)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CORN</td>
<td>0.0032 ± 0.0081 (n=21) range = 0.0 – 0.034</td>
<td>0.015 ± 0.026 (n=10) range = 0.0 – 0.080</td>
</tr>
<tr>
<td>COTTON SEED</td>
<td>0.0026 ± 0.0052 (n=15) range = 0.0 – 0.034</td>
<td>0.0055 (n=2) range = 0.0 – 0.011</td>
</tr>
<tr>
<td>BARLEY</td>
<td>0.0068 ± 0.0090 (n=13) range = 0.0 – 0.026</td>
<td>0.047 (n=2) range = 0.037 – 0.057</td>
</tr>
<tr>
<td>RYE</td>
<td>0.0052 ± 0.0062 (n=11) range = 0.0 – 0.018</td>
<td>0.0073 ± 0.0012 (n=5) range = 0.0057 – 0.0090</td>
</tr>
</tbody>
</table>
### REPORT OF THE COMMITTEE

<table>
<thead>
<tr>
<th>Grain</th>
<th>ppt TEQ [ND=0]*</th>
<th>ppt TEQ [ND=0]*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(17 D/F congeners)</td>
<td>(3 PCB congeners)</td>
</tr>
<tr>
<td>(mean ± stdev)</td>
<td>(mean ± stdev)</td>
<td></td>
</tr>
<tr>
<td>OATS</td>
<td>0.0059 ± 0.0081 (n=10)</td>
<td>0.034 (n=2)</td>
</tr>
<tr>
<td>MILO</td>
<td>0.0011 ± 0.0030 (n=9)</td>
<td>0.0 (n=1)</td>
</tr>
<tr>
<td>WHEAT</td>
<td>0.0022 ± 0.0036 (n=5)</td>
<td>no data</td>
</tr>
<tr>
<td>PEANUTS</td>
<td>0.00026 ± 0.0058 (n=5)</td>
<td>no data</td>
</tr>
<tr>
<td>RICE</td>
<td>0.00071 ± 0.00069 (n=4)</td>
<td>0.0053 ± 0.0061 (n=4)</td>
</tr>
</tbody>
</table>

*preliminary data that has not been verified

#### GRAIN BY-PRODUCTS

<table>
<thead>
<tr>
<th>Grain</th>
<th>ppt TEQ [ND=0]*</th>
<th>ppt TEQ [ND=0]*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(17 D/F congeners)</td>
<td>(3 PCB congeners)</td>
</tr>
<tr>
<td>(mean ± stdev)</td>
<td>(mean ± stdev)</td>
<td></td>
</tr>
<tr>
<td>SOYBEAN MEAL</td>
<td>0.017 ± 0.027 (n=10)</td>
<td>0.0 (n=2)</td>
</tr>
<tr>
<td>CANOLA MEAL</td>
<td>0.00058 ± 0.00105 (n=10)</td>
<td>0.023 ± 0.045 (n=9)</td>
</tr>
<tr>
<td>COTTON SEED MEAL</td>
<td>0.025 ± 0.028 (n=9)</td>
<td>0.00065 (n=2)</td>
</tr>
<tr>
<td>RICE BRAN</td>
<td>0.0083 ± 0.0131 (n=8)</td>
<td>0.031 ± 0.040 (n=8)</td>
</tr>
<tr>
<td>WHEAT MIDDLS</td>
<td>0.044 ± 0.047 (n=5)</td>
<td>no data</td>
</tr>
</tbody>
</table>

*preliminary data that has not been verified
## ENVIRONMENT

### FISH MEAL

<table>
<thead>
<tr>
<th>Fish Type</th>
<th>ppt TEQ [ND=0]* (17 D/F congeners) mean ± stdev</th>
<th>ppt TEQ [ND=0]* (3 PCB congeners) mean ± stdev</th>
</tr>
</thead>
<tbody>
<tr>
<td>MENHADEN</td>
<td>1.36 ± 0.44 (n=22) range = 0.89 – 3.0 range = 0.89 – 3.0</td>
<td>0.58 ± 0.31 (n=22) range = 0.011 – 1.1 range = 0.011 – 1.1</td>
</tr>
<tr>
<td>PERUVIAN/ S. AMERICA</td>
<td>0.091 (n=3) range = 0.018 – 0.24 range = 0.020 – 0.23</td>
<td>0.22 (n=3) range = 0.20 – 0.23 range = 0.20 – 0.23</td>
</tr>
<tr>
<td>HERRING CANADA</td>
<td>0.58 (n=4) range = 0.20 – 1.1 range = 0.24 – 0.42</td>
<td>0.37 (n=4) range = 0.24 – 0.42 range = 0.24 – 0.42</td>
</tr>
<tr>
<td>SARDINE MEXICO</td>
<td>0.02 (n=3) range = 0.0 – 0.06 range = 0.0 – 0.06</td>
<td>0.021 (n=3) range = 0.0 – 0.063 range = 0.0 – 0.063</td>
</tr>
<tr>
<td>MIXED SPECIES PACIFIC COAST</td>
<td>0.43 (n=3) range = 0.29 – 0.70 range = 0.26 – 0.45</td>
<td>0.36 (n=3) range = 0.26 – 0.45 range = 0.26 – 0.45</td>
</tr>
<tr>
<td>COD (Alaska)</td>
<td>0.0032 (n=1) range = 0.0 range = 0.0</td>
<td>0.061 (n=1) range = 0.0 range = 0.0</td>
</tr>
<tr>
<td>KRILL (Alaska)</td>
<td>0.00038 (n=1) range = 0.0 range = 0.0</td>
<td>0.0018 (n=1) range = 0.0 range = 0.0</td>
</tr>
</tbody>
</table>

*preliminary data that has not been verified

### FISH OIL

<table>
<thead>
<tr>
<th>Fish Type</th>
<th>ppt TEQ [ND=0]* (17 D/F congeners) mean ± stdev</th>
<th>ppt TEQ [ND=0]* (3 PCB congeners) mean ± stdev</th>
</tr>
</thead>
<tbody>
<tr>
<td>MENHADEN</td>
<td>12.2 ± 6.8 (n=7) range = 7.8 – 27 range = 13</td>
<td>6.9 ± 2.0 (n=7) range = 4.4 – 10 range = 7.8 – 27</td>
</tr>
<tr>
<td>CATFISH</td>
<td>12.7 (n=3) range = 12 – 14 range = 12</td>
<td>0.85 (n=3) range = 0.52 – 1.3 range = 0.52 – 1.3</td>
</tr>
<tr>
<td>WHITING</td>
<td>1.5 (n=2) range = 1.0 – 1.9 range = 2.3 – 2.9</td>
<td>2.6 (n=2) range = 2.3 – 2.9 range = 2.3 – 2.9</td>
</tr>
<tr>
<td>FISH NOS (Norway)</td>
<td>0.013 (n=1) range = 0.03</td>
<td>0.28 (n=1) range = 0.03 range = 0.03</td>
</tr>
</tbody>
</table>

*preliminary data that has not been verified
REPORT OF THE COMMITTEE

FORAGES

<table>
<thead>
<tr>
<th></th>
<th>ppt TEQ [ND=0]*</th>
<th>ppt TEQ [ND=0]*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(17 D/F congeners)</td>
<td>(3 PCB congeners)</td>
</tr>
<tr>
<td></td>
<td>(mean ± stdev)</td>
<td>(mean ± stdev)</td>
</tr>
<tr>
<td>ALFALFA HAY (CA, KS, NY, PA &amp; OR)</td>
<td>0.033 ± 0.046 (n=5)</td>
<td>no data</td>
</tr>
<tr>
<td></td>
<td>range = 0.0 – 0.103</td>
<td></td>
</tr>
<tr>
<td>CORN SILAGE (IA, IL, NY &amp; OH)</td>
<td>0.016 ± 0.010 (n=4)</td>
<td>no data</td>
</tr>
<tr>
<td></td>
<td>range = 0.0069 – 0.031</td>
<td></td>
</tr>
<tr>
<td>Sweet Corn Cannery Waste (corn husks)</td>
<td>0.0 (n=1)</td>
<td>no data</td>
</tr>
</tbody>
</table>

Proposed Fiscal Year 2005 Survey

Dioxins in Rendered Mammalian/Poultry Fats, in Yellow Grease, and in Filtering/Bleaching Agents – Nationwide Survey

<table>
<thead>
<tr>
<th>Sample Description</th>
<th>No. of Samples</th>
</tr>
</thead>
<tbody>
<tr>
<td>rendered fat, poultry</td>
<td>10</td>
</tr>
<tr>
<td>rendered fat, swine</td>
<td>10</td>
</tr>
<tr>
<td>rendered fat, cattle</td>
<td>10</td>
</tr>
<tr>
<td>rendered fat, mixed animal species</td>
<td>10</td>
</tr>
<tr>
<td>yellow grease</td>
<td>10</td>
</tr>
<tr>
<td>filtering/bleaching agents</td>
<td>10</td>
</tr>
</tbody>
</table>

Follow-up Cattle Investigations to a Recent USDA Survey

<table>
<thead>
<tr>
<th></th>
<th>ppt TEQ [ND=0]*</th>
<th>ppt TEQ [ND=0]*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(17 D/F congeners)</td>
<td>(3 PCB congeners)</td>
</tr>
<tr>
<td></td>
<td>(mean ± stdev)</td>
<td>(mean ± stdev)</td>
</tr>
<tr>
<td>MIXED</td>
<td>0.057 ± 0.151 (n=11)</td>
<td>0.018 ± 0.033 (n=9)</td>
</tr>
<tr>
<td>CATTLE RATION</td>
<td>range = 0.00071 – 0.51·</td>
<td>range = 0.0 – 0.078</td>
</tr>
<tr>
<td>MINERAL/ SUPPLEMENT</td>
<td>0.14 ± 0.26 (n=15)</td>
<td>0.0011 ± 0.0017 (n=6)</td>
</tr>
<tr>
<td>WATER</td>
<td>.00025 ± .00057 (n=12)</td>
<td>.00059 ± .00183 (n=11)</td>
</tr>
<tr>
<td></td>
<td>range = 0.0 – 0.0019</td>
<td>range = 0.0 – 0.0061°</td>
</tr>
<tr>
<td></td>
<td>2nd highest value = 0.00031</td>
<td></td>
</tr>
</tbody>
</table>
### ENVIRONMENT

<table>
<thead>
<tr>
<th></th>
<th>FAT</th>
<th>HAY/SILAGE</th>
<th>Corn</th>
<th>Corn Steepwater</th>
<th>Molasses</th>
<th>Bedding</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.41 ± 0.29 (n=6)</td>
<td>0.049 ± 0.031 (n=6)</td>
<td>0.0 – 0.041</td>
<td>0.054 (n=1)</td>
<td>0.0068 (n=1)</td>
<td>2.9 (n=1)</td>
</tr>
<tr>
<td></td>
<td>range = 0.048 – 0.75</td>
<td>range = 0.0 – 0.0030</td>
<td>0.0 – 0.041</td>
<td>0.0</td>
<td>no data</td>
<td>0.010 (n=1)</td>
</tr>
<tr>
<td></td>
<td>0.15 (n=3)</td>
<td>0.031 ± 0.024 (n=4)</td>
<td>0.0 (n=1)</td>
<td>0.00053 (n=1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>range = 0.058 – 0.34</td>
<td>range = 0.0 – 0.058</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*preliminary data that has not been verified

#### Follow-up Investigations to a Recent USDA Dioxin Survey

<table>
<thead>
<tr>
<th></th>
<th>ppt TEQ [ND=0]* (17 D/F congeners)</th>
<th>ppt TEQ [ND=0]* (3 PCB congeners)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Utility Pole (barn support)</td>
<td>44,432</td>
<td>0.0</td>
</tr>
<tr>
<td>Feeder (home made; gnawed)</td>
<td>3,197</td>
<td>0.0</td>
</tr>
<tr>
<td>Feeder (home made)</td>
<td>1,117</td>
<td>0.0045</td>
</tr>
<tr>
<td>Corral Post</td>
<td>852</td>
<td>no data</td>
</tr>
<tr>
<td>Security Light Pole</td>
<td>318</td>
<td>0.0</td>
</tr>
<tr>
<td>Corral Post</td>
<td>44</td>
<td>no data</td>
</tr>
<tr>
<td>Utility Pole (barn support)</td>
<td>7.3</td>
<td>0.0019</td>
</tr>
<tr>
<td>Corral Post</td>
<td>0.93</td>
<td>no data</td>
</tr>
<tr>
<td>Treated Lumber</td>
<td>0.42</td>
<td>0.0049</td>
</tr>
<tr>
<td>Feeder (built in 1980s)</td>
<td>0.22</td>
<td>0.077</td>
</tr>
<tr>
<td>Treated Lumber</td>
<td>0.10</td>
<td>0.0</td>
</tr>
<tr>
<td>Fence Post</td>
<td>0.0047</td>
<td>0.0</td>
</tr>
<tr>
<td>Green Treated Lumber</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Treated Lumber</td>
<td>0.0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

- mixed cattle ration containing 0.51 ppt TEQ was collected from the bottom of a feeder similar to this one. The dioxin/furan congener pattern in the mixed ration was similar to that in this feeder.

*preliminary data that has not been verified
REPORT OF THE COMMITTEE ON
FEED SAFETY

Chair: Mr. Kevin G. Custer, Cumming, GA
Vice Chair: Mr. Richard Sellers, Arlington, VA

Dr. Roy D. Brister, AR; Mr. Ed Corrigan, WI; Dr. Richard L. Dutton, NE; Dr. Don A. Franco, FL; Dr. G. Yan Ghazikhanian, CA; Dr. Eric C. Gonder, NC; Dr. Jay Hawley, IN; Dr. G. Thomas Holder, MD; Dr. Rex D. Holt, GA; Dr. John P. Honstead, CO; Dr. David C. Kradel, PA; Dr. Elizabeth A. Lautner, NY; Dr. David L. Meeker, VA; Dr. Kakambi V. Nagaraja, MN; Dr. Gary D. Osweiler, IA; Dr. Jane F. Robens, MD; Dr. John A. Schmitz, NE; Mr. James E. Stocker, NC; Dr. H. Wesley Towers, DE; Dr. Elizabeth K. Wagstrom, IA; Dr. W. Douglas Waltman, GA; Dr. Gary L. Waters, MT.

Vice Chair Richard Sellers chaired the meeting for Chair Kevin Custer in his absence. Vice Chair Sellers called the meeting to order at 12:30 pm on October 26, 2004. Twenty-four committee members, and guests, were present.

Dr. Dan McChesney Center for Veterinary Medicine (CVM), Food and Drug Administration (FDA) gave an update on CVM feed safety issues. The agency’s developing Animal Feed Safety System was reviewed. The objective is to develop a comprehensive, risk-based system for feed manufacture and distribution to minimize risks to animal and human health due to animal feed. A public meeting will be held in 2005 to gather/review information.

Relative to Bovine Spongiform Encephalopathy (BSE), Dr. McChesney stated the circumstances and science had changed since 1997. He reported the infectious dose might be lower than previously thought. The Advanced Notice of Proposed Rulemaking relative to strengthening the feed ban was reviewed and infrastructure challenges were outlined.

The agency’s overall strategy relative to dioxin(s) is to limit exposure to dioxin(s) through food. Mineral survey results from FY 04 survey showed very few products above 5 ppt TEQ. FY 05 data collection will focus on fats and oils. Dr. McChesney stated that a partnership among industry, academia, and government could be beneficial.

Dr. Lisa Ferguson United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) gave an update on surveillance for BSE. Total worldwide cases of BSE were reviewed, showing that 99.97% have occurred in the United Kingdom. The BSE National Surveillance Plan goal is to obtain as many samples as possible from the targeted high-risk population in a 12-18 month period. This plan addresses animal health, not
FEED SAFETY

food safety. Total animals tested from June 1, 2004 through October 21, 2004 are 91,745. Current testing is exceeding 6,000 animals/week.

Dr. C. Ross Hamilton, Darling International, Inc., discussed animal disease issues relative to carcass disposal methods. Dr. Hamilton reviewed the integration of rendering and animal and meat production, illustrating that 52,000,000,000 pounds of animal co-products are processed each year by the rendering industry. Currently, specified risk material (SRM) that is rendered is regulated by various government agencies. Dr. Hamilton stated that banning SRM’s, downers and dead stock from feed with out regulations controlling the disposition of these materials would diminish regulatory oversight by state and federal agencies and that a critical control point for conventional pathogens will be lost. Dr. Hamilton stated that as new feed restrictions are considered, so must disposition of affected raw materials.

Richard Sellers, American Feed Industry Association (AFIA), reviewed AFIA’s Dioxin Feed Summit: Dialogue for the Future, which was held on October 22, 2004.

Dr. Elizabeth Wagstrom, National Pork Board, reviewed the new Swine Nutrition Advisory Group, which will address, nutrition, feed safety, alternative production enhancers and antibiotic use. A review of the Pork Quality and Safety Summit, held in Des Moines, IA was reviewed, highlighting pre-harvest interventions for Salmonella.

Dr. Alfred Montgomery, CVM-FDA, reviewed two terrorist organizations—Animal Liberation Front and Earth Liberation Front—which are a concern relative to feed/food security. The CARVER risk assessment model was reviewed. This model breaks the feed system into its smallest pieces (nodes) in the farm to table continuum, and identifies the most “critical nodes” that are most likely targets for a terrorist attack.

A brief discussion was held relative to the Committee’s involvement with CVM-FDA Animal Feed Safety System. It was decided that further dialogue would be pursued via teleconference calls.
REPORT OF THE COMMITTEE ON FOOD SAFETY

Chair: Dr. R. David Glauer, Reynoldsburg, OH
Vice Chair: Dr. Bonnie J. Buntain, Washington, DC

Dr. Robin C. Anderson, TX; Dr. Marilyn F. Balmer, MD; Mr. John R. Behrmann, PA; Dr. Joseph L. Blair, VA; Dr. Dale D. Boyle, VA; Dr. Richard E. Breitmeyer, CA; Mr. Terry L. Burkhardt, WI; Dr. Donald W. Butts, VA; Dr. David M. Castellan, CA; Dr. Jan Charminske, WV; Dr. Max E. Coats, Jr., TX; Dr. Chris S. Cmich, AZ; Mr. Kevin M. Elfering, MN; Dr. Jaime Estupinan, VA; Dr. Wyatt Frampton, UT; Dr. Don A. Franco, FL; Dr. Bob Gerlach, AK; Mr. L. Wayne Godwin, FL; Dr. Eric C. Gonder, NC; Dr. Larry M. Granger, MD; Mr. Neil Hammerschmidt, MD; Dr. David R. Hermes, IN; Dr. Donald E. Hoerig, ME; Dr. G. Thomas Holder, MD; Dr. Rex D. Holt, GA; Dr. David E. Hopson, NC; Mr. Danny R. Hughes, AR; Dr. John P. Huntley, NY; Dr. John R. Irby, FL; Dr. Lee C. Jan, TX; Dr. Robert F. Kahrs, FL; Dr. Susan J. Keller, ND; Dr. Spangler Klopp, DE; Dr. Glenn E. Kolb, WI; Dr. Elizabeth A. Krushinskie, GA; Dr. Daniel E. LaFontaine, SC; Dr. Elizabeth A. Lautner, NY; Dr. William F. Leese, DC; Dr. David J. Ligda, IN; Mr. Michael M. Mammenga, IA; Mr. Arthur P. Marquez, NM; Dr. Bret D. Marsh, IN; Dr. David T. Marshall, NC; Dr. James D. Mckean, IA; Mrs. Phyllis Menden, WI; Dr. William Mies, FL; Dr. Harry C. Mussman, MD; Dr. Lee M. Myers, GA; Dr. Jill L. Nezworski, MN; Mr. Tom Nunes, CA; Dr. Carol A. Olmstead, MT; Dr. Kenneth E. Olson, IL; Dr. Gary D. Owsheimer, IA; Dr. Marshall Phillips, PA; Dr. H. Graham Purchase, DE; Dr. Gerardo Quaassdorff, VT; Dr. John R. Ragan, MD; Mr. Steven Roach, IA; Ms. Nancy J. Robinson, MO; Dr. Kerry Rood, VT; Dr. Leon H. Russell, Jr., TX; Dr. John P. Sanders, Jr., WV; Dr. Charles R. Seagren, SD; Mr. Glenn N. Slack, KY; Dr. Harry Snelson, NC; Dr. Bruce N. Stewart-Brown, MD; Dr. Manuel A. Thomas, Jr., TX; Dr. Kenneth L. Thomazin, CA; Dr. H. Fred Troutt, IL; Dr. Lyle P. Vogel, IL; Mr. David C. Warren, FL; Dr. Irene V. Wesley, IA; Dr. Richard D. Willer, AZ; Dr. Larry L. Williams, NE; Dr. Terrance M. Wilson, MD; Dr. Nora E. Wineland, CO; Dr. Richard R. Wood, IL; Mr. John F. Wortman, Jr., NM; Ms. Ria de Grassi, CA.

The Committee met on October 24, 2004, from 12:30 pm to 6:00 pm. Chair David Glauer presided over the meeting and in the absence of Vice Chair Bonnie Buntain, was assisted by Dr. John Ragan. Dr. John Ragan is the National Livestock Program Leader, United States Department of Agriculture (USDA), Food Safety Inspection Service (FSIS) Animal Production Food Safety (APFS). Approximately 60 committee members and guests were welcomed to the annual meeting.
FOOD SAFETY

The first discussion item of discussion was entitled “The Real Story on BSE.” USDA, Animal and Plant Health Inspection Service (APHIS) Administrator Dr. Ron DeHaven, Deputy Assistant Administrator Office of Field Operations, USDA-FSIS Dr. Kenneth Peterson, and Center for Veterinary Medicine (CVM, Food and Drug Administration (FDA), Office of Surveillance and Compliance Director Dr. Dan McChesney participated.

Dr. DeHaven reviewed the firewalls that were in place prior to the announcement on December 23, 2003, of the bovine spongiform encephalopathy (BSE) positive cow in the state of Washington and the United States response that followed, including the banning of non-ambulatory cattle from slaughter and the removal of specified risk material (SRM) from human food. Enhanced surveillance is proceeding at a pace to collect 268,000 samples in a continuous 12 month period. This testing is for the purposes of detecting BSE, if present, and the prevalence if BSE is detected in cattle in the United States. The test is not for the purpose of food safety. Seventy million dollars have been made available to the USDA for conducting the enhanced surveillance.

Domestic confidence in beef meat product has remained high, but international trade reflects a 3.3 billion dollars net loss. Japan and the United States have concluded negotiations that may open trade following relevant rule making. Bovine animals included in the Beef Export Verification Program for Japan must be traceable to live animal production records for age verification.

Dr. Peterson also commented on the high consumer confidence. He stated that good animal health leads good public health. The December 23, 2003, announcement heightened the multi-agency relationship between APHIS, FDA and FSIS. The banning of non-ambulatory cattle from slaughter is an example of the cooperation. Also, a change in policy permits FSIS to collect surveillance samples for BSE. Additional FSIS interim rules including the test and hold procedure, prohibition of SRM from the human food chain, prohibition of Advanced Meat Recovery processes and air injection stunning were discussed. Dr. Peterson indicated that the removal of SRM was the single most important step in the protection of public health.

Dr. McChesney updated the committee on the status of compliance for the “Feed Ban Rule.” Compliance exceeds 99 percent. The number of firms that handle prohibited material for processing feed has dropped from approximately 1300 in 1997 to approximately 900 in 2004. Knowledge of the BSE agent has changed since 1997. Once it was believed that the infective dose for cattle was one gram of infected brain material. Now the infective dose is believed to be 0.01 grams or possibly as little as 0.001 grams of infected brain material. In addition, Dr. McChesney discussed the advanced notice of proposed rule-making (ANPR) that includes banning blood and blood products, plate
waste, and the feeding of poultry litter. In addition, the ANPR requires the use of dedicated production lines and strengthening of the feed ban. If the feed ban were strengthened to prohibit SRM from all feed, an additional 13.3 billion pounds of material from slaughter would need to be disposed of at a substantial cost and an impact on the environment.

Dr. John Dunn, Epidemic Intelligence Service Officer, Foodborne and Diarrheal Diseases Branch, Centers for Disease Control and Prevention (CDC) presented “Antibiotic Resistance in Foodborne Pathogens: Consequences, Sources and Solutions.” Dr. Dunn reported on data that demonstrated how the increase in antimicrobial resistance is dangerous for public health. This may be due to the inappropriate use of antibiotics in both human and veterinary medicine. There is an increasing amount of international knowledge of treatment failures and the resultant human health consequences attributed to animals. Dr. Dunn stated that the use of antibiotics in animals is estimated at 25 million pounds compared to less than 5 million pounds in human medicine. Resistance to fluoroquinolones, third generation cephalosporins, ciprofloxacin and nalidixic acid were cited as examples. Dr. Dunn discussed the complex genetic mechanisms that influence virulence, and the effect selective pressure has on the development of antimicrobial resistance.

Dr. David Reeves, Associate Professor Large Animal Medicine, University of Georgia presented “The Rationale for the Effects of Changing Antimicrobial Regulations on Food Animal Production and Practice.” Dr. Reeves demonstrated through a series of data collection from farms that do not use antimicrobials and those that use them therapeutically, and therapeutically and for growth promotion have little effect on the development of antimicrobial resistance. Other factors such as stress, movement, and time of collection have significant effect upon the development of resistance. In addition, the effect short and long term use has on the development of antimicrobial resistance is dependent upon the antimicrobial product itself. The relationship of antimicrobial resistance in humans attributed to animals can not be determined at this time.

Mr. Albert Chambers, Coordinator of the Canadian On-Farm Food Safety Working Group presented “The Canadian On-Farm Food Safety Program.” Mr. Chambers discussed an aggressive proactive Hazard Analysis and Critical Control Point (HACCP) ISO (International Organization for Standardization) 22000 pre- and post-farm gate food safety program. He described a comprehensive plan for food safety status certification at the farm level of essentially all food commodities. The program represents an unprecedented collaboration of government and industry in assuring the safety of all food commodities. He indicated that the Canadian producers, including livestock, poultry, horti-
FOOD SAFETY

culture and aquaculture, are seeking this type of program due to their concern for food safety.

Mr. James Riva, Branch Chief, Audit, Review and Compliance Branch Livestock and Seed Program, Agriculture Marketing Service (AMS) presented “AMS Quality Systems and Assessment Programs.” Mr. Riva clearly described AMS auditing as a verifier of a process and not product quality. Examples of verifying a process would include organic certification, export verification programs and certified products. The auditors employed in this branch are ISO 9000 trained.

Dr. David Pyburn, National Trichinae Coordinator, USDA, APHIS, Veterinary Services (VS) presented “Animal Health and Zoonoses Certification Programs.” Dr. Pyburn discussed the voluntary certifications programs available from APHIS, Veterinary Services including: the Scrapie Flock Certification Program, the Voluntary Bovine Johne’s Disease Control Program, the National Poultry Improvement Plan, and the National Trichinae Certification Program. These programs are producer driven to establish a level of confidence in the health and food safety status of livestock and poultry encompassed in these programs.

Dr. Barbara Glenn, Director, Animal Biotechnology, Food, and Agriculture Section Biotechnology Industry Organization presented “Biotechnology and Food Safety.” Dr. Glenn discussed biotechnology in the areas of genomics, cloning and transgenics. These are processes used to develop improved animals traits and products of animal, including drugs. Goemics does not present a food safety issue. However, cloned and transgenic animal have not received food safety clearance from FDA. Dr. Glenn indicated that this may take eight to ten years. Public opinion is variable depending upon their knowledge base, but cloned and transgenic animals do not have a high approval rating at this time.

The mission statement of the Committee was reviewed. No revisions were recommended.

Three resolutions were approved and forwarded to the Committee on Nominations and Resolutions for approval by the general membership. They addressed:

2. Support for the Food Animal Residue Avoidance Databank (FARAD) and the National Antimicrobial Resistance Monitoring System (NARMS).
3. Requesting USDA-APHIS-VS Center for Veterinary Biologics to assume the oversight for approval and licensing of vaccines that have a benefit in reducing food safety risks.
REPORT OF THE COMMITTEE ON FOREIGN AND EMERGING DISEASES

Chair: Dr. Corrie C. Brown, Athens, GA
Vice Chair: Dr. Alfonso Torres, Ithaca, NY

Dr. Helen M. Acland, PA; Mr. John B. Adams, VA; Dr. Bruce L. Akey, NY; Dr. Wilbur B. Amand, PA; Dr. Alex A. Ardans, CA; Dr. Joan M. Arnoldi, WI; Dr. Charles A. Baldwin, GA; Dr. Thomas W. Bates, CA; Mr. John R. Behrmann, PA; Dr. Derek J. Belton, NZ; Dr. Bob H. Bokma, MD; Dr. Steven R. Bolin, MI; Dr. Theresa L. Boyle, ; Mr. Philip E. Bradshaw, IL; Dr. Richard E. Breitmeyer, CA; Dr. Deborah L. Brennan, MS; Dr. Gary L. Brickler, WA; Dr. William L. Brown, KS; Dr. Allen C. Bryce, New Zealand; Dr. William W. Buisch, NC; Dr. Eric J. Bush, CO; Dr. Johnny D. Callahan, MD; Dr. Jerry J. Callis, NY; Dr. John A. Caver, SC; Dr. Yung Fu Chang, NY; Dr. Robert A. Cook, NY; Dr. Joseph L. Corn, GA; Dr. Robert A. Crandell, TX; Dr. Andrew Cupit, Australia; Dr. Linda A. Detwiler, NJ; Dr. Debbi A. Donch, MD; Dr. Edward J. Dubovi, NY; Dr. Dee Ellis, TX; Dr. Roger G. Ellis, NY; Dr. Francois C. Elvinger, VA; Dr. John I. Enck, Jr., PA; Dr. Luis Alberto Espinoza, El Salvador; Dr. Jaime Estupinan, VA; Dr. Adele Faul, South Africa; Dr. Peter J. Fernandez, DC; Dr. Steven Finch, IA; Dr. Richard W. Fite, MD; Dr. Patricia L. Foley, IA; Dr. James M. Foppoli, HI; Dr. Wyatt Frampton, UT; Dr. Don A. Franco, FL; Dr. Anthony M. Gallina, FL; Dr. John E. George, TX; Dr. E. Paul J. Gibbs, FL; Dr. Joel Goldman, LA; Mr. Daniel M. Goodyear, PA; Dr. Amirali N. Hamir, IA; Dr. Christopher H. Hannafin, RI; Dr. Scott R. Haskell, CA; Dr. Robert A. Heckert, MD; Dr. Rudolf G. Hein, DE; Dr. Jorge Hernandez, FL; Dr. Billy R. Heron, CA; Dr. David W. Hertha, AL; Dr. Owen W. Hester, AL; Dr. Sharon K. Hietala, CA; Dr. Richard E. Hill, IA; Dr. Sam D. Holland, SD; Dr. Thomas J. Holt, FL; Dr. David E. Hopson, NC; Dr. Floyd P. Horn, MD; Dr. Martin E.Hugh-Jones, LA; Dr. John L. Hyde, NY; Dr. Robert F. Kahrs, FL; Dr. Elizabeth A. Lautner, NY; Dr. Hardi Liao, ME; Dr. David J. Ligda, IN; Dr. Linda L. Logan, APO; Dr. Jorge W. Lopez, Brazil; Dr. Bret D. Marsh, IN; Ms. Mary J. Marshall, UK; Ms. Barbara M. Martin, IA; Dr. David L. Meekeer, VA; Mrs. Phyllis Menden, WI; Mr. David A. Miller, IA; Dr. Robert B. Miller, VA; Dr. F. W. Milward, GA; Dr. John C. New, TN; Dr. James E. Novy, TX; Dr. Raul Casas Olascoaga, Uruguay; Dr. Richard E. Pacer, APO; Dr. Charles Palmer, CA; Col. Gerald Parker, DC; Mr. Richard P. Peterson, CA; Dr. John W. Poe, KY; Dr. Kelly R. Preston, MD; Dr. Gerardo Quassendorff, VT; Dr. James A. Roth, IA; Dr. Mo D. Salman, CO; Dr. A. David Scarfe, IL; Dr. Jack L. Schlater, IA; Dr. Thomas C. Schooler, TX; Dr. Eduardo Serrano, El Salvador; Dr. Scott R. Severin, VA; Dr. David M. Sherman, MA; Dr. Harry Snelson, NC; Dr. David L. Suarez, GA; Dr. Paul Sutmoller, VA; Dr. David E. Swayne,
The Committee met on October 26, 2004, from 8:00 am to 5:30 pm. There were 90 attendees. Chair Corrie Brown assisted by Vice Chair Alfonso Torres presided and conducted the meeting. The purpose statement of the Committee on Foreign and Emerging Diseases was reviewed by the Chair and Vice Chair. Responses to 2003 resolutions were reviewed. The next edition of the gray book was discussed. Volunteers were solicited to write and review various chapters.

Dr. Mo Salman, the FED committee’s representative to the National Animal Health Emergency Management System Steering Committee (NAHEMSC), gave highlights of the recent discussions in this group. There have been some structural changes associated with the development of Department of Homeland Security (DHS), and there is a proposal that DHS will consider NAHEMS as an advisory group for agricultural threats. United States Department of Agriculture (USDA)-Food Safety Inspection Service (FSIS) and DHS have signed an agreement with National Association of State Departments of Agriculture (NASDA) to conduct a study to determine the inventory list of the current emergency plans across the states.

Panel on educational issues

Dr. Larry Miller, USDA-APHIS-Veterinary Services (VS), Director of Veterinary Accreditation, gave a review of the accreditation/foreign animal disease (FAD) curriculum assessment. Over the course of 12 months, every veterinary school in the U.S. was visited, and interviews were conducted with state veterinarians, federal veterinarians, faculty and students. Several conclusions emerged. Regulatory medicine and biosecurity are underrepresented in the curriculum. Twelve of 28 veterinary schools have a course dedicated to FAD’s and of these, 7 were core and the remainder elective. At the time of graduation, 26 percent of new veterinarians had had a dedicated course on FAD’s. Regarding accreditation, most reported that food animal medicine instruction time
REPORT OF THE COMMITTEE

has been reduced and there is decreasing opportunity to present ma-
terials relevant to accreditation. The Executive Summary was sent to
the Steering Committee and all Associate Deans, and will be dissemi-
nated to Area Veterinarians-in-Charge (AVIC) and State Veterinarians.

Dr. Miller also gave an update on the proposed revision of the ac-
creditation process. There are two categories. Category I is for com-
panion animals only, and does not include equine or food animals.
Renewal is every 3 years. Category II is a more rigorous process and is
designed for all species, including equine and food animals as well as
companion animals. Renewal is every 3 years and requires completion
of 9 supplemental training modules that will be available both on-line
and in hard copy format. An information technology system, Veterinary
Services Process Streamlining (VSPS) is in the early stages of testing
and will be used to monitor and administer the program.

Dr. Kent Hoblet, Ohio State University, presented conclusions from
a white paper that was published by the Association of American Vet-
erinary Medical Colleges, “Veterinarians in Population Health and Public
Practice: Meeting Critical National Needs.” There is recognition that
we are now at a critical decision point in the profession. Societal needs
in population health and public practice are not being met by the nation’s
veterinary medical colleges. Recruitment and retention for these areas
should be addressed. Experience in the professional curriculum and
co-curriculum is essential to educate students about opportunities in
population and public health.

Paula Cowen, Director of Technical Training for USDA-APHIS-VS,
reviewed APHIS programs for FAD education. She described the Plum
Island FAD courses, including the “classic” FAD course designed for
state and federal Veterinary Medical Officer (VMO’s), a course oriented
for pathologists, the Smith-Kilborne program for veterinary students,
and the introduction of species-specific courses (swine and poultry).
An on-line FAD course was developed by a Cooperative State Research,
Extension and Education Service (CSREES) grant to Iowa State is
offered through Veterinary Information Network (VIN), which is now
offered at 18 of the 28 US veterinary schools. A web-based course,
developed by Iowa State University, is in the final stages of develop-
ment for all APHIS employees. The University of Wisconsin, University
of Tennessee, and University of Georgia each have week-long summer
courses on FAD’s, all supported by USDA. Plans for the near future
include video conferencing ability to allow real-time transmission of
images from animal and necropsy rooms at Plum Island to four loca-
tions in the U.S.

Dr. Ed Mallinson presented his proposal for an educational initia-
tive for 4-H groups and Future Farmers of America. A program will be
developed to sensitize young people about biosecurity and disease
prevention.
FOREIGN AND EMERGING DISEASES

Dr. Robert Heckert, Animal Health Program Leader for USDA, Agriculture Research Service (ARS), presented the proposed changes to the upcoming 5th edition of *Biosafety in Microbiological and Biomedical Laboratories* (BMBL). A committee drafted guidelines for animal disease containment. A separate chapter on biosecurity is being written.

Panel on influenza viruses

Dr. Max Coats, Texas Animal Health Commission, reported on highly pathogenic avian influenza (HPAI) in Texas. Sick birds were noted on February 16, 2004 and diagnosis made on February 17, 2004. H5N2 was confirmed by the USDA-APHIS-VS National Veterinary Services Laboratories (NVSL). A pre-planned response existed and that was essential in effecting control. This response was created jointly by state, federal, academic, and industry partners. Public information began early and this was determined to be crucial in control efforts. A joint incident command center was initiated. Surveillance and movement regulations were undertaken and the outbreak was rapidly eradicated.

Dr. David Suarez, USDA-ARS Southeast Poultry Research Laboratory (SEPRL), gave an update on the avian influenza outbreak in Asia. Nine countries have reported having H5N1 in their country. Viruses are being examined at the SEPRL – all kill chickens rapidly. Viruses from Thailand and Vietnam are pathogenic for mice as well. Some viruses also cause disease in ducks, which is unusual for HPAI isolates. Each of the viruses has slightly different biological properties – there are a number of variants circulating. The factors associated with the size of the outbreak are thought to be related to lack of veterinary infrastructure and insufficient resources. Vaccination may be practicable in some situations.

Dr. Cynda Crawford, University of Florida, related the incident involving influenza virus in racing greyhounds. In late January 2004, there were a number of dogs with clinical signs of respiratory distress, with a few mortalities, at a racetrack in Jacksonville. Postmortem lesions included extensive hemorrhage in lungs and pleural cavity. Dr. Ed Dubovi at Cornell isolated influenza A subtype H3N8, with 96-99 percent homology in all 8 genes with recent equine influenza H3N8 strains in the US. The strain was named A/canine/Florida/43/04 (H3N8). The possibility of dogs serving as a mixing vessel for influenza virus was emphasized.

Dr. Dennis Senne, USDA-APHIS-VS-NVSL, reported on the appearance of avian influenza viruses in swine populations. Avian influenza has infected swine on a number of occasions. Between 1996 and 2003, there were four different incidents reported, on three continents. Events can happen but they appear to be rare. Pigs can be infected with avian influenza but pig-to-pig transmission is not thought
Panel on foot-and-mouth disease

Dr. Jack Rhyan, USDA-APHIS-VS, described the purported outbreak of foot-and-mouth disease (FMD) in deer and cattle in California in 1924/25. Recent focus on FMD prompted investigators to examine archival records. They concluded that the disease was, in fact, most probably FMD.

Dr. Rhyan also relayed the results of experimental infection of North American bison and elk at the Plum Island Animal Disease Center (PIADC). Bison became clinically ill subsequent to inoculation, with characteristic lesions of the disease and virus recovered. In elk, after experimental infection, clinical disease was mild. Noninfected elk placed in the same enclosure with infected elk seroconverted but did not develop clinical disease. Noninfected cattle placed with the infected elk did not develop clinical disease.

Dr. Alfonso Torres, Associate Dean for Public Policy, Cornell University, presented the committee's time-specific paper entitled, “Foot-and-Mouth Disease (FMD) Hemispheric Eradication Program,” co-authored by Mr. Phil Bradshaw. The complete text of this paper are included in these proceedings.

Dr. Andres Perez, University of California at Davis, presented on a global FMD surveillance system. FMD outbreak data from Pakistan and Iran, were examined, with superimposition of livestock distribution zones, for predictive modeling of spread. Additional countries were then examined. The goal is to predict spread in countries where FMD is endemic as well as FMD-free areas.

Dr. Mark Schoenbaum, USDA-APHIS-VS, Center for Epidemiology and Animal Health, reviewed the SpreadModel of FMD, a program developed by United States, Canadian, and Mexican scientists. This is a spatial temporal disease-simulation model. The purpose of the model is to aid decisions by highlighting potential spread and examining mitigation strategies such as vaccination, destruction, and movement controls. Models have been compared to real outbreaks in various overseas locations. The model is being continually refined based on expanding informational input. The Canadian Food Inspection Agency and the University of Guelph are collaborating on a variation of SpreadModel, called SHARCspread.

Dr. Mark Thurmond, University of California at Davis, explained the BioPortal information system for FMD surveillance. BioPortal is a web-based dissemination system, originally developed through a National Science Foundation initiative to allow decision-makers ready access to real-time information for disease control. Early versions were constructed for West Nile virus in New York and botulism in California. Recent funding from the Department of Homeland Security and Armed Forces
FOREIGN AND EMERGING DISEASES

Medical Intelligence Center has allowed expansion to other diseases. Foot-and-mouth disease is the first global disease to be examined this way. Data from around the world is being entered through a secure portal, encrypted, analyzed and disseminated in an output. To date, information has been captured from the Food and Agriculture Organization (FAO) and some FMD reference laboratories.

Barbara Martin, USDA-APHIS-VS, Coordinator of the National Animal Health Laboratory Network, provided an update regarding the network. A Steering Committee was formed in March of 2003, and a strategic plan is being developed. Considerable progress was made this year in the development of an information technology system. The NAHLN v2.0 software release is scheduled for early 2005. Validation of assays is being done by both ARS and APHIS, in a cooperative effort. Four diseases, avian influenza, Newcastle disease, classical swine fever, and foot-and-mouth disease, are all in the final phases of validation and transfer to state laboratories.

Dr. Bruno Oesch, Prionics, Switzerland, explained the strain variation being seen in some cases of bovine spongiform encephalopathy (BSE) in Europe. A new Italian BSE strain was detected earlier this year using the Western blot test. Since then, other cases have surfaced which show distinct glycoform profiles in comparison to the “standard” BSE strains.

Panel on foreign animal disease research

Dr. Beth Lautner, Director of PIADC for DHS, reviewed the evolving administrative structure at the PIADC. Plum Island facilities operations and maintenance were transferred to DHS on June 1, 2003. The Foreign Animal Disease Diagnostic Laboratory (FADDL) remains under the purview of USDA-APHIS. The USDA-ARS maintains a core of scientific investigators. With these three agencies, an integrated program is being developed, with five main shared functions. First, “targeted advance development” will take products from ARS and move them through to approval and application. Second, “bioforensics” is a joint effort between DHS and APHIS to allow for attribution in the event of an intentional incursion. Third, a “disease threat assessment and epidemiology” unit will be created and to integrate Plum Island-based science with efforts occurring globally. “Core services,” to include microscopy and sequencing, will be provided by DHS, as will the fifth area, “animal care.”

Dr. Neville Clark, from the National Center for Foreign Animal and Zoonotic Disease Defense, Texas A&M University, described the plans for the Center. More detailed information can be found at: http://fazd.tamu.edu. Four representative animal diseases will be thoroughly studied—foot-and-mouth disease, Rift Valley fever, avian influenza, and brucellosis.
REPORT OF THE COMMITTEE

Dr. Paul Kitching, Canadian Food Inspection Agency, Director, National Centre for Foreign Animal Diseases, Winnipeg, Manitoba, briefed the Committee on the Strategic Global Research Partnership for Foot and Mouth Disease Control. Investigators from five laboratories (Pirbright, Plum Island, Winnipeg, Geelong, and ILRI) gathered earlier this year to develop a plan to improve research on FMD with the aim of effective control. Research goals over a five year time period include: understanding the host immune response, development of inexpensive and thermostable vaccines, improved understanding of the carrier state, identification of antiviral compounds, and development of epidemiologic economic models. They are seeking a budget of $70M.

Dr. Luis Rodriguez, Research Leader, USDA-ARS-PIADC, reviewed research progress at Plum Island. A multiplex real-time assay was developed for detecting vesicular stomatitis virus (both New Jersey and Indiana serotypes) from diverse geographical regions. Phylogenetic analysis was used to track and analyze the outbreak in the southwestern U.S. in 2004. A single lineage was responsible for the outbreak in 2004, with the closest relative being a virus from southern Mexico. In classical swine fever research, studies are underway for the development of an attenuated live marker vaccine. Adenovirus-vectorized FMD vaccines provide good immunity in swine and cattle. Adding an interferon alpha gene as well provides earlier immunity. They have entered into agreement with a commercial entity and are seeking licensure.

FOOT-AND-MOUTH DISEASE (FMD) HEMISPHERIC ERADICATION PROGRAM

Alfonso Torres¹ and Philip Bradshaw²
Inter-American Group for the Eradication of Foot-and-mouth Disease (GIEFA)

¹ College of Veterinary Medicine, Cornell University, Ithaca, NY;
² Illinois Soybean Board, Griggville, IL

Foot-and-mouth disease (FMD) has been present in the Western Hemisphere since 1870 with widespread dissemination, especially in South America during the first half of the 20th century. The disease has been eradicated from North America (USA 1929, Canada 1952 and Mexico 1954). Central America and the Caribbean have been historically free of FMD. Country-wide programs for the eradication of FMD from South America were initiated in the 1960’s, leading to the creation of the South American Commission for the Eradication of FMD (COSALFA) in 1972, which continues to meet yearly. Progress on the eradication programs, especially with the active participation of the private sector, led to the promulgation and implementation of the Hemi-
FOREIGN AND EMERGING DISEASES

spheric Plan for the Eradication of FMD (PHEFA) in 1988. This plan is coordinated by the Pan American Health Organization (PAHO) through its Pan American Foot-and-Mouth Disease Center (PANAFTOSA) located in Rio de Janeiro, Brazil. The Hemispheric Commission for the Eradication of FMD (COHEFA) oversees the implementation of the PHEFA in conjunction with the Inter-American Meeting of Ministers of Agriculture and Health (RIMSA). The PHEFA divides the hemisphere into six zones: North America, Central America, Caribbean, Andean, Amazonian, and Southern Cone. The first three zones are free, while the latter are affected by FMD. FMD in South America is endemic in four areas: many parts of Venezuela and Ecuador, the Beni region of Bolivia and the Chaco region composed of areas in southern Bolivia, western Paraguay and Northern Argentina.

The hemispheric interest in the completion of the eradication of FMD led the United States Department of Agriculture (USDA) to collaborate with PAHO in organizing a Hemispheric FMD Conference in Houston, Texas, March 3-4, 2004. This conference gathered most Ministers and Vice-Ministers of Agriculture, Directors of Veterinary Services and Chief Veterinary Officers of the continent. They issued the “Houston Declaration” emphasizing their commitment to the eradication of FMD from the Americas by the year 2009, and the creation of an Inter-American Group for the Eradication of Foot-and-Mouth Disease (GIEFA) with the responsibility of elaborating, applying and supervising the PHEFA.

The GIEFA group is composed of two members from each one of the six regions stipulated in the PHEFA. For each region there is one representative of the Private Sector and one representative from the Public Sector. The GIEFA is led by an Executive Committee composed of three of its members. The PANAFTOSA was designated as ex officio Secretariat of the group. The representatives from North America are Mr. Phil Bradshaw from the Private Sector and Dr. Alfonso Torres from the Public Sector. The Executive Committee was formed by the representatives of the Public Sector for North America (Dr. Alfonso Torres, USA, who acts as the Chairman), the representative of the Private Sector of the Amazonian Region (Mr. Sebastiao Guedes, Brazil), and the representative from the Public Sector in the Southern Cone (Dr. Recaredo Ugarte, Uruguay). Since mid-March of 2004, the entire GIEFA and/or its Executive Committee has met in Montevideo, Uruguay; Santa Cruz, Bolivia; Washington D.C., the U.S., and Bogotá, Colombia. An Action Plan for 2005 -2009 will be presented to PAHO in November, 2004 for their endorsement and consequent distribution to all countries in the Americas. After discussion and approval at an extraordinary meeting of the COHEFA to be held in Brasilia in December 1st, 2004, the plan will be implemented across the continent.

The GIEFA Action Plan includes Technical Actions for the enhance-
REPORT OF THE COMMITTEE

ment of the eradication program in the endemic areas of the continent (Venezuela, Ecuador, parts of Bolivia and border control points) as well as the establishment of the following progressive control and eradication levels:

- FMD-free without vaccination (following OIE guidelines)
- FMD-free with vaccination (following OIE guidelines)
- Level 1 (low risk)
- Level 2 (moderate risk)
- Level 3 (high or unknown risk)

The Action Plan will also include a Financial Plan for the coordination of present and future national and international fiscal resources needed to execute the plan. Additionally, the Action Plan includes evaluative procedures for Country Reviews and measures to prevent the introduction of FMD into the free areas of the hemisphere.
REPORT OF THE COMMITTEE ON
GOVERNMENT RELATIONS

Chair: Dr. Bret D. Marsh, Indianapolis, IN
Vice Chair: Dr. Lee M. Myers, Atlanta, GA

Dr. J. Lee Alley, AL; Dr. Wilbur B. Amand, PA; Dr. Jones W. Bryan, SC; Mr. Bob Frost, CA; Dr. Donald E. Hoenig, ME; Mr. James W. Leafstedt, SD; Dr. Donald H. Lein, NY; Dr. R. Tracy Rhodes, WY; Dr. Richard D. Willer, AZ; Dr. Ronald B. Wilson, TN; Dr. Taylor Woods, MO; Mr. John F. Wortman, Jr., NM.

American Association of Veterinary Laboratory Diagnosticians (AAVLD)
Members Present: President Willie Reed, MI; President-Elect Gary Osweiler, IA; Vice President Donal O’Toole, WY; Past President Terry McElwain, WA; Secretary/Treasurer Alex Ardans, CA; Chairman of AAVLD Government Relations Committee Bruce Akey, NY

The Committee met in Washington, DC, on February 8-11, 2004. The Committee met jointly with the Board of Directors of AAVLD. All United States Animal Health Association (USAHA) Committee Chairs were invited to the meeting. Eight Committee Chairs were present.

On February 8, 2004 an organizational meeting was held to prepare for the week’s activities. The USAHA Executive Committee met that evening with Dr. Ron DeHaven, Deputy Administrator of the United States Department of Agriculture (USDA), Animal Plant Health Inspection Service (APHIS), Veterinary Services (VS). The AAVLD Board of Directors also participated in this meeting. The discussion covered a variety of topics including the National Animal Health Laboratory Network (NAHLN), the completion of the National Centers for Animal Health (NCAH) in Ames, Iowa, the national animal identification plan, and the current status of disease control and eradication programs.

On February 9, 2004 the Committee traveled to the APHIS Riverdale facility. Drs. Larry Granger, Joe Annelli, Joe VanTiem gave the Committee a tour of the Emergency Operations Center (EOC). Each attendee received a CD presentation that describes the functions of the EOC. After the tour, the Committee received program reports from Dr. John Clifford with additional comments from members of the National Animal Health Programs staff.

Mr. Scott Charbo, Chief Information Officer for USDA reported on recent developments and efforts of USDA to immediately implement a verifiable system of national animal identification. Mr. Charbo has been charged by Secretary Veneman ‘to expedite the development of the technology architecture to implement this system,’ a system that is to facilitate traceback within 48 hours of any animal that enters intra- or
REPORT OF THE COMMITTEE

interstate commerce, in case of disease emergency. Keith Collins, Chief Economist, and Nancy Bryson, General Counsel of USDA review economic and legal matters related to such a system. Fiscal year 2004 funding for design and developmental work comes from emergency appropriations, with $33 Million proposed in the 2005 federal budget. Primary design goals are to have a system that:

1. Presents no extra burden on producers;
2. Leverages systems and developments that are already piloted or in place for several commodity groups; and
3. Be technology neutral.

The system should also be set up to be ‘budget neutral.’ Mr. Charbo envisions a system in which USDA proposes requirements and standards, and private industry is to develop the various technologies that are best adapted to needs and characteristics of different species or commodity groups.

The major challenge and potential roadblock to implementation of an efficient and transparent system is the concern of data confidentiality and related trade secrets. Data repositories need to be protected from improper access, including protection from requests for access under the Freedom of Information Act. Data items, such as, say, date of birth or age or others, to be associated with premise and individual animal or animal group ID, have to be carefully selected such as not to hamper the proper functioning and efficiency of the system.

The audience’s main concern was the disruption of the normal flow of animal commerce due to implementation of various technologies, which could make it necessary for deploying several different readers at livestock assembly points (markets, slaughter houses, etc.). This could affect especially small producers and operators. Mr. Charbo however stated that it was not USDA’s intent to impose a single technology platform, and that it would be left up to Industry to assure compatibility of various technologies.

Mr. Charbo concluded by reminding everyone that all stakeholders and the public needed to be educated as to not expect that implementation of a National Animal Identification System would ‘cure disease problems.’ The system will be an essential tool in controlling animal disease and addressing food safety concerns.

Dr. Barb Martin, USDA-APHIS-VS National Veterinary Services Laboratories (NVSL) provided an update on the validation of reverse transcriptase polymerase chain reaction (RT-PCR) tests. In February 2002, USDA-APHIS and USDA-Agriculture Research Service (ARS) signed an agreement in which APHIS took the responsibility to provide to ARS acceptable validation criteria for use in the process of diagnostic test development. A committee with inter-agency and international participation was formed in June 2002 to outline such criteria. The World Organisation for Animal Health (OIE), in its Manual of Stan-
GOVERNMENT RELATIONS

dards, has defined ‘validation’ as the ‘process through which a test method is confirmed to be fit for the intended purpose,’ and with which performance characteristics are defined. Validation is differentiated into 1. bench validation, allowing primer/probe development and optimization; determination of analytical sensitivity and specificity; preliminary estimation of accuracy and precision, and 2. field validation, providing estimates on diagnostic sensitivity and specificity, ruggedness, accuracy and precision, and allowing inter-laboratory comparisons (reproducibility).

APHIS and ARS have partnered in developing and validating several tests for foreign animal diseases in 2003, to be completed in 2004. Personnel has been hired for validation (1 fulltime, permanent; 3 fulltime, 2-yr terms) and subsequent proficiency testing (2 fulltime, permanent) of staff in laboratories in particular of the National Animal Health Laboratory Network (NAHLN). A validation template has been developed summarizing validation and acceptance criteria to provide guidance in the incremental validation process and promote quality of diagnostic assays.

Currently, tests for classical swine fever (CSF), foot and mouth disease (FMD), and vesicular stomatitis virus (VSV) infection, avian influenza (AI) and exotic Newcastle disease (END), African swine fever (ASF), rinderpest and lumpy skin disease are in various stages of the validation process. Completion of validation and deployment for tests for CSF and FMD are expected for May and June 2004, respectively. Specimens for field validation of the CSF test were assembled from the European Union reference laboratory, from the Dominican Republic, Columbia and Mexico. Samples for FMD test field validation currently are being assembled from Afghanistan, Argentina, Bolivia and Brazil, South Africa, Thailand and Kyrgyzstan. Although ARS has developed a FMD portable real-time RT-PCR that will be validated in the near future, Dr. Martin stated that these collected / stored samples and related data (results from virus isolation and serology) were available for field validation and comparison of an additional 3 diagnostic tests that were developed currently by other institutions and commercial entities.

Dr. Martin’s unit is currently also evaluating Quality Control issues such as robustness of developed tests, providing appropriate protocols, monitoring of performance, and help with trouble-shooting. Equivalency testing of improved or scaled up tests needs to be evaluated and organized, and proficiency tests and internal controls need to be developed or improved. These processes are to ensure international acceptance of tests developed in the United States, and of results obtained from these tests.

Dr. Joseph T. Spence, Acting Associate Deputy Administrator, Animal Production, Product Value and Safety, USDA-ARS and Dr. Robert Heckert, National Animal Health Program Leader, USDA-ARS provided
an update on organization and budgets of ARS, on ARS collaboration with APHIS and the Department of Homeland Security (DHS), especially as related the Plum Island Foreign Animal Disease and Diagnostic Laboratory (FADDL), on ARS activities related to bovine spongiform encephalopathy (BSE) and other food safety issues, and on ARS facilities.

Dr. Spence pointed out the good cooperation and interaction that ARS, which is the research arm of USDA, and APHIS enjoy. Both organizations work together and have shared goals with DHS. In particular, the DHS has taken control in June 2003 of the Plum Island FADDL, which has raised issues of program priorities and continuation. Indeed, presently DHS considers FMD its primary focus and threat to animal agriculture, which may lead to a reorientation of priorities at the laboratory. According to Dr. Heckert, DHS is to take the lead in development of diagnostics and in disease control activities, while ARS is to take the lead in fundamental pathogenesis research. He presented the progress made on several diagnostic tests, of which all phases including field testing had been completed for AI and END tests; tests for FMD, CSF, VSV were in the field testing process; tests for rinderpest, lumpy skin disease had been bench tested; no test was in development for contagious bovine pleuropneumonia. [Note: for non-foreign animal diseases, tests for bovine viral diarrhea (BVD), swine influenza virus (SIV), and porcine respiratory and reproductive syndrome (PRRS) were in the field testing process.]

Dr. Spence also presented ARS support of APHIS animal health programs, notably for bovine tuberculosis, brucellosis, Johne’s disease, scrapie and screwworm control and/or eradication. He especially pointed to the use of ARS resources in support of APHIS for detection and characterization of the first US BSE case: ARS performed the confirmatory testing at the National Animal Disease Center (NADC) in Ames, IA with western blots and genotyping of the prion gene, and confirmed the origin of the BSE index case, at the Meat Animal Research Center (MARC) in Clay Center, Nebraska, using microsatellite and SNP (single nucleotide polymorphism) genotyping within 48 hours of first detection.

With the change-over of control of Plum Island to DHS, budgets for ARS were adjusted. Resources for maintenance are now included in the DHS budget, representing a loss to ARS; however, research funding for various activities of ARS on Plum Island will stay with ARS. Staff resources will be shared by both agencies. Dr. Heckert presented an organizational chart for FADDL: A Board of Directors (administrators of APHIS, ARS and a DHS representative), and a Scientific Advisory Board will provide direction to and oversee activities of the Center Director (Dr. Beth Lautner). Three branches, representing each of the 3 participating agencies, are led by 1. the APHIS-FADDL Chief, maintaining
GOVERNMENT RELATIONS

the diagnostics and forensics capabilities; 2. the ARS Research Leader, overseeing CSF, FMD and emerging diseases research; and 3. the DHS Scientific Director, who oversees three sections, including targeted advanced development in high priority and security areas; pathology, microscopy and sequencing services, including use of animal models; and disease assessment and epidemiology, and a strain repository. Dr. Heckert pointed out that implementation of this organizational plan should accelerate given the recent appointment of Dr. Beth Lautner, former Vice-President for Science and Technology of the National Pork Board, as the new director. Given Dr. Lautner’s credentials as, Dr. Heckert was confident that interests of various stakeholders in animal agriculture and animal health would be defended.

Dr. Spence further presented other areas of collaboration between ARS-APHIS and the Food Safety Inspection Service (FSIS), specifically the Collaboration on Animal Health, Food Safety and Epidemiology (CAHFSE), in which an animal production surveillance system focused on animal health and food safety is designed and implemented. With periodic sampling from production through slaughter (starting with swine), the goal is to detect disease threats and trends early and to benefit both animal and human health. In these collaborative programs, APHIS leads the on-farm efforts and animal health component, having currently enrolled farms in four states (Iowa, Minnesota, North Carolina, Texas); FSIS does the in-plant sampling of sentinel farm animals; and ARS leads the laboratory efforts for food safety, including antibiotic resistance testing.

Finally Dr. Heckert reported on progress and maintenance of different ARS laboratories, in particular the Southeast Poultry Research Laboratory (SEPRL) in Athens. This laboratory founded in 1962-63 is in need of new or renovated / expanded facilities. The Biosafety Level-3 (BSL-3) section was built in 1972, following an outbreak of Newcastle Disease. Fourteen investigators and 32 support staff conduct research on END and AI, and on Salmonella, poult enteritis mortality syndrome (PEMS) in turkeys and on avian pneumovirus. The Arthropod-borne Animal Diseases Research Laboratory (ABADRL) in Laramie, Wyoming, is also in need of improvements, but Dr. Heckert pointed out the satisfaction of the agency with the final installment of funds proposed for the FY05 budget to complete facilities in Ames, Iowa by 2007.

Dr. Heckert concluded by stating the absolute need of the United States for a BSL-4 facility on United States soil to meet the growing research and developmental needs for maintaining and protecting the nation’s animal agriculture and health, and human health.

The day concluded with a meal at Sir Walter Raleigh’s restaurant. Guests included the USAHA Committee on Government Relations and Committee Chairs, AAVLD Board of Directors, USDA, APHIS and ARS, and the American Veterinary Medical Association (AVMA) including
On February 10, 2004 the Government Relations Committee gathered at the office of the AVMA Governmental Relations Division to meet with their staff, AVMA President Jack Walther and with American Association of Veterinary Medical Colleges (AAVMC) and their director, Dr. Larry Heider.

Dr. Heider explained his organization that is made up of the 28 veterinary colleges in the United States, plus 6 schools from Canada and Europe, as well as some colleges with departments of veterinary science. They lease offices in the AVMA floor space in DC and strive to help AVMA in legislative endeavors that will benefit all veterinarians. He stressed that AAVMC cannot legally act as a lobbyist. One of their biggest goals is to get some extended federal funding to help states upgrade the infrastructure of their veterinary schools.

Dr. Mike Chaddock director of the AVMA-Government Relations Division (GRD) introduced his staff of 8, gave an outstanding description of the work and role the GRD plays to benefit veterinary and agricultural interests on the legislative front. He also offered the USAHA to use AVMA office space and personnel when they come to DC, and to see if the USAHA resolutions could be worked on in a joint manner with the AVMA-GRD.

Dr. Jack Walther, President of the AVMA, discussed some of the items that AVMA is dealing with, and expressed his view that to succeed politically, we need to develop and maintain coalitions with other groups, such as American Medical Association (AMA), American Kennel Club, USAHA, etc., that can offer benefits to all. He also described the new legislative task force that will be available to aid states with their own legislative issues. Dr. Walther also expressed his hope that the AVMA and the USAHA can continue their mutual co-operation in advancing the issues involved with animal health.

The Committee then met at USDA's Jamie L. Whitten Building with Mr. John Baughman and Mr. Gary Taylor of the International Association of Fish and Wildlife Agencies (IAFWA). The Committee had a good discussion on issues of mutual interest.

The Committee also met with members of the Animal Agriculture Coalition (AAC) to discuss issues of interest.

On February 11, 2004 the Committee met with Agriculture Secretary Ann Veneman. Since Secretary Veneman was appointed to her position three years ago, many of the major issues she has dealt with have been animal health related. The Washington state BSE case was difficult due to timing, but the USDA still got information out quickly, honestly, and in a way that maintained consumer confidence. Veneman stated the U.S. needs to increase its BSE testing. The current testing capacity of NVSL is 61,000 samples per year. She said that it is important to get rapid screening tests for BSE approved and to expand test-
The Committee met with Jeff Green, Acting Associate Deputy Administrator, USDA, Wildlife Services (WS). The mission of the WS is to provide federal leadership and expertise to resolve human/wildlife conflicts allowing for people and wildlife to coexist peacefully. Nationally, wildlife damage to agriculture is estimated at $600 million to $1.6 billion annually. More than half of all farmers and ranchers experience some kind of wildlife damage every year. Current areas of interest for WS are airport safety, rabies, and wildlife diseases. A goal for the future is to develop and implement a national wildlife disease surveillance and emergency response program. This program would assist with investigations involving Tuberculosis (TB), CWD, BSE, AI, Pseudorabies, Swine Brucellosis, and Salmonella/E. coli around the country.

The Administrator of USDA, FSIS, Dr. Garry L. McKee, met with the Committee. Currently, the FSIS is the largest employer of veterinarians. FSIS will increase the training for its Veterinary Medical Officers in the future. FSIS has the leading role in the Food Emergency Response Network (FERN) which will integrate the nation’s laboratory infrastructure in order to detect agents in food at the local, state, and federal levels. The Electronic Laboratory Exchange Network (eLEXNET) will be used by all laboratories in the FERN system to report results from bioterrorism and chemical terrorism related analyses. FSIS has been part of the PulseNet system which uses DNA “fingerprinting” to identify strains of bacteria and rapidly detect and control outbreaks of foodborne illness. Last September, FSIS held a symposium to discuss ways to reduce the levels of *E. coli* 0157:H7 in live animals before slaughter. A pre-harvest best management practices Guide is being developed that will be distributed to producers. FSIS veterinarians enforced the December 30, 2003, ban that Secretary Veneman made on all non-ambulatory cattle entering the food supply. FSIS issued four other regulations to further enhance safeguards to prevent BSE from
REPORT OF THE COMMITTEE

entering the food supply. A notice was sent to all inspectors to no longer mark cattle as “inspected and passed” until confirmation is received that cattle have tested negative for BSE. The skull, brain, trigeminal ganglia, eyes, vertebral column, spinal cord, and dorsal root ganglia of cattle 30 months and older and small intestines from all cattle are considered specified risk material. FSIS expanded its regulation on advanced meat recovery to include the dorsal root ganglia and spinal cord tissue. The practice of using air-injection stunning was banned to insure portions of the brain were not dislocated into the carcass. FSIS will be holding teaching workshops until March 2004 to ensure all processors understand the new regulations.

Dr. Curt Mann, Homeland Security Council (HSC), White House, spoke to the Committee. After September 11, 2001, the federal government underwent reorganization due to the new threats in the United States. The DHS was established and includes the following divisions: Science and Technology; Information Analysis and Infrastructure Protection; Emergency Preparedness and Response; and Borders and Transportation Security Management. The HSC was also established and has a staff of 60 people. The council acts as an advisor to the President. The mission of the HSC is to develop and coordinate the implementation of a comprehensive national strategy. To coordinate the executive branch’s efforts to detect, prepare for, prevent, protect against, respond to, and recover from terrorist attacks within the United States. Homeland Security Presidential Directive 9 is the nation’s policy to defend agriculture and food systems against terrorist attacks, major disasters, and other emergencies. President Bush’s FY 05 budget would allocate $568 million for agricultural emergencies and $239 million for food emergencies.

During the afternoon of February 11, 2004, the Committee heard reports from several key leaders. Dr. Robert Smith, National Program Leader, Agriculture Homeland Security, CSREES and Dr. Peter Johnson, National Program Leader, Animal Health, CSREES reported on the NAHLN. There are twelve participants in the NAHLN, and the current budget of $3.7 million is not enough to expand the network. The President’s budget requests $30 million, and all Committee members were encouraged to engage in the budget process. Dr. Smith reminded the Committee that the requested funds are for a plant and an animal laboratory network, so the entire amount in the budget would be shared with the plant network.

Dr. Stephen Sundlof, Director, Center for Veterinary Medicine, Food and Drug Administration (FDA) discussed issues regarding BSE. He referred to the Harvard Risk Assessment as a significant source of information for developing policy for the agency. Currently, the FDA is considering several additional restrictions on the use of meat and bone meal to further mitigate the risks associated with BSE. Inspection teams
GOVERNMENT RELATIONS

for the FDA have conducted extensive checks of feed mills nationwide, and these inspection reports indicate a greater than 99% compliance rate. If enforcement actions are necessary, warning letters, recalls and injunctions could be used to gain compliance. Further, Dr. Sundlof discussed user fees for the approval of drugs, streamlining the drug approval process, and continuing activities in policy development regarding compounding of drugs.

The Administrator of APHIS, Bobby Acord, met with Committee members. He was joined by Drs. Rick Hill and Andrea Morgan. Mr. Acord discussed the extensive APHIS activity regarding AI, END and BSE. He appreciated the support of states to accomplish these eradication programs. He encouraged states to be judicious in the use of interstate restrictions because of the impact of these actions on international trade opportunities. He also discussed the national animal identification system, and he encouraged everyone to stay engaged in the process of implementing the program nationwide.

Acting Administrator of USDA-ARS Dr. Edward Knipling, and Acting Associate Administrator Dr. Caird Rexroad met with the Committee. They discussed the goals of the ARS to utilize research to support the goals of USDA. There was a discussion about Plum Island and the new relationship with the DHS in managing the facilities and research initiatives.
REPORT OF THE COMMITTEE ON IMPORT-EXPORT

Chair: Dr. G. Reed Holyoak, Stillwater, OK
Vice Chair: Dr. George O. Winegar, Howell, MI

Dr. Bob H. Bokma, MD; Dr. Charles E. Brown, II, WI; Dr. Suzanne L. Burnham, TX; Dr. Linda A. Detwiler, NJ; Dr. Najam Q. Faizi, VA; Dr. William H. Fales, MO; Dr. Adele Faul, South Africa; Dr. Lisa A. Ferguson, MD; Dr. Richard W. Fite, MD; Mr. Bob Frost, CA; Dr. Chester A. Gipson, MD; Dr. Rube Harrington, VA; Dr. Robert B. Hillman, TX; Dr. Brian R. Jamieson, CAN; Dr. Julie Ann Jarvinen, IA; Dr. Robert F. Kahrs, FL; Mr. Oscar Kennedy, VA; Dr. Ralph C. Knowles, FL; Mr. Charles J. Larson, VT; Dr. Elizabeth A. Lautner, NY; Mr. Jay C. Lemmermen, FL; Dr. David J. Ligda, IN; Ms. Amy W. Mann, DC; Mr. David A. Miller, IA; Dr. Donald R. Monke, OH; Dr. Andrea M. Morgan, DC; Mr. Ky Mortensen, KY; Dr. Lee M. Myers, GA; Dr. James E. Pearson, IA; Dr. Kelly R. Preston, MD; Dr. Gerardo Quaassdorff, VT; Mr. Paul E. Rodgers, CO; Dr. David A. Stringfellow, AL; Dr. Paul Sutmoller, VA; Ms. Susan W. Tellez, TX; Dr. Lynn Anne Tesar, SD; Dr. Lee Ann Thomas, MD; Dr. Peter J. Timoney, KY; Dr. Charles D. Vail, CO; Dr. James A. Watson, MS; Dr. Gary M. Weber, DC; Mr. David Winters, TX; Dr. Cindy B. Wolf, MN.

The committee was called to order at 12:30 pm on Monday, October 25, 2004 with 19 members and 35 visitors present. Vice Chair George Winegar conducted the meeting in Chair Holyoak’s absence. He presented the revised mission statement of the Committee with explanation. The Committee voted to adopt the revised version as follows: “The purpose of the Committee on Import-Export is to foster discussion and cooperation with and between members of the private sector of the livestock industries, United States, and state government regulatory officials, and the scientific community, on the problems and opportunities in the import/export of disease-free livestock and germplasm.”

Old business included a review of the resolutions that were passed at the 2003 Annual Meeting. Resolution #16 was read and the response by the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS) noted. Resolution #21 was discussed. Since there had been no formal response received concerning this resolution from the Department of Homeland Security the committee voted to table it until later in the meeting when it could be revisited.

The annual report from USDA, APHIS, Veterinary Services (VS), and Plant Protection and Quarantine (PPQ) was presented by Drs.
IMPORT-EXPORT

Arnaldo Vaquer, Senior Staff Officer, USDA-APHIS-VS, National Center for Import and Export and LeAnn Thomas, Assistant Director, Veterinary Medical Regulatory Support, PPQ/Customs and Border Protection. Their report follows:

NATIONAL CENTER FOR IMPORT AND EXPORT
USDA-APHIS-VS FISCAL YEAR 2004

Arnaldo Vaquer
National Import Center, Riverdale, MD

(I) ANIMAL IMPORT ACTIVITIES:

This past Fiscal Year (FY) 2004 saw a continuation in the reduction of import and export of ruminants to and from the United States because of the Bovine Spongiform Encephalopathy (BSE) case diagnosed in the state of Washington from a cow imported from Canada, and the cow diagnosed in Canada last May 20, 2003. This is also true of bovine germplasm exports as some countries placed bans on export of bovine semen from the United States.

A major effort has gone into the standardization of protocols for the import of bovine semen and embryos from the European Union (EU), and these protocols are now under consideration by the European Commission. The United States has always imported bovine semen from the EU but each protocol was negotiated with individual countries in the 1990’s and contained certification statements concerning BSE that are now considered unnecessary. Both protocols are consistent with World Organisation for Animal Health (OIE) standards and do not require the exporting country to make any certification statements with respect to BSE.

With respect to the BSE rule for minimal risk countries: APHIS addressed over 3000 comments on issues regarding the import of live animals, animal products as well as comments and concerns about the risk assessment that was developed in support of the rule. There is no date yet for the publication of the final rule.

A staff veterinarian visited the seaport of Manzanillo, Mexico to review the biosecurity inspection and quarantine of imported dairy heifers from Australia.

Several trips have been conducted by National Center for Import and Export (NCIE) staff veterinarians to border ports to strengthen our working relationship and foster our understanding of port operations.

There are many requests for import protocols for a variety of live animals and their germplasm from many countries around the world. Several diseases limit the number of countries where live animals can be imported, such as: foot and mouth disease (FMD), rinderpest (RP), Bovine Spongiform Encephalopathy (BSE), classical swine fever (CSF),
and others. Among the request pending are:

- Argentina-bovine semen
- Brazil-swine semen
- Costa Rica- Feeder Cattle
- Iceland-sheep and goats
- Italy-swine
- Mexico-breeding cattle, camels, camels, giraffes, antelopes, big horn sheep
- Romania-wild boars
- The Netherlands-equine embryos
- Trinidad & Tobago-sheep semen
- Spain-swine and swine semen

Table 1: Animal Imports

<table>
<thead>
<tr>
<th>Species</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bovine</td>
<td>2,521,791</td>
<td>2,361,547</td>
<td>2,033,330</td>
<td>1,456,827</td>
</tr>
<tr>
<td>Swine</td>
<td>5,072,234</td>
<td>5,910,125</td>
<td>6,815,459</td>
<td>8,639,603</td>
</tr>
<tr>
<td>Camelids</td>
<td>584</td>
<td>694</td>
<td>728</td>
<td>29</td>
</tr>
<tr>
<td>Cervids</td>
<td>2,610</td>
<td>2,121</td>
<td>146</td>
<td>0</td>
</tr>
<tr>
<td>Equine</td>
<td>40,525</td>
<td>38,785</td>
<td>37,493</td>
<td>52,428</td>
</tr>
<tr>
<td>Sheep</td>
<td>81,957</td>
<td>107,641</td>
<td>127,945</td>
<td>1,234</td>
</tr>
<tr>
<td>Goats</td>
<td>4,113</td>
<td>9,664</td>
<td>13,272</td>
<td>49</td>
</tr>
<tr>
<td>Zoo Animals</td>
<td>155</td>
<td>55</td>
<td>51</td>
<td>25</td>
</tr>
</tbody>
</table>

GERMPLASM IMPORTS

Germplasm

<table>
<thead>
<tr>
<th>Embryos</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bovine</td>
<td>1,221</td>
<td>1,490</td>
<td>1,643</td>
<td>5,533</td>
</tr>
<tr>
<td>Caprine</td>
<td>348</td>
<td>64</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Equine</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Ovine</td>
<td>0</td>
<td>0</td>
<td>40</td>
<td>101</td>
</tr>
</tbody>
</table>

Semen

| Bovine        | 3,315,963| 3,004,342| 2,958,652| 2,671,135|
| Equine        | 18,020   | 20,841   | 13,751   | 11,617   |
| Porcine       | 21,284   | 17,447   | 6,853    | 2,086    |
| Ovine         | 2,323    | 349      | 1,828    | 2,156    |
| Cervidae      | 1,336    | 837      | 705      | 92       |
| Caprine       | 0        | 33       | 401      | 0        |

POULTRY IMPORTS

Poultry

<table>
<thead>
<tr>
<th>Type</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day-old chicks</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>/ live poultry</td>
<td>14,484,961</td>
<td>17,627,372</td>
<td>18,440,828</td>
<td>17,742,984</td>
</tr>
</tbody>
</table>
IMPORT-EXPORT

Hatching eggs (doz) 23,191,710 21,470,455 9,832,466 14,993,440
Other live poultry / birds 240,253 77,220 70,359 198,418
Ratites (ostrich, emu, rhea) 0 0 0 0

BOVINE IMPORTS
Bovine imports by port of entry

<table>
<thead>
<tr>
<th>Year</th>
<th>Canadian ports</th>
<th>Mexican ports</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>1,255,441</td>
<td>1,266,327</td>
<td>2,521,768</td>
</tr>
<tr>
<td>2002</td>
<td>1,575,722</td>
<td>784,274</td>
<td>2,359,996</td>
</tr>
<tr>
<td>2003</td>
<td>1,001,987</td>
<td>1,031,338</td>
<td>2,034,673</td>
</tr>
<tr>
<td>2004</td>
<td>12,177</td>
<td>1,444,650</td>
<td></td>
</tr>
</tbody>
</table>

SWINE IMPORTS
Swine imports by port of entry

<table>
<thead>
<tr>
<th>Year</th>
<th>Canadian ports</th>
<th>Denmark</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>5,071,608</td>
<td>612</td>
</tr>
<tr>
<td>2002</td>
<td>5,909,291</td>
<td>669</td>
</tr>
<tr>
<td>2003</td>
<td>6,814,037</td>
<td>601</td>
</tr>
<tr>
<td>2004</td>
<td>8,639,403</td>
<td>200</td>
</tr>
</tbody>
</table>

Importation of Horses - Activities

USDA-APHIS-VS, National Veterinary Services Laboratory (NVSL) has validated the competitive Enzyme-Linked Immunosorbent Assay (cELISA) test for piroplasmosis. The test has been submitted to the OIE Standards Commission for consideration as a prescribed test for international trade and was accepted and adopted by the General Session in May of 2004. The cELISA was incorporated into the 2004 Manual of Diagnostic Test and Vaccines for Terrestrial Animals as a prescribed test for international trade.

The Contagious Equine Metritis (CEM) Working Group met and has provided recommendations for changes to current import testing and treatment requirements for horses imported into the United States from regions affected with CEM. The changes will provide a greater chance of identifying CEM infected horses based on current scientific knowledge and research. These recommendations were presented at the Committee on Infectious Diseases of Horses in October 2003. VS has formulated a regulatory work plan which is currently under review.

There have been numerous requests made to USDA by state veterinarians and Area Veterinarians-In-Charge (AVIC’s) who approve and monitor CEM quarantine facilities for a more comprehensive and complete list of requirements for these facilities. USDA in conjunction with the CEM Working Group has developed the “CEM Quarantine Facilities Guidelines for States” and a sample of an “Agreement between States and Premise Owners” to provide states with recommendations which they can use at their discretion to approve and monitor these facilities.

Due to the outbreaks of Vesicular Stomatitis Virus (VSV) in the states of Texas, Colorado and New Mexico, there have been several
embarques placed on horses originating in the United States by several countries such as Dominican Republic, Russia, and many others. The National Center for Import and Export have worked with these countries to have these bans either removed or regionalized for horses which originate from the affected state.

The 2004 Breeders Cup Championships, a world-renowned high-stakes international Thoroughbred horse race, was to be held at the Lone Star Park racetrack in Texas. The Breeders Cup Limited organization requested USDA provide guidance on devising surveillance and monitoring plan based on the most current knowledge of VS epidemiology and ecology to establish appropriate prevention strategies for VSV. A plan was presented with the input of the Texas Animal Health Commission to the Breeders Cup Limited organization and Lone Star Park officials for implementation with the assistance of the Texas office of USDA-APHIS-VS.

APHIS held an Animal Health Technical Working Group (AHTWG) teleconference with the European Commission in July 2004 to discuss United States-European Union (EU) equine trade issues. Some of the issues discussed were the EU’s dourine/glanders disease status, the standardization of diagnostic laboratory testing procedures and reagents between the United States and laboratories in the EU, and the export of equine viral arteritis (EVA)-positive stallions to the EU. APHIS will also be developing a draft health certificate regarding the requirements for pre-export veterinary inspection of horses exported to the United States, and provide an update on the import requirements for CEM and piroplasmosis. Follow-up equine AHTWG meetings with the Commission are expected to be held in 2005.

(II) AVIAN/ZOO ANIMALS IMPORT ACTIVITIES:
Poultry and Hatching Eggs
There were 17,742,984 poultry, including day old chicks, and 14,993,440 poultry hatching eggs imported into the United States during fiscal year (FY) 2004.

Commercial Birds
The imports of commercial birds are limited to those that are exempt from the Wild Bird conservation act, serviced by the United States Fish and Wildlife Service (USFWS). There were birds released from USDA-operated commercial bird quarantine facilities in (FY) 2004. There were 234,856 commercial birds released from USDA-supervised private bird quarantine facilities.

Pet Bird Program
There were 3,430 pet birds imported into the United States and quarantined at a USDA-operated animal import center during FY 2004. The number of home quarantined birds was 121.

Ratite Importations, no ratites or hatching eggs of ratites were im-
IMPORT-EXPORT

ported into the United States. The current price of ratites and hatching eggs does not justify the cost of importing such animals.

Smuggled/confiscated birds (387)

NCIE worked with the USFWS and the Arizona State Veterinarian to import critically endangered Sonoran Pronghorns into an Arizona reserve for breeding/re-population purposes.

Outbreak of Highly Pathogenic Avian Influenza (HPAI), H5N1. NCIE joined with Centers for Disease Control and Prevention (CDC) to temporarily ban live birds and unprocessed products from eight countries in Southeast Asia.

An Interim rule was written to restrict birds/unprocessed products from regions reporting HPAI, H5N1

Canada Food Inspection Agency (CFIA) confirmed HPAI, H7N3 virus in British Columbia, Canada. USDA regionalized Canada temporarily prohibiting live birds and unprocessed products from British Columbia.

NCIE is working on an updated brochure for distribution - “Importing a Pet Bird-Special rules for Bringing Pet birds of Non-U.S. Origin Into the United States.”

USDA Legislative and Public Affairs developed “Biosecurity Is for the Birds” - Practice Good Biosecurity and Keep Birds Healthy!" Included are Animal Disease Alert handouts about exotic Newcastle disease (END) and avian influenza (AI). The distribution was to practicing veterinarians to target noncommercial poultry.

The Bioterrorism Act required the FDA to receive prior notice of imported food shipments including livestock. Anyone that imports or transits cattle, sheep, goats, pigs, horses, chickens etc., must comply with the new FDA regulations. NCIE complied with the FDA to add links for this new requirement to our import requirements websites for poultry, cattle, sheep, goats, pigs and horses.

The Miami Animal Import Center moved into their new facility.

NCIE began work plan to include all HPAI as defined to the Code of Federal Regulations with requirements similar to END.

NCIE is working with USDA-APHIS-Animal Care to rewrite the zoological ruminant Post Entry Quarantine (PEQ) Memo and the current MOU.

(III) ANIMAL EXPORT ACTIVITIES:
Short Narrative, Successes and pending issues-Americas:

APHIS has been involved in recurring bilateral or multilateral animal health discussions with a number of countries, either as part of Sanitary and Phytosanitary negotiations for free trade agreements (Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Honduras, Nicaragua, Panama, and Peru), established SPS/animal health committees (Canada, Mexico and most recently Chile), as well as Con-
REPORT OF THE COMMITTEE

Consultative Committees on Agriculture (Argentina, Brazil, Canada, and Mexico). APHIS participates in a similar animal health committee with Uruguay. Additionally in a number of countries, APHIS officers’ in-country meet routinely with animal health counterparts.

Significant effort has been expended towards regaining access for BSE low risk commodities including bovine semen, bovine embryos, tallow and pet foods, as well as live ruminants. A few countries have also placed restrictions on other animals, including cats (Colombia and Ecuador). On the positive, a number of countries have now opened to the United States for low risk bovine products. Significant effort has been expended towards country action to lift restrictions on pet food which does not contain U.S.-source ruminant materials, as well as for dairy products, tallow, blood products and biologicals. Several countries are currently accepting live ruminants, namely Canada (slaughter cattle and bob calves), Cuba (breeding cattle and small ruminants), Guyana (small ruminants), Honduras (ruminants under import permit), Mexico (slaughter sheep and slaughter goats), Suriname (cattle, sheep and goats), and Trinidad and Tobago (small ruminants).

Regarding poultry diseases, many Americas countries maintain these restrictions due to non reportable low pathogenic AI findings as well as HPAI. APHIS has provided extensive information to these countries, attempting to regain access for raw products and poultry and hatching eggs. These countries include Argentina, Brazil, Costa Rica, Cuba, Honduras, Mexico, Panama, Uruguay and the Andean Pact countries of Bolivia, Colombia, Ecuador, Peru and Venezuela. Mexico and the Andean Pact countries require one and two years since the date of the last infection to consider lifting restrictions.

Argentina, Brazil, and Honduras have not recognized the United States as free of END, in spite of receipt of extensive information.

The NCIE continues in efforts to gain access related to restrictions imposed due to anaplasmosis (Canada), bluetongue (Canada, Chile, and Cuba), equine viral arteritis (Colombia), vesicular stomatitis (Canada and Dominican Republic) as well as restrictive statements pertaining to West Nile virus. Another initiative is directed towards harmonizing requirements for brucellosis, tuberculosis and pseudorabies with Canada.

Free trade negotiations are ongoing.

Argentina

USDA's consultative committee on agriculture, with animal health bilaterals. Restrictions on United States for BSE, scrapie, AI and END.

Bovine semen protocol negotiated. Old requirements were revoked when the United States reported BSE. Argentina insists in BSE statements.

Poultry diseases. Argentina refuses to consider the United States as free of AI or Newcastle disease.
IMPORT-EXPORT

Argentine poultry meat lamb and beef: USDA is working on requests from Argentina. Publishing appropriate rule making is forthcoming for poultry meat and lamb. A new site visit for beef still needs to occur before we can consider rulemaking.

Bolivia
Bolivia is a part of the Andean Community (AC) and member of the AC technical committee on animal health. Restrictions on the United States for BSE, scrapie and AI.

Brazil
USDA’s consultative committee on agriculture, with animal health bilaterals. Restrictions on the United States for BSE, scrapie and AI. Brazil is evaluating information provided by APHIS in order to consider the United States as free of AI or Newcastle disease, as well as for classical swine fever and exports of swine to Brazil. We do have a new approved health certificate for swine; however, they still require either that swine are non-tittered for 9 Leptospires or treated twice with dihydrostreptomycin.

APHIS is evaluating the status of Brazil with respect to their request to regionalize a region for FMD.

Canada
A North American Free Trade Agreement (NAFTA) member country. Free trade agreement has been negotiated and SPS committee exists. Restrictions on the United States for BSE, bluetongue and ana-plasmosis. Safe products for BSE are allowed.

In May 2003 APHIS added Canada to the list of countries affected with BSE. APHIS is working towards rulemaking which would allow the importation of low risk ruminant products and cattle and sheep and goats for fattening and slaughter before 30 and 12 months of age.

Cayman Islands
Recently lifted restrictions on the United States for BSE

Chile
Free trade agreement has been negotiated and an SPS committee exists. APHIS recognized Chile as free of classical swine fever, following review of their application. July 2004 Restrictions on United States for BSE and bluetongue.

Colombia
Free trade negotiations are ongoing. Part of the AC and member of the AC technical committee on animal health. Restrictions on United States for BSE, scrapie and AI. APHIS is not actively pursuing a request by the Government of Colombia to regionalize portions of the country for FMD, due principally to inability to conduct an appropriate site visit because of security issues. Colombia refuses to consider our request to be considered as free of HPAI. They restrict poultry to a few approved States for purposes of importing genetics. Ban recently was narrowed to California, Connecticut, Delaware, Maryland, Maine, Michi-
REPORT OF THE COMMITTEE

gan, New Jersey, New York, Pennsylvania, and Texas.

Costa Rica
Free trade agreement has been negotiated and an SPS committee is being established. Restrictions on United States for BSE, scrapie and AI.

Cuba
Restrictions on United States for bluetongue and AI. Recently lifted BSE restrictions. Animal products: Pet food and dairy certificates were approved. Table eggs and poultry meat. A variety of States are restricted for AI, Canada’s HPAI (States bordering British Columbia), LPAI H7 Northeast United States, as well as Texas. Specific restricted states are California, Connecticut, Delaware, Idaho, Maine, Maryland, Massachusetts, Montana, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Texas, Vermont, Washington. Beef and pork: U.S. shipments of beef and pork are approved from FSIS plants; however, BSE certification language is pending.
Live ruminants and genetic material: VS hosted a mission from Cuba. We are currently reworking protocols for live ruminants and anticipate a site visit to approve farms and select cattle later this year. We have also new protocols for bovine semen and have a proposal on the table for bovine embryos.

Dominican Republic
Free trade agreement has been negotiated and an SPS committee is being established. Restrictions on United States for BSE.

Ecuador
Free trade negotiations are ongoing. Part of the AC and member of the AC technical committee on animal health. Restrictions on United States for BSE, scrapie and AI.

El Salvador
Free trade agreement has been negotiated and an SPS committee is being established. Restrictions on United States for BSE, scrapie and AI.

Grenada
Recently lifted restrictions on the United States for AI. Recently lifted restrictions on the United States for BSE.

Guatemala
Free trade agreement has been negotiated and an SPS committee is being established. Restrictions on United States for BSE and scrapie. Recently lifted restrictions on the United States for AI.

Guyana
Recently lifted BSE restrictions

Honduras
Free trade agreement has been negotiated and an SPS committee is being established. Restrictions on United States for scrapie and AI. Recently lifted BSE restrictions. APHIS is evaluating a request from
the Government of Honduras to consider the country as free of END.

**Jamaica**
Restrictions on United States for BSE, scrapie and AI.

**Mexico**
A NAFTA country. Free trade agreement has been negotiated and SPS committee exists. Restrictions on United States for BSE, scrapie and AI. Mexico has considered information submitted related to END and released all restrictions due to END. A variety of States are still restricted for AI, including highly pathogenic H5 and low pathogenic H7 AI (Texas), low pathogenic H6 AI California, H2 (Pennsylvania), as well as H7 (Connecticut).
APHIS recognized Mexico’s Yucatan states as free of END. APHIS recognized Mexico’s Baja California, Baja California Sur, Chihuahua, and Sinaloa as free of classical swine fever. August 2003 banned Holstein cross steers and Holstein cross spayed heifers from Mexico. March 2004 Mexico is open to live slaughter sheep and goat exports.

**Nicaragua**
Free trade agreement has been negotiated and an SPS committee is being established. Restrictions on United States for BSE, scrapie and AI (just Texas).

**Panama**
Free trade negotiations are ongoing. Restrictions on United States for BSE, scrapie and AI. Panama refuses to consider our request to be considered as free of highly pathogenic AI. They restrict poultry to a few approved states for purposes of importing genetics.
APHIS is evaluating a request from the Government of Panama to consider the country as free of END.

**Peru**
Free trade negotiations are ongoing. Part of the AC and member of the AC technical committee on animal health. Restrictions on United States for BSE, scrapie and AI (CA, CT, DE, MD, NJ, PA, RI, TX). Peru refuses to consider our request to be considered as free of HPAI. They restrict poultry to a few approved states for purposes of importing genetics.
APHIS is reviewing information submitted by the government of Peru for regions to be considered as low risk or free of FMD (llama importations) and END (ostrich meat).

**Suriname**
Recently lifted BSE restrictions.

**Trinidad and Tobago**
Recently lifted BSE restrictions. Recently lifted AI restrictions.

**Uruguay**
An SPS committee under JCTI (like a Free trade agreement) meets routinely. Restrictions on United States for BSE, scrapie and AI.

**Venezuela**
REPORT OF THE COMMITTEE

Part of the AC and member of the AC technical committee on animal health. Restrictions on United States for BSE, scrapie and AI.

The following countries allow the importation of U.S. ruminant livestock:

**Canada:** Slaughter cattle, accepted under a State health certificate issued by an accredited veterinarian, under seal to slaughter only. Slaughter animals are managed as normal slaughter subject to same SRM removal and BSE surveillance procedures as is the case for Canadian cattle.

**Cuba:** Breeding cattle and small ruminants; requires an in situ risk assessment conducted by inspection team.

**Guyana:** Small ruminants (Based on import permit only, no protocol developed); allows the importation from the United States of sheep and goats once an import permit is issued with the health regulations.

**Honduras:** Allows ruminants under import permit; lifted bans for all non risk ruminant-origin materials, including live ruminants under the age of 30 months. Decree No. 485-04 dated May 26, 2004, lifts the temporary prohibition for the importation from U.S. of animals, products, and sub-products of ruminant species, included in Decree No. 968-2003 of December 2003. Conditions as per conditions of import permit, apparently as previous to December 2003.

**Mexico:** Slaughter sheep and slaughter goats; requires a certification statement: “In the country of origin, there are animal health regulations that forbid the feeding of ruminant origin proteins to ruminant animals except milk and milk products / En el país de origen existe reglamentación zoosanitaria vigente que prohíbe alimentar a los rumiantes con proteínas de origen rumiante, excepto leche y proteínas de leche.”

Due to scrapie concerns, Mexico imposes the restriction that the animals are accompanied by Federal official to slaughter plant.

**Suriname:** Cattle, sheep and goats (no protocol available for sheep and goats); “cattle [and small ruminants] are allowed into Suriname, if with regards to BSE, the shipment is accompanied by an official USDA declaration, certifying that the State(s) and farm(s) of origin have been free; i.e., no case of BSE has been diagnosed in either State or farm.”

**Trinidad and Tobago:** Small ruminants; “the exportation of live small ruminants may be resumed under the following conditions:

a. There must be certification that the ban on the feeding of ruminant material to ruminants has been complied with on the premises of origin.

b. That there have been no cases of BSE on the premises of origin of the animals or among animals that have originated from the same premises.”
IMPORT-EXPORT

Successes and Pending Issues - European Union, Africa/New Zealand and Australia

- Successful trade discussions were held with Ukraine, Poland, Hungary, Estonia and the Czech Republic. A meeting with Russia was not immediately gratifying, but soon after poultry restrictions were lifted. FAS Russia has the impression of less resistance than formerly on the part of the Ministry.
- Completed memorandum for handling of stray ruminants from Canada and Mexico
- Resolved contentious export situation involving horses to South Africa.
- A successful ongoing bovine embryo import project has been initiated with Mexico
- Despite the outbreak of VSV, equine exports to the EU were continued with only a short disruption of trade
- VSV has caused relatively few export problems with Europe, Australia, New Zealand and sub-Saharan Africa

Work in progress

- Revision of Spayed heifer requirements – collaboration with Western Region
- Technical trade talks with the European Union regarding:
  - Bovine semen
  - Bovine embryos
  - Equine certifications
- European Union has annexed 10 new countries – we are working to harmonize health certificates, and to obtain & post bilingual certificates where needed
- Electronic permits and certification is going forward; much interest in computer-generated export certificates
- Removal of BSE statements from export certificates
  - Opening or maintaining markets for bovine semen and embryos in the wake of BSE concerns
Import project to obtain gerenuk semen from Kenya
  - Exhaustive protocol development, and testing requirements
  - On-site USDA supervision of collections, testing and control of semen and samples
  - Collaborative efforts
    - with Zoo and wildlife veterinarians in the private sector with regulatory veterinarians
    - USDA-APHIS-VS, USDA-APHIS-International Services and USDA, APHIS, VS Foreign Animal Disease Diagnostic Laboratory
REPORT OF THE COMMITTEE

- Regulatory veterinarians in USDA and Kenya
- Developing SOP standards for disaster/emergency situations that might disrupt work flow of NCIE

Short Narrative, Successes and pending issues - Asia/Middle East:

The detection of a single case of BSE in an imported cow in the State of Washington in December 2003 continues to negatively impact U.S. ruminant exports. To our knowledge, no country in the region is open to U.S. cattle. With respect to U.S. small ruminants, details are sketchy; one or more countries may be open but overall, export possibilities would appear to still be significantly reduced. Through preexisting or newly introduced import health protocols or by special edict, a number of countries had BSE-related import bans on U.S. bovine semen and/or embryos, this despite international standards declaring that such bans, or any BSE-related import restrictions, are inappropriate for these commodities. To date, we’ve had success in getting most of the bans lifted, although a number of countries still are trying to include some restrictions in their protocols.

United States exports of day-old chicks and hatching eggs have been compromised this year by reports of detections of high-path and even low-path AI virus here. Negative foreign import actions have varied greatly by country, particularly with respect to the reports pertaining to low-path H5 AI virus and low-path H7 AI virus. We have aggressively countered the negative actions, with reasonable success.

Overall, this year’s outbreak of vesicular stomatitis (VS) seems to have had only a moderate negative impact on exports to countries of the region. Our conservative approach in past foreign import health protocol negotiations (we did not agree to a requirement for country-freedom certification for the disease) has significantly minimized the damage. And we hope the OIE’s recent decision to no longer separate the infectious diseases covered in the Terrestrial Animal Health Code into a List A group (diseases perceived as most severe; VS was included in this group) and a List B group will mitigate future foreign concerns over the disease.

ACCOMPLISHMENTS

Japan
- Improved import health protocol (IHP) negotiated for U.S. bovine embryos.
- New IHP negotiated for honey bees from Hawaii.

Philippines
- Improved IHP negotiated for U.S. swine.

Turkey
- New IHP negotiated for U.S. female breeding cattle. Note: Almost simultaneous with this success was a downgrading by the European Food Safety Authority of the United States’s Geo-
IMPORT-EXPORT

graphical BSE Risk (GBR) from GBR Level II to GBR Level III. This action caused Turkish authorities to maintain an import ban on all U.S. cattle despite the agreement on the specified IHP.

CURRENT ACTIVITIES

China
— Improved IHP’s for U.S. bovine semen, bovine embryos, cattle, and swine under negotiation.
— New IHP’s for U.S. exotic ruminants and rabbits under negotiation.

India
— New IHP’s for bovine semen and rabbits under negotiation.

Israel
— New IHP’s for breeding cattle and feeder cattle under negotiation.

Japan
— Attempting to dialogue on reopening the market for U.S. cattle.
— Revised IHP for bovine semen under negotiation.

Taiwan
— Improved TGE testing requirement (in IHP for U.S. swine) under negotiation.

Tunisia
— New IHP’s for U.S. breeding cattle and feeder cattle under negotiation.

Table 2: Animal Exports

BY SPECIES

<table>
<thead>
<tr>
<th>Live Animals</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bovine</td>
<td>174,767</td>
<td>130,549</td>
<td>82,426</td>
<td>24,171</td>
</tr>
<tr>
<td>Equine</td>
<td>107,041</td>
<td>73,015</td>
<td>65,128</td>
<td>58,445</td>
</tr>
<tr>
<td>Ovine</td>
<td>377,520</td>
<td>479,896</td>
<td>216,829</td>
<td>85,430</td>
</tr>
<tr>
<td>Caprine</td>
<td>43,217</td>
<td>34,503</td>
<td>28,282</td>
<td>5,824</td>
</tr>
<tr>
<td>Porcine</td>
<td>26,336</td>
<td>271,125</td>
<td>188,245</td>
<td>349,310</td>
</tr>
<tr>
<td>Cervids</td>
<td>2,207</td>
<td>946</td>
<td>186</td>
<td>259</td>
</tr>
<tr>
<td>Camelids</td>
<td>41</td>
<td>103</td>
<td>116</td>
<td>106</td>
</tr>
<tr>
<td>Zoo animals</td>
<td>475</td>
<td>396</td>
<td>204</td>
<td>700</td>
</tr>
<tr>
<td>Bison</td>
<td>2,498</td>
<td>592</td>
<td>29</td>
<td>84</td>
</tr>
</tbody>
</table>

POULTRY EXPORTS

<table>
<thead>
<tr>
<th>Poultry Type</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day-old chicks / live poultry</td>
<td>46,190,951</td>
<td>41,611,945</td>
<td>36,821,151</td>
<td>38,677,805</td>
</tr>
<tr>
<td>Hatching eggs (doz)</td>
<td>80,230,234</td>
<td>80,354,301</td>
<td>86,886,458</td>
<td>65,452,462</td>
</tr>
</tbody>
</table>

275
REPORT OF THE COMMITTEE

Other live poultry / birds  51,720,190  44,624,523  48,040,190  43,364,010

GERmplasm EXPORTS

Embryos  2001  2002  2003  2004
Bovine  15,563  12,005  13,562  12,063
Ovine  40  30  0  0
Porcine  100  100  0  1,093
Equine  10  2  54  43
Cervid  0  0  0  0
Caprine  0  0  364  0

Semen
Bovine  11,432,972  10,656,353  10,230,501  10,049,013
Equine  13,570  15,873  19,266  19,860
Porcine  12,642  21,994  15,409  23,734
Caprine  350  951  2,002  0
Ovine  450  1,368  400  2,171
Cervid  2,141  1,209  497  369

AQUACULTURE

Aquaculture
Type  2001  2002  2003  2004
Live fish, incl.  mollusks & crustaceans  10,487,542  253,313,503  138,555,808  30,502,994
Eggs  128,732,044  109,795,049  132,185,008  154,718,512

Aquaculture Update

Infectious Salmon Anemia (ISA)
ISA is a foreign animal disease and an OIE notifiable disease of Atlantic salmon that was first detected in Cobscook Bay, Maine in the spring of 2001. The disease had been present in salmon net-pen farming operations in neighboring New Brunswick, Canada since 1996. In December of 2001, the Secretary of Agriculture declared an emergency due to ISA and provided assistance for depopulation, cleaning and disinfection as well as indemnification. Of the 17 net-pen sites in Cobscook Bay, 8 depopulated voluntarily prior to the emergency declaration and 9 depopulated under the USDA program in early 2002.

Following depopulation of all net-pen sites in the bay, all sites and equipment were cleaned and disinfected and were fallowed for more than 100 days. A mandatory surveillance program, part of the ISA program, was instituted and is ongoing.

Following restocking in April of 2002, all U.S. net-pen sites remained negative for ISA until June of 2003 when two cages at two different net-pen sites tested positive. The infection pressure from neighboring
IMPORT-EXPORT

Canada was high, as New Brunswick had 18 positive sites (not just cages) in 2003, all in close proximity to net-pen sites in Maine. Additionally, the extreme tides and strong currents bring water from Canada down into Maine.

The USDA program success has led to improved disease control measures in the New Brunswick, Canada ISA program as well as harmonization between the United States and Canadian programs. U.S. and Canadian regulators meet biannually to discuss respective ISA programs, and local ISA program managers in Maine and New Brunswick meet frequently.

Suspect cages continue to be identified, and to date, multiple cages at four U.S. net-pen sites have been confirmed positive in 2004, all post-harvest.

An import protocol has been developed and will be published through the rulemaking process.

Spring Viremia of Carp (SVC)

Spring Viremia of Carp is a Foreign Animal Disease and an OIE notifiable disease primarily affecting cyprinids such as carp and koi carp. The disease was first identified in the United States in a farm consisting of approximately 214 ponds in North Carolina and Virginia in the spring of 2002. In March of 2003, the Secretary of Agriculture declared an emergency due to SVC allowing APHIS to assist with de-population, cleaning and disinfection, and also indemnification.

Depopulation, cleaning and disinfection of the infected premises in North Carolina and Virginia was completed in September of 2003. The facility restocked with SVC-free certified animals in the winter of 2004. APHIS conducted surveillance testing of the animals in the spring of 2004 and is preparing for a fall test to confirm that SVC eradication efforts are successful.

National surveillance for SVC was implemented in the spring of 2003. Surveillance includes trace in and trace outs of facilities, other importers and exporters that belong to a voluntary SVC testing program. Eighty premises in 21 states have been tested as part of our SVC surveillance program, all with negative results.

In June of 2004, a backyard koi hobbyist pond in Washington State tested positive for SVC. The site has been depopulated, cleaned and disinfected and traces conducted. In July of 2004, a commercial farm in Missouri also tested positive for SVC. Preliminary traces link to Illinois and Minnesota. The Missouri facility finished depopulation on August 31st. Cleaning and disinfection is underway. The Illinois facility voluntarily cleaned and disinfected after all remaining fish were sent to NVSL (results were negative although water temperatures were not conducive for detecting SVCV). The Minnesota facility remains under quarantine.

An SVC import protocol has been developed and will be published
REPORT OF THE COMMITTEE

following the rulemaking process.

White Spot (WSSV)

White spot is an OIE notifiable disease of shrimp. The disease has been detected in shrimp growing operations in the Gulf of Mexico area. On April 14, 2002, the disease was detected for the first time in a commercial shrimp farm on the island of Kauai in Hawaii. The farm operates on well water and uses SPF shrimp and has strict biosecurity measures in place. The source of the virus is unknown. The facility has been depopulated, cleaned and disinfected with APHIS assistance. Hawaii will seek to obtain WSSV-free status following OIE criteria.

EU Export Issues

EU Directive 2003/858/EC lays down the conditions for export of fish, their eggs and gametes for farming or human consumption into the European Union. Many of the requirements in the directive are impossible to meet such as having the Certificate of Veterinary Inspection signed by an APHIS official on day of shipment. APHIS negotiated with the EU to accept our “system” of accredited veterinarians and APHIS approved labs to certify these animals and products, allowing for some leeway in interpreting the health certification requirements outlined in the directive.

EU Directive 2003/804/EC lays down the conditions for export of mollusks, their eggs and gametes for farming or human consumption into the European Union. Similar issues exist with this directive as the fish directive. Additionally, because APHIS certifies on a farm basis and not a regional or area basis, the EU has agreed only to accept our product until June 1, 2005 and pending the outcome of an animal health audit. The ability to continue trade depends on the outcome of this audit that will include the EU looking for competent authority registration and oversight of farms approved to ship to the EU and also they will be scrutinizing water source issues (i.e. farms are free of OIE notifiable diseases, but not necessarily the wild populations sharing the same water source with farm-raised animals). APHIS is working with NOAA and FWS to prepare for the audit. FDA will also be involved from the public safety standpoint.

National Aquatic Animal Health Plan

The Joint Subcommittee on Aquaculture (JSA) is a Federal inter-agency group authorized by the National Aquaculture Act and serves to coordinate aquaculture efforts in the various agencies. The JSA has many task forces. The National Aquatic Animal Health Task Force (NAAHTF) has been charged to develop a National Aquatic Animal Health Plan. Dr. John Clifford is chair of the NAAHTF. The rationale for developing such a plan is to protect our wild and cultured resources, support efficient aquaculture, achieve efficient and predictable commerce, and meet our national and international trade obligations.

The NAAHTF is responsible for drafting chapters of the plan. Input
is received from stakeholders through working group meetings and comments on draft chapters. To date, the first three draft chapters of the plan have been drafted and are being circulated to the JSA and stakeholders. Additional draft chapters are scheduled to be completed this year and will be included on the Animal and Plant Health Inspection Service’s Web site (http://www.aphis.usda.gov/vs/aqua/naah_plan.html). Our goal is to complete the plan by June 2006. The task force is on target to complete the plan by this date.

(IV) REGIONALIZATION:

Americas

The following countries* of the Americas are being evaluated for the status of the diseases or acceptability to export designated commodities:

- **Foot-and-Mouth Disease:** Argentina, Brazil, and Peru
- **Exotic Newcastle Disease:** Argentina, Honduras, Mexico (States of Chihuahua, Coahuila, Durango, Nuevo Leon, and the Lagunera Region), Mexico (State of Nayarit), Panama, and Peru
- **Classical Swine Fever:** Mexico (States of Campeche, Quintana Roo, Sonora, and Yucatan) and Mexico (State of Nayarit)
- **Brucellosis:** Mexico (State of Sonora)
- **Tuberculosis (TB):** Review efforts to regionalize certain Mexican States for TB are ongoing

*In some cases, only a certain region or regions are being evaluated for the indicated disease

World

The following countries* are being evaluated for the status of the diseases or acceptability to export designated commodities:

- **Foot-and-Mouth Disease:** Argentina, Brazil, Croatia, Lithuania, Namibia, Peru, Slovakia, and South Africa
- **Exotic Newcastle Disease:** Argentina, Denmark, Honduras, Mexico (States of Chihuahua, Coahuila, Durango, Nuevo Leon, and the Lagunera Region), Mexico (State of Nayarit), Panama, and Peru
- **Classical Swine Fever:** Several regions in the EU including Hungary, Lithuania, Poland, and Slovakia; Mexico (States of Campeche, Quintana Roo, Sonora, and Yucatan); and Mexico (State of Nayarit)
- **Swine Vesicular Disease:** Lithuania, Poland, and Slovakia
- **African Horse Sickness:** Saudi Arabia
- **Brucellosis:** Mexico (State of Sonora)
REPORT OF THE COMMITTEE

- **Tuberculosis (TB):** Review efforts to regionalize the certain Mexican States for TB are ongoing
- **Bovine Spongiform Encephalopathy:** Canada
  - In some cases, only a certain region or regions are being evaluated for the indicated disease

**(V) ANIMAL PRODUCTS ACTIVITIES:**

**Export Division**

The export division of the animal products staff has had an extremely active year. Negotiations have taken place with many countries to begin or facilitate trade in many different types of animal products. In some cases these negotiations were conducted jointly with FSIS or the USDA-Agriculture Marketing Service-Dairy Division. Many of these discussions involved efforts to retain markets after the BSE case was confirmed in Washington State, and HPAI was confirmed in Texas.

Some of the activities are as follows:

- Pet food to Australia
- Animal feed ingredients to Australia
- Animal feed ingredients to Brazil
- Table eggs to Mexico
- Ruminant products to Japan – BSE issue
- Poultry products to many countries expressing concern about exotic Newcastle disease in the United States
- Dairy products to Argentina
- Beef pancreas to Argentina
- Inedible egg products to Argentina
- Fetal bovine serum and calf serum to Argentina
- Poultry product to Azerbaijan
- Dairy products to Barbados
- Pet food to Barbados
- Gelatin to China
- Hides to Hong Kong
- Pet food products and animal by products to the European Union
- Pet food to Turkey
- Pet food to Israel
- Hides to Israel
- Pet food to Russia
- Dairy products to Russia
- Technical gelatin to Russia
- Pet food to South Africa
- Hides to South Africa
- Poultry products to Thailand
- Bovine serum to Taiwan
- Animal feed ingredients to Taiwan
- Pet food and other animal products to Sri Lanka
- Table eggs to Singapore
- Pet Food to India
- Dairy to India
- Animal products including dairy to Ukraine
- Beef to Romania
- Dairy products to Cuba
- Animal feed ingredients to Cuba
- Pet food to Cuba
- Animal feed ingredients to Malaysia
- Pet food to Malaysia
- Rendered products to Mexico
- Pet food to Mexico
- Table eggs to Mexico
- Ruminant serum to Mexico
- Pet food to Chile
- Dairy products to Bolivia
- Meat-and-bone meal to China
- Dairy products to Chile
- Dairy products to Indonesia
- Meat products to Guatemala
- Tallow to Korea
- Fetal bovine serum to Korea
- Deer and elk products to Korea
- Animal feed ingredients to Japan
- Poultry and eggs to Japan
- Animal feed ingredients to Japan
- Poultry to New Caledonia
- Dairy products to Peru
- Pet food to the Philippines
- Pet food to Taiwan
- Poultry to Taiwan
- Poultry to Taiwan
- Technical blood products to the United Kingdom
- Hides to Vietnam
IMPORT-EXPORT

Import Division

The import animals' products staff continues to protect the U.S. livestock and poultry population from Foreign Animal Diseases by implementing mitigations in response to issues related to the animal disease status of our trading partners.

Due to Canada's intensive efforts to control and containment HPAI in British Columbia, and their ability to meet the OIE standards for disease free status, VS recently removed the import restrictions and prohibitions on bird and poultry from British Columbia, Canada.

As a result of the BSE case being diagnosed in Canada, USDA implemented new disease health certification mitigations for low risk commodities in or for them to continue to enter the United States. VS issued hundreds of import permit for eligible products including ruminant meat and meat products, hunter harvested meat and trophies, pet food and research samples. In addition, as a result of the R-Calf lawsuit against the USDA, numerous import permits that contained disease mitigation requirements for the import of Canadian ruminant meat and meat products were cancelled. These permits provided for products to enter which were determined to be for products outside the scope of Secretary Veneman's August 8, 2003 announcement. This announcement listed those commodities that were considered low-risk and could be imported without risk. USDA maintains the lawsuit and subsequent permit cancellations were not an animal health issue but rather a process issue.

For FY 2004 1,839 new permit applications were received, and 1,633 renewal or amended applications were received for products from Canada.

(VI) VETERINARY REGULATORY SUPPORT, PLANT PROTECTION AND QUARANTINE

During Fiscal Year 2004, the Department of Homeland Security (DHS) Customs and Border Protection (CBP) was responsible for conducting all inspections of passenger declarations; inspecting international passengers, luggage, cargo, mail and monitoring all international garbage compliance agreements for USDA. CBP is tasked with regulating all imported commodities including animal products, by-products, international garbage and related risk materials according to rules, regulations and policies set down by USDA. Veterinary Regulatory Support (VRS) has had a major role as a liaison between USDA Veterinary Services, National Center for Import /Export and CBP Agriculture Inspection, Policies and Programs (AIPP). VRS is responsible for providing alerts to the U.S. ports of arrival via CBP-AIPP, informing them of changes in animal disease status world wide and appropriate mitigation procedures to be followed by CBP when regulating imported commodities from countries affected with a foreign animal disease of
REPORT OF THE COMMITTEE

concern to U.S. Agriculture. VRS, Agriculture Quarantine Inspection Veterinary Medical Officers in the field work tirelessly to provide technical and scientific expertise and guidance for CBP Agriculture Specialists and other CBP Officers in the regulation of imported animal products, animal by-products, related materials and international garbage.

Summary of Activities: October 2003- Sept 2004

100,895 Foreign Vessels Arrived
35,918 Foreign Vessels Boarded
5,217 Foreign Vessels Boarded for Garbage Violations
12,330,122 kg Weight of garbage removed from foreign vessels
522,921 Aircraft arrived from foreign locations
34,960,717 kg Weight of garbage removed from aircraft arrivals

Agriculture products confiscated at the Border

<table>
<thead>
<tr>
<th>Site</th>
<th>Number of Lots</th>
<th>Weight (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maritime</td>
<td>2,314</td>
<td>42,219,367</td>
</tr>
<tr>
<td>Aircraft</td>
<td>228,669</td>
<td>476,198</td>
</tr>
<tr>
<td>Land Border</td>
<td>150,215</td>
<td>2,517,580</td>
</tr>
<tr>
<td>Mail</td>
<td>25,538</td>
<td>40,947</td>
</tr>
</tbody>
</table>

Miscellaneous: Footwear Cleaned and Disinfected 120,196

Dr. Michael David, Director of International Sanitary Standards, NCIE, USDA-APHIS-VS, provided a report on the new OIE disease reporting system. The following is his report:

Disease notification to the OIE was previously based on Lists A and B. There is now a mandate to unify the current List A and List B into a single list and establish the criteria to help determine whether a disease is either included or excluded from the list and to define a new frequency of disease reporting. The new disease reporting system will allow diseases on the list to “gravitate” to their true relative importance and promote transparency and avoid penalizing countries that do notify the OIE of their disease outbreaks. The new criteria to list diseases are based on international spread, emerging potential, zoonotic potential and significant spread in naïve populations. There are two degrees of disease reporting frequency; immediate and routine. Immediate reporting will take place –

- when it is the first occurrence of a listed disease and/or infection in a country or zone/compartment;
- when there is re-occurrence of a listed disease and/or infection in a country or zone/compartment following a report that declared the outbreak as ended;
- with the first occurrence of a new strain of a pathogen of an OIE listed disease in a country or zone/compartment;
- when there is a sudden and unexpected increase in the distri-
IMPORT-EXPORT

bution, incidence, morbidity or mortality of a listed disease prevalent within a country or zone/compartment;

- with an emerging disease with significant morbidity or mortality, or zoonotic potential;

- when there is evidence of change in the epidemiology of a listed disease (including host range, pathogenicity, strain) in particular if there is a zoonotic impact.

Routine reporting will take place on a biannual basis. Beginning January, 2005, emergency reports are to be made immediately within a 24 h period and routine reports on all diseases are to occur every six months, with a yearly report containing any additional information will also be submitted.

Dr. Bob Bokma, Senior Staff Veterinarian, Regionalization Coordinator for Regionalization, USDA-APHIS-VS, Regional Coordinator for the Americas, USDA-APHIS-VS NCIE, reported his perspective on regionalization for movement of animals and products. The following is his report:

Regionalization applies to both our requests to other countries as well as official requests from other countries to the United States and is mandated by the SPS Agreement of the World Trade Organization (WTO). The purpose is to allow international trade to occur following either the recognition as free, or achieving recognition as low risk for, a specific animal disease, which impedes trade of specific animals or animal products.

In the United States, this process requires submission of an official request supplemented with information sufficient to allow the importing country to conduct appropriate risk assessment and promulgate any necessary changes.

With regard to domestic regionalization requests presented by the United States to importing countries in the Americas, significant effort has been expended towards regaining access for BSE low risk commodities including bovine semen, bovine embryos, tallow and pet foods, as well as live ruminants. A few countries have also placed restrictions on other animals, including cats (Colombia and Ecuador). A number of these countries have now opened for low risk bovine products. Significant effort has been expended towards for action by countries to lift restrictions on pet food, which does not contain U.S.-source ruminant materials, as well as for dairy products, tallow, blood products and veterinary biologics. Several countries are currently accepting live ruminants, namely Canada (slaughter cattle and bob calves), Cuba (breeding cattle and small ruminants), Guyana (small ruminants), Honduras (ruminants under import permit), Mexico (slaughter sheep and slaughter goats, slaughter deer, and breeding wild sheep), Suriname (cattle, sheep and goats), and Trinidad and Tobago (small ruminants).
REPORT OF THE COMMITTEE

Regarding poultry diseases, many Americas countries maintain these restrictions due to non-reportable low pathogenic AI virus findings as well as HPAI. APHIS has provided extensive information to these countries, attempting to regain access for raw products and poultry and hatching eggs. These countries include Argentina, Brazil, Costa Rica, Cuba, Honduras, Mexico, Panama, Uruguay and the Andean Pact countries of Bolivia, Colombia, Ecuador, Peru and Venezuela. Mexico and the Andean Pact countries require one and two years since the date of the last infection to consider lifting restrictions.

The following countries worldwide are being evaluated by the United States for the status of the diseases or acceptability to export designated commodities:

- African Horse Sickness: Saudi Arabia
- Bovine Spongiform Encephalopathy: Canada
- Classical Swine Fever: Several regions in the EU including Hungary, Lithuania, Poland, and Slovakia; Mexico (States of Compeche, Quintana Roo, Sonora, and Yucatan); and Mexico (State of Nayarit)
- Brucellosis: Mexico (State of Sonora)
- Exotic Newcastle Disease: Argentina, Denmark, Honduras, Mexico (States of Chihuahua, Coahuila, Durango, Nuevo Leon, and the Lagunera Region), Mexico (State of Nayarit), Panama, and Peru
- Foot-and-Mouth Disease: Argentina, Brazil, Croatia, Lithuania, Namibia, Peru, Slovakia, and South Africa
- Swine Vesicular Disease: Lithuania, Poland, and Slovakia
- Tuberculosis (TB): Review efforts to regionalize the certain Mexican States for TB are ongoing.

Processing an exporting country’s request for regionalization is a lengthy process, as it requires a formal request with supporting information (in English), clarification as to further information needs and receipt of this information, one or more site visits to corroborate and further clarify the information received, a risk assessment which may be qualitative or quantitative (quantitative if commodity is from a country vaccinating for a particularly contagious disease), the determination of appropriate mitigation to reduce any risk to a negligible level, the preparation of a proposed rule, a public comment period, the evaluation of and response to all relevant comments received, the preparation of the final rule, final clearances and finally publication and follow up implementation. Further, for meat and meat products, the USDA Food Safety and Inspection Service must conduct an equivalence evaluation, which also requires rules changes.

The lengthy evaluative processes that the USDA conducts has been
IMPORT-EXPORT

characterized as a frustrating experience for the applying country because the time involved may be several years before the meritorious rules change is finally promulgated.

Dr. Percy Hawkes, International Animal Health and Plant Health Regulatory Programs, Payson, UT; Los Andes, Chile, reported on issues related to the import-export of fetal bovine serum. The following is a summary of his report:

USDA-APHIS-VS has the responsibility of ensuring that fetal bovine serum (FBS) imported from other countries is free of pathogens which do not exist in the United States and pose a risk to the U.S. livestock population. Since BSE has become the main disease limiting the trade of live cattle, meats and bovine products throughout the world, the limited supply of USDA approved FBS has not been able to keep up with the demand, resulting in price differences that make USDA approved FBS as much as 10 times higher than non USDA approved FBS. This price difference rewards smuggling and misrepresentation of FBS between origins, thus putting at risk the traceability and safety of “USDA approved FBS”, throughout the world. World demand is increasing steadily at approx. 4-5% per year and both supply and demand are inelastic to price.

Gamma irradiation has been used by USDA-APHIS-VS for several decades, as a method to inactivate potential pathogens in ruminant serum imported from countries known to have livestock diseases that do not occur in the United States. Importations ruminant serum have been authorized by USDA-APHIS-VS in limited quantities for developmental research and diagnostic purposes by both governmental and private institutions. Gamma irradiation is currently being used as approved treatments to eliminate potential pathogens in medical products used for both human and animal medical applications. Gamma irradiation is also authorized by USDA for the treatment of many food products of animal and plant origin. Many research laboratories and biologics manufacturers can use gamma irradiated serum from BSE free countries, especially in those applications where the absence of BSE is most critical. Currently, there are multiple companies already approved and monitored by USDA and FDA for gamma irradiation of multiple products in operation. They breakdown as follows: 20 companies in United States, 3 companies approved in Brazil, 2 companies approved in Argentina, 1 in Chile and 1 in Mexico. FBS, in small quantities, is presently imported from countries where FMD exists but is irradiated after arrival to prevent introduction of exotic animal disease. To allow the importation of larger commercial shipments of gamma irradiated FBS from countries and/or regions that are free of BSE, but have restrictions because of other pathogens that can be eliminated by gamma irradiation will help assure a reliable, affordable, safe and continuous supply of pathogen-free FBS to research laboratories and
biologics manufacturers in the United States. It will further facilitate a level of harmonization between USDA and EU requirements and reduce the economic incentive for illegal trade of FBS.

Dr. Brian Evans, Chief Veterinary Officer for Canada, Executive Director, Animal Products Directorate, Canadian Food Inspection Agency, presented “BSE…A Canadian Perspective on the North American Lessons Learned”. The following is a summary of his presentation:

The world has become highly interconnected and rapidly traversed. One nation’s problem soon becomes everyone’s national problem. BSE has become a global problem. Since 1986, BSE has been confirmed in 23 countries in their indigenous cattle populations and this number is expected to continue to increase in the years to come. In addition, 3 countries have reported imported cases of BSE. As of September 30, 2004 approximately 189,000 cases have been reported worldwide with almost 184,000 in the United Kingdom. In 2003, the annual incidence rates based on number of cases per million animals over twenty-four months of age ranged from 186.95 (Portugal) to 0.33 (Canada). In the U.K., the number of cases peaked in 1992 at 37,280 and had declined to 612 in 2003. As of July, 169 cases have been reported in 2004. The epidemiological link to new variant Creutzfeldt-Jacob disease in 1996 created significant public concern fueled by projections of 10 million human deaths by 2080. As of 2003, these estimates have been reduced to project between 40 and 500 additional cases over the next 70 years. In the face of these reduced estimates public perception has not followed suit. The Canadian experience with BSE has provided the following insights and lessons.

- Each industry’s primary market is its domestic market
- Consumer and public confidence is the foundation of rational policy making and market recovery
- Sectoral interests are both interdependent and conflicting
- Risk communication must be timely, consistent and transparent
- Emergency management is 30% pathogen control, 30% relationship management and 40% risk communication
- Emergency preparedness and response will always be more developed than recovery
- International confidence is a function of investments in surveillance, reporting, transparency and traceability
- Hemispheric alliances should be founded on international standards
- There are many kinds of science
- Export dependency increases need for investment in infrastructure, including investments in improving awareness and edu-
IMPORT-EXPORT

cation in improving and increasing domestic slaughter capacity

- Industry to industry relationships are as important as Government to Government
- Animal health and public health communities are not yet seamless
- Myths, misunderstanding and misconceptions around BSE persist
- Difficult to justify investments being made based on relative risk
- Science based measures and standards can only be as effective as the weakest human factor in the chain and the political will to implement them.
- Never say never, never say always
- Certification based on country status may be hazardous to your health

Mr. Steven G. Hennager, Serology Section, Diagnostic Bacteriology Laboratory, NVSL, presented the latest progress on the development of serologic tests for equine Piroplasmosis, Glanders, and Dourine. The following is a summary of his report:

Import equine serum samples are tested for antibodies to detect exposure to piroplasmosis, glanders, and dourine. For all three diseases the current test is the complement fixation (CF) test. The CF test has advantages in detecting acute infected animals, however the antigens are difficult to produce and the test is subject to yielding no test results on some horse sera. A new piroplasmosis competitive enzyme linked-immunosorbent assay (cELISA) has been developed and approved for use on import and export sera. This test will be implemented on November 1, 2004 at the National Veterinary Services Laboratories. The new test will have the advantage of high specificity and consistent test results. A cELISA test for glanders has been developed and the validation information has been presented for approval. Investigative studies on dourine immune response have been initiated with a view to develop a new serologic test.

Dr. Peter Fernandez, Associate Administrator, USDA-APHIS, reported on the BSE related negotiations with Japan in an effort to regain our ability to export beef, bovine semen and embryos to Japan after having been excluded from their market. He briefly outlined that initial negotiations were based on scientific foundations. Later discussions and the current agreement were based on marketing aspects, with the current agreement allowing for input and guidance from the scientific community.

Mr. David Winters, Texas Animal Health Commission, Del Rio, Texas, gave a short presentation on some of the events occurring on the Mexi-
can border. He spoke of an incident at a border crossing resulting in the death of about 20 zebu type cattle that had been dipped for ticks on the Mexican side of the border with a solution that was about double strength. He also pointed out that trucks bringing livestock into the United States were often in line for hours waiting for the x-ray techniques used by the DHS for all trucks coming into the United States. Trucks with live animals had to stay in line with all other vehicles.

Dr. George Winegar read a letter from the FDA indicating that prior notice of live animals arriving at a U.S. border point would be necessary after June 4, 2004. Discussion followed and VS representatives indicated that FDA and DHS consider that the inspections and activities of the VS port personnel would suffice. The port APHIS personnel are to be notified by the shipper or his agent prior to the arrival of the animals.

Three resolutions were approved by the Committee and forwarded to the Committee on Nominations and Resolutions for approval by the general membership. They addressed:

1) Requesting the USDA to study the feasibility of importing Fetal Bovine Serum from countries that are free of BSE but affected by other diseases such as FMD.
2) Urging USDA to communicate with DHS the need to develop a process to allow vehicles with live animals on board to advance ahead of other vehicles in line that are carrying inanimate cargo to enhance the well being of the animals and avoidance of cruelty to animals.
3) Resolution # 21 from the 2003 Annual Meeting was re-affirmed. It requests DHS-CBP to recognize that prevention of animal and plant diseases must be considered a high priority; to reconsider the de-emphasis of agriculture inspections at medium and large ports of entry and the elimination of agriculture inspections at small ports of entry; and to reassign legacy agriculture inspectors with appropriate skills as CBP Agriculture Specialists and that CBP officer positions be open to all legacy customs, immigration and agriculture inspectors.
REPORT OF THE COMMITTEE ON INFECTIOUS DISEASES OF CATTLE, BISON AND LAMA

Chair: Dr. James J. England, Caldwell, ID
Vice Chair: Dr. Howard D. Lehmkuhl, Ames, IA

Dr. Helen M. Acland, PA; Ms. Teri N. Baird, CO; Dr. Bob H. Bokma, MD; Dr. Carole A. Bolin, MI; Dr. Steven R. Bolin, MI; Dr. Bruce L. Branscomb, NV; Dr. Gary L. Brickler, WA; Dr. H. Michael Chaddock, DC; Mr. Alan R. Christian, MD; Dr. Wilber W. Clark, MT; Dr. Terry H. Conger, TX; Ms. Karen Conyngham, TX; Dr. A. A. Cuthbertson, NV; Dr. Allan L. Dewald, SD; Mr. Bob Frost, CA; Dr. Robert W. Fulton, OK; Dr. John E. George, TX; Mr. Daniel M. Goodyear, PA; Dr. Lenn R. Harrison, KY; Dr. Robert L. Hartin, OK; Dr. Burke L. Healey, OK; Mr. Del E. Hensel, CO; Dr. David L. Hunter, MT; Dr. Julie Ann Jarvinen, IA; Dr. Robert F. Kahrs, FL; Dr. Arthur J. Kennel, MN; Dr. John D. Kopec, MD; Dr. William W. Laegreid, NE; Dr. Donald H. Lein, NY; Mr. Gary R. Light, TX; Ms. Janet Maass, CO; Ms. Mary J. Marshall, UK; Dr. Peter W. Mason, NY; Dr. Donald E. Mattson, OR; Dr. J. Mark McConnon, NY; Dr. Patrick L. McDonough, NY; Dr. Robert M. Meyer, CO; Dr. Janice M. Miller, IA; Dr. Michael W. Miller, CO; Dr. Donald R. Monke, OH; Dr. Louis E. Newman, FL; Dr. Phillip A. O'Berry, IA; Dr. Steven C. Olsen, IA; Dr. Robert J. Pollard, CA; Dr. Julia F. Ridpath, IA; Dr. John A. Schmitz, NE; Mr. C. Marbury Seaman, Jr., VA; Dr. Lynne M. Siegfried, PA; Dr. Susan M. Stehman, NY; Mr. George Teagarden, KS; Ms. Susan W. Tellez, TX; Dr. Robert M. S. Temple, OH; Dr. Charles O. Thoen, IA; Dr. John U. Thomson, MS; Dr. Cheryl B. Tillman, OR; Mrs. Marsharee Wilcox, MD; Dr. Cristopher A. Young, KY.

The Committee met on October 25, 2004 from 12:30 pm to 4:30 pm. There were over 80 attendees. In the Chair’s absence, Vice Chair Howard Lehmkuhl conducted the meeting assisted by Dr. Julie Ann Jarvinen. Vice Chair Lehmkuhl welcomed the Committee members and each were given an opportunity to introduce themselves. An attendance sheet was circulated among the attendees.

Mark Wilson, United States Department of Agriculture (USDA) Animal and Plant Health Inspection Service (APHIS), National Veterinary Services Laboratories (NVSL), National Reference Center for Leptospirosis, Ames, IA presented a time specific paper entitled “Comparative Testing of Cattle Sera with Three Genotypes of Harjo.”

The project concerned a serological study to determine which of three genotypes of hardjo was best when used in the Leptospira microscopic agglutination test (MAT). A total of 2,431 sera from cattle were comparatively tested against three genotypes of hardjo. Sera were obtained from laboratories in 16 states (New York, Ohio, Florida, Geor-
REPORT OF THE COMMITTEE

gia, North Carolina, Wisconsin, Minnesota, Illinois, Missouri, Nebraska, Oklahoma, Texas, Arizona, California, Wyoming, and Washington). Samples were obtained from four geographic regions designated as: East (665 sera), upper Midwest (699 sera), lower Midwest (515 sera), and West (552 sera). Cattle sera were obtained regardless of herd status, vaccination history, breed, or age.

Of these, 1475 / 2431 (60.7%) cattle sera were negative at 1:100 for all three hardjo genotypes. Seroprevalence to one or more hardjo genotype(s) was 956 / 2431 (39.3%). Considering only the 956 positive sera, a Hardjo Prajitno (HP) titer was detected in 941 / 956 (98.4%). Fifteen sera (1.6%) had titers to Hardjo bovis A (HA), Hardjo bovis B (HB), or both, but not to HP. In contrast, HA and HB titers were not detected at 1:100 in 394 / 956 (41.2%) when an HP titer of 100 or greater was observed. If only HA or HB were used, more than 50% of all samples positive for HP would not have been detected at the 1:100 dilution. The conclusion from this study supports the use of Hardjo Prajitno as the reference strain to be used in evaluating cattle serum for hardjo antibody.

Mark Wilson then provided the Summary of Activities for the National Diagnostic Leptospiral Reference Center. During the period of September 1, 2003 through August 31, 2004, the NVSL received a total of 1,631 sera submitted for Leptospira microscopic agglutination test (MAT). Of these, 1081 were for diagnostic and 550 were for export purposes; total number of tests performed was 8,343. During this same period, clients requested and were provided 351,400 milliliters of polysorbate 80-bovine albumin medium, 240 Leptospira reference cultures, 188 vials of Leptospira reference antiserum, 242 vials of Leptospira multivalent fluorescent antibody conjugate, and 51 vials of flazo orange counterstain. Twelve people from 9 states (Wisconsin, Kentucky, Georgia, Nebraska, New York, Pennsylvania, Virginia, Minnesota, and Iowa) participated in a two-day Leptospira MAT training. Leptospira MAT training schools will also be offered in 2005 to meet incoming training requests.

Hong Li, Animal Disease Research Unit, USDA, Agriculture Research Service, Pullman, Washington presented information on A Devastating Outbreak of Malignant Catarrhal Fever (MCF) in a Bison Feedlot. MCF, a frequently fatal disease primarily of ruminant species, is caused by a group of herpesviruses. The disease is increasingly being recognized as the cause of significant economic losses in several major ruminant species, including cattle, bison and deer. Most cases in the U.S. are caused by the virus known as ovine herpesvirus 2 (OvHV-2), the sheep-associated MCF virus, which exists as a ubiquitous subclinical infection in domestic sheep. This virus, despite many attempts, has never been successfully propagated in vitro. Concerning the epidemiology of OvHV-2 within the sheep population, recent data from
our lab indicate that transmission of the sheep virus differs from the wildebeest-associated MCF virus in some significant aspects. Whereas intense viral shedding from the wildebeest reportedly occurs largely during the first 90 days of life, lambs do not begin to shed significantly until they are more than 5 months of age. The vast majority of lambs are not infected until after 2 to 3 months of age. Although colostrum and milk do contain virus-infected cells, these routes do not transmit the infection. If lambs are removed from contact with infected sheep prior to 2 to 3 months of age, lambs remain uninfected and can be raised free of the virus. This can be used as a management tool to for the production of MCF-virus free sheep. Both lambs and adult sheep are susceptible to infection through horizontal transmission by close contact. Passively acquired immunity appears not to affect the rate of infection, which seems to be simply dose-dependent. Recently we demonstrated that nasal secretions are the predominant vehicle by which OvHV-2 is shed from sheep and 6 to 9 months old adolescent sheep are the highest risk group for viral shedding. We found high levels of intact virus in sheep nasal secretions during short, intense shedding episodes and accomplished consistent transmission of MCF virus from sheep to sheep by experimental aerosolization of these nasal secretions. Recently we also established animal models, namely sheep and bison, for experimental transmission of MCF virus using a standard pool of nasal secretions obtained from sheep experiencing intensive shedding episodes, which has positioned us to pursue the development of vaccines for control of the transmission and the disease.

Dale Grotelueschen, Pfizer Animal Health, Gering, NE, made a presentation entitled, “Current Thoughts on BVD: Vaccination, Eradication and Control.” The cattle industry has recognized the need for increased levels of control for bovine viral diarrhea virus (BVDV). Organizations including the Academy of Veterinary Consultants, American Association of Bovine Practitioners, and the National Cattlemen’s Beef Association (Cattle Health and Well-Being Committee) have endorsed the need for effective BVDV control. Discussions have involved various aspects of control as well as eradication, with some resistance to targeting BVDV eradication. BVDV control can be defined as the implementation of planned strategies to maintain negative status, reduce incidence or eliminate BVDV from a unit of interest, including documentation and/or monitoring of progress. BVDV eradication can be defined as the implementation of planned strategies to eliminate BVDV from a unit of interest, including documentation of that status.

A control strategy that is embraced by all interests, including scientific disciplines, veterinary practitioners, and cattle producers is needed. Education at all levels is critical as the strategy is conceptualized and implemented. Surveillance, biosecurity and biocontainment are critical
components that require input and adoption across multiple scientific disciplines as well as by those implementing the plan. Diagnostic laboratory leadership, innovation and participation is a key component for success. Use of scientifically valid, cost effective surveillance is needed for better detection of BVDV-infected herds. Biosecurity plans include methods to prevent entry of BVDV into herds, monitoring for BVDV and persistently infected (PI) reservoirs, and vaccination to control losses if exposure occurs. Biocontainment plans focus first on elimination of PI BVDV animals and include biosecurity, monitoring and vaccination to control losses incurred by exposure.

Setting goals and objectives is critical to successful BVD control within individual herds or larger subsets of the cattle population. Goals may or may not include elimination of BVDV from a particular herd or unit of interest. There is great diversity among beef operations that are exploring and/or implementing BVD control strategies. Control plans must be effective and economically beneficial within that diversity.

Clearly, more effective strategies are needed if the cattle industry expects to achieve better control of BVDV. A comprehensive strategy for BVDV biocontainment and biosecurity is proposed.

Michaell Kutzler, Oregon State University College of Veterinary Medicine, Corvalis, Oregon presented information on West Nile Virus (WNV) in Camelids. WNV is a flavivirus that was first introduced into the United States in 1999. The natural transmission cycle of WNV is between birds and mosquitoes, but occasionally other non-avian species become infected. In 2000, the first case of WNV infection was identified in camelids and since then dozens have succumbed to a deadly encephalitis. Clinical signs of WNV encephalitis in camelids are variable and include facial and body tremors, “swan neck” appearance, hyper-excitability/depression, paresis/ataxia, colic/anorexia and fever. In fatal cases, clinical signs progress to recumbence, seizures and death, if not euthanized first. However, camelids are considered by many to be at “low risk” of developing clinical disease. Based on serosurveillance studies from 197 camelids in twelve states, the overall prevalence of WNV was 36% with a range of 0-90% seropositivity between farms. Determining the case fatality has been challenging, as few owners and veterinarians are familiar with the clinical signs of WNV camelids and routine postmortem diagnoses do not include WNV testing. The Alpaca Research Foundation has established a central data base for suspected and confirmed WNV cases in camelids, which is strictly confidential and provides funding for postmortem WNV diagnostic testing, both reverse transcriptase polymerase chain reaction (RTPCR) and immunohistochemistry. It is critical that this information is properly gathered and analyzed before the susceptibility towards WNV infection in camelids can be concluded.

The Purpose Statement for the Committee was discussed. The Committee recommended that the word “lama” be replaced with “camelids” to be more inclusive.
REPORT OF THE COMMITTEE ON INFECTIOUS DISEASES OF HORSES

Chair: Dr. Peter J. Timoney, Lexington, KY
Vice Chair: Dr. James A. Watson, Jackson, MS

Dr. Helen M. Acland, PA; Dr. Debbie Barr, CAN; Dr. Derek J. Belton, NZ; Dr. C. Carter Black, GA; Dr. Bruce L. Branscomb, NV; Dr. Jones W. Bryan, SC; Dr. Suzanne L. Burnham, TX; Dr. C. L. Campbell, FL; Dr. John A. Caver, SC; Dr. Max E. Coats, Jr., TX; Dr. Leroy M. Coffman, FL; Dr. Tim Cordes, MD; Mr. Ed Corrigan, WI; Ms. Michelle H. Davidson, CA; Dr. Dee Ellis, TX; Ms. J. Amelia Facchiano, TX; Dr. Tony G. Frazier, AL; Dr. E. Paul J. Gibbs, FL; Dr. Mary H. Giddens, OR; Dr. Nancy E. Halpern, NJ; Dr. Steven L. Halstead, MI; Dr. Nanette Hanshaw Roberts, PA; Dr. Robert M. Harbison, AR; Dr. Burke L. Healey, OK; Dr. Carl Heckendorf, CO; Dr. Sharon K. Hietala, CA; Dr. Robert B. Hillman, NY; Dr. G. Reed Holyoak, OK; Dr. John R. Irby, FL; Dr. Breitaighe Jones, MO; Dr. Ralph C. Knowles, FL; Dr. Donald P. Knowles, Jr., WA; Dr. Maxwell A. Lea, Jr., LA; Dr. Donald H. Lein, NY; Dr. Mary Jane Lis, CT; Dr. Martha A. Littlefield, LA; Ms. Amy W. Mann, DC; Dr. Patrick L. McDonough, NY; Dr. Clifford W. McGinnis, NH; Dr. Andrea M. Morgan, DC; Mr. Ky Mortensen, KY; Dr. Lee M. Myers, GA; Dr. Sandra K. Norman, IN; Dr. Don L. Notter, KY; Dr. Eileen N. Ostlund, IA; Dr. John W. Poe, KY; Dr. James Sprague, TX; Dr. Robert Stout, KY; Mr. Ward A. Stutz, TX; Dr. David Stutin, NV; Dr. Manuel A. Thomas, Jr., TX; Dr. H. Wesley Towers, DE; Dr. Susan C. Trock, NY; Dr. Charles D. Vail, CO; Dr. Taylor Woods, MO; Dr. Ernest W. Zirkle, NJ.

The Committee met on Sunday, October 24, 2004 from 12:30 pm to 6:15 pm. A total of 33 committee members and 37 visitors were recorded on the roll. Chair Peter Timoney presided assisted by Vice Chair James Watson. Committee members were recognized and given the opportunity to introduce themselves. Papers on a variety of diseases or disease related issues of topical importance were presented. The program included two time-specific papers the first of which was entitled “A Better Understanding of Non-Immune Approaches to the Prevention and Control of Streptococcus equi Infections” by Dr. John Timoney, Gluck Equine Research Center, University of Kentucky. The second time-specific paper was entitled “Equine Infectious Anemia and Control of The Disease: How Much is Enough?” by Dr. Charles Issell, Gluck Equine Research Center, University of Kentucky. The complete text of both papers are included in these proceedings.

Dr. Sabrina Swenson, United States Department of Agriculture (USDA), Animal Plant Health Inspection Service, (APHIS), Veterinary Services (VS), National Veterinary Service Laboratory (NVSL) discussed...
a paper entitled “Vesicular Stomatitis: 2004 Experience”. This year’s occurrence, which has been restricted to Texas, New Mexico and Colorado, was caused by the New Jersey serotype of the virus. Characterized by a variable clinical attack rate on affected premises, the disease has been reported primarily in horses, with significantly fewer cases confirmed in cattle and an isolated case each in a llama and an alpaca. Diagnosis was based primarily on serological findings, the competitive Enzyme-Linked Immunosorbent Assay (cELISA) being used as a screening test on suspect cases of infection and any positive samples re-tested by the compliment fixation test to establish recentness of exposure to the virus. Virus detection was attempted by virus isolation, polymerase chain reaction (PCR) and antigen-capture Enzyme-Linked Immunosorbent Assay (ELISA).

West Nile Virus (WNV) was the subject of two presentations. Dr. Katie Wetherall, California Department of Food and Agriculture, presented an overview of WNV in California for 2004. The state has recorded the highest number of equine cases of the disease nationally. Of particular concern was the higher than usual case-fatality rate in affected horses (over 40%) and under-reporting of cases of the disease from the field. The California Department of Food and Agriculture role in the outbreak included programs on awareness and education, disease prevention and control in horses and equine surveillance. Case findings to date clearly underscore the importance of vaccination as the best available means of preventing neurological disease caused by WNV. Dr. Stephanie Thompson, Merial, presented information on the development of a recombinant canary pox vectored WNV vaccine (Recombinek) and it’s safety and efficacy for use in horses. Due to host specificity, productive replication of the canary pox vector does not occur in mammalian cells; therefore stimulation antibody production directed at the virus vector does not occur. The recombinant equine WNV vaccine has been proven effective in the face of a live WNV-infected mosquito challenge. In a year-long, two dose duration of immunity study, horses were fully protected from viremia following a virulent WNV infected mosquito challenge. In a further study, 100 percent efficacy against viremia was demonstrated as early as 14 days after completion of the initial two dose vaccination series. Immunization has been shown to illicit better humoral and cell mediated immune responses in vaccinates.

Drs. Timothy Cordes and Freeda Isaac, USDA-APHIS-VS, Riverdale, MD, made a presentation entitled “Uniform Methods and Rules (UM&R) for Equine Viral Arteritis (EVA): What’s Next?” The UM&R, published in 2004 after significant input from members of the horse industry, provide a framework for states to use in developing their respective control programs against this disease. The UM&R should not be regarded as a final definitive document, it can be modified as new
scientific information and procedures become available. It was estab-
lished that the UM&R for EVA was not binding on states, implementa-
tion of what it contained could not be enforced by the USDA without
implementation of interstate regulations. Individual states should con-
sider adoption of the UM&R standards. Under terms of World Trade
Organization’s Sanitary Phytosanitary Agreement, USDA can only en-
force entry-testing requirements for EVA on stallions and imported se-
men or embryos after a domestic control program has been estab-
lished. Implementation of a testing requirement on interstate move-
ment was suggested as a possible first step in moving forwarded with
a domestic control program. It was felt that the endorsement of the
horse industry should be sought before any further action is taken.

Dr. Isaac then presented “Contagious Equine Metritis (CEM): Quar-
antine Facilities Guidelines for States and Related Issues”. At the re-
quest of a number of State Veterinarians and veterinary practitioners,
the USDA Working Group on CEM significantly revised guidelines used
to approve premises and facilities for quarantine and testing infected
stallions and mares for CEM. As a result, specific criteria were devel-
oped for the approval of premises and facilities, management, sam-
pling and inspections of mares and stallions while under quarantine.
The CEM Working Group has also been working on updating the cur-
cent CEM Regulations. As various issues are still under consideration
with respect to the diagnostic tests used to detect the carrier state in
this infection, these recommendations have not been finalized. Refer-
ence was made to the importance of monitoring horses entering the
United States under 90 day temporary import permits. The compliance
agreement that is signed between USDA and the State Veterinarian
during such events was considered sufficient to address this concern.

Dr. Isaac also made a presentation on “Equine Health Issues and
the European Union”. In the spirit of facilitating trade between the United
States and Member States of the European Union (EU), a number of
animal health working groups had been established to address spe-
cific animal health trade issues. Earlier this year, the USDA formed an
Equine Technical Working Group which had an inaugural meeting on
July 6, 2004 via teleconference with a group of EU Commission offi-
cials to discuss a range of issues of concern to both parties. Topics
addressed were; “Concerns of potential equine health issues as a re-
sult of having 10 new member states”; “Pre and post-entry testing re-
quirements for CEM and EVA”; “Standardization of diagnostic labora-
tory tests with respect to Dourine, Glanders and Piroplasmosis”;“ Pre-
embcarcation Veterinary Inspections and Certification”; ”Implementation
of CELISA for Piroplasmosis on horses entering the United States”
and “Collection of equine embryos for exportation to the United States”.
Dr. Isaac reported that this meeting was very productive and hoped
that these meetings could occur on an annual basis.
“Reclassification of Diseases by the Office of International des Epidemiologies (OIE)” was the subject of a presentation by Dr. Cordes. OIE disease classification and reporting of those diseases, has traditionally been based on criteria that delegates the disease to OIE List A or B. The new disease classification system, which will begin on January 2005, will be based on four criteria. These criteria are: ability of disease to spread internationally; zoonotic potential; significant spread in naive populations; and if it is an emerging disease. The new notification requirements will be as follows: emergency reports- within 24 hours; all endemic diseases—every 6 months; and annual reports will provide comprehensive disease outbreak and related information.

Dr. Cynda Crawford, University of Florida presented a paper on “Equine Influenza Virus Infection in Greyhounds”. What was described as a newly emergent disease of greyhounds was associated with respiratory disease of variable severity with a case fatality rate of over 30 percent in some recorded outbreaks. Epidemics of “kennel cough” had been recorded in track greyhounds in 1992, 1999, 2003, and 2004. The majority of the affected animals coughed for up to two weeks, with many dying from a peracute pneumonia. A strain of equine influenza virus was isolated from the lungs of a fatal case during an outbreak in Jacksonville, Florida earlier this year. The virus was sequenced and phylogenetically compared with other mammalian and avian influenza viruses. It was found to be genetically related to strains of equine influenza virus (H3N8) in circulation in the United States in 2002 and 2003. The canine prototype virus has been designated (Influenza A/Canine/Florida/43/04/H3N8). This year’s outbreaks of influenza virus related respiratory disease have resulted in nationwide restrictions of greyhound movements and significant loss of income from those involved in the greyhound racing industry.

Dr. Eileen Ostlund, USDA-APHIS-VS-NVSL, presented a paper entitled “Three Tiered Laboratory System for the Serologic Diagnosis of Equine Infectious Anemia (EIA)”. A Pilot Program was conducted to examine the impact of the proposed tiered laboratory system for EIA. Four states, Georgia, Iowa, Oklahoma and Oregon participated in the Pilot Program and required Tier 1 laboratories to conduct ELISA tests for EIA. Positive ELISA samples were referred to Tier 2 (State/university) laboratories for further testing. Discrepant samples were forwarded to the National Veterinary Services Laboratories (NVSL) for resolution. During the 6 months duration of the Pilot Program, approximately 60,000 samples were tested in Tier 1 laboratories. A total of 62 ELISA positive samples were referred from Tier 1 laboratories. Of these, 43 were resolved at Tier 2 laboratories and 19 were referred to NVSL (Tier 3). Twenty-four EIA positive horses were identified in participating states during the Pilot Program; of these, 4 required confirmation at NVSL.

It was estimated that the Pilot Program encompassed 6% of na-
tional testing for the time period. Feedback from participant laboratories indicated general acceptance of the ELISA method at Tier 1 laboratories. Concerns about limiting Tier 1 laboratory testing options and prevention of Tier 1 laboratories from conducting tests for international movement were expressed. Several states declined participation in the Pilot Program for the same reasons. Tier 2 laboratories noticed an increase in workload with referred samples and additional EIA testing for international movement. Additional testing of ELISA positive samples, for horses that were eventually resolved as negative, inconvenienced laboratory clients. “False positive” ELISA results were possible with all licensed brands of EIA tests. Confirmatory testing at Tier 2 and Tier 3 laboratories was required for final determination of EIA status.

Ms. Amelita Facchiano, Global VetLink, presented a paper entitled “Diagnostic Lab Connectivity and Electronic Health Certificates for Equids”. Diagnostic Laboratory connectivity with electronic health certificates provide laboratories and private practitioners with real-time record keeping, accurate epidemiology data queries for the dissemination of information relating to the diagnosis of animal diseases, animal movement tracking and trace back reports necessary for regulatory surveillance, monitoring, and control of existing, emerging and/or foreign animal diseases.

The rationale for her presentation was built upon significant accomplishments in the development and implementation of electronic health certificates and diagnostic lab connectivity since 1999 and to present the epidemiology results with electronic health certificates with diagnostic laboratory connectivity for Equine Infectious Anemia (EIA) between September 2001 and September 2003.

In 1999, the Florida Department of Agriculture and Consumer Services (FDACS), contracted with GlobalVetLink, LC of Ames, Iowa, for a project encompassing Internet applications for all species and diagnostic lab connectivity for Equine Infectious Anemia (EIA) applications necessary for animal health regulatory management.

From a time period of September 2001 through September 2003, the State of Florida produced a total of 50,114 certificates for 19,701,679 total animals. Of the total queried, the numbers represent 19,437 EIA and 2,681 Official Certificates of Veterinary Inspection (OCVI) that include diagnostic lab test results. The system is used in the export of horses to more than 47 states and 3 U.S. territories.

Tests for the 20,200 EIA applications were submitted to one (1) state and two (2) private diagnostic labs. All tests were reported Negative. None were positive, suspect or needed retest. Ninety percent were run with Agar Gel Immunodiffusion test and 10% using ELISA. The reasons for testing were: 18,834 Annual, 9 Breeding, 49 Change of Ownership, 31 Export, 274 First Test, 87 Market, 123 Other, and 51 Show.
REPORT OF THE COMMITTEE

Digital images, an additional method of identification, replace the hand drawings, are provided on the lab submittal form and are available in the lab applications should a Certified Copy be requested by a veterinarian and/or client. With diagnostic lab results and vaccination records readily available on OCVI’s, the electronic health certificates provide immediate ability to verify tests results and vaccines requires for the movement of animals.

We conclude that electronic health certificates offer the practitioners and diagnostic labs the ability to create complete and legible documents, incorporate digital images and signatures of practitioners and lab technicians, compile real time data, allow for ease of data analysis, and disseminate documents to the appropriate animal health officials with the same ease as sending e-mail. Reduction of paper work and time/cost benefits to administrative staff accomplishes the goals supported by United States Animal Health Association, which are now in national implementation stages by USDA-APHIS-VS. This project compliments the goals of the National Animal Health Lab Network (NAHLN) and their partnership with state and federal agencies to safeguard animal health and fully coincides with the National ID Plan and U.S. Animal Identification Plan (USAIP).

The EIA Subcommittee Report was presented by chair Dr. Ernest Zirkle. The EIA Subcommittee met via teleconference May 5, 27, July 15, 29, August 19 and September 9. In addition there were several sub-subcommittee calls addressing specific issue assignments. During these calls, what a National EIA Control Plan should include and how it should be enforced was discussed. The subcommittee forwarded several documents to the full Committee for review and edification in preparation for today’s Committee meeting. They included three resolutions and outcomes from the 2003 Annual Meeting:

1) Develop a proposal for National Control Program based on a nationwide census. USDA and the EIA Subcommittee have developed that proposal and are recommending a resolution to implement it.

2) Laboratory system for serologic diagnosis of EIA. A pilot study was implemented by USDA. Dr. Eileen Ostlund reported on that at this meeting.

3) Two year moratorium on training for new EIA laboratories. USDA implemented the moratorium November 17, 2003.

The EIA Subcommittee also distributed the following documents to the full Committee: Draft EIA National Control Program; EIA National Control Program, Cost/Benefit Analysis based upon 5 regions; Equine Ag. Census, 2002 as compared to EIA tests 2003; Draft Resolution requesting implementation of National EIA control program; and Draft Resolution requesting implementation of eEIA (electronic EIA) connectivity to those laboratories who desire it.
INFECTIOUS DISEASES OF HORSES

Following the scientific program, the committee considered and approved the report of the activities of the EIA Subcommittee. In addition, three (3) resolutions were approved by the Committee and forwarded to the Committee on Nominations and Resolutions for approval by the general membership. They addressed:

1. Enhancement of USDA’s data gathering program for outbreaks of infectious diseases of horses and sharing that information with stakeholders and state animal health officials;
2. Providing laboratory connectivity to states for the electronic Equine Infectious Anemia application; and

The following is the “Proposed Three Phase Plan for Implementation of a National State-Federal Cooperative Program for the Control of EIA,” as reported by EIA Subcommittee Chair Zirkle.

PROPOSED THREE PHASE PLAN FOR IMPLEMENTATION OF A NATIONAL STATE-FEDERAL COOPERATIVE PROGRAM FOR THE CONTROL OF EIA

E. Zirkle, Fairton, NJ

Introduction:

This document describes a proposed National State-Federal Cooperative Equine Infectious Anemia (EIA) Control Program. The goals of this program are to, without the burden of additional regulations, (a) reduce the overall national prevalence of EIA and (b) reduce the imposition of required EIA testing. Under this plan, EIA test requirements for equine movement will be standardized, simplified and, in some cases, eliminated; allowing greater freedom of movement while reducing the risk of being exposed to equidae of unknown EIA status. These proposed changes will reduce the overall cost of EIA control – a change that will be reflected in reduced expense across the equine industry. The Program proposal calls for a three-phase implementation with an open time frame. Phase One establishes EIA Risk Zones within the U.S. based on incidence levels derived from historical EIA testing records; Phase Two refines the Risk Zones and risk management as improved equine census and disease prevalence information becomes available; and Phase Three further develops the program, and its utility to the industry, through the development of a voluntary EIA Certification Program partially supported by Federal funding. This Program will reward equine owners who test and have historically tested their animals with reduced costs, increased ease of movement, and protection from punishment for the untested and non-commingled EIA reservoir equidae in their region.
REPORT OF THE COMMITTEE

Assumptions:
- There are two major goals of our efforts: to develop a proposal for a National EIA Control Program and to expedite testing according to risk
- Industry support for development of a National Control Program exists
- APHIS already considers EIA a Program Disease and can modify the program easily
- An adequate system of equine ID will be forthcoming under the auspices of the Equine Species Working Group (this will facilitate all control efforts)
- The National Control Program must be based on assisting states/regions to be successful

Perspective:
- Certification for control of EIA virus transmission must be based on good science
- Movement from an EIA-free facility in a low risk region to a lower risk region should be seamless
- Knowledge of each equid is needed to accurately assess the risk
- The UM&R for EIA is a good starting point for development of certification schemes
- Cost benefit analyses indicate savings in excess of $10,000,000 per year to owners if “test-by-risk” regional testing plans are implemented (see the attached COST-BENEFIT file)
- Testing the National Animal Health Management Services (NAHMS) Equine 98 serum bank might provide useful unbiased data about the national prevalence of EIA (please see the NAHMS serum file attached)
- To encourage cooperation between states and within regions where possible.

Points:
- To support and participate in any meaningful control program, states would need:
  1) Authority to require testing of exposed equine. This would include those determined to be at significant risk epidemiologically
  2) Authority to control movement of test positive and suspect animals by use of ‘hold orders’ or ‘quarantines’
  3) Authority to conduct necessary epidemiologic investigations
- Case rate determinations must be based on accurate or reli-
INFECTIOUS DISEASES OF HORSES

1) Current numerators (numbers tested) reflect the numbers of tests conducted and do not directly measure the number of individual animals tested. A more accurate number will depend on the development and implementation of a unique Equine Animal ID system so that case rates represent the proportion of individual animals affected. Whatever figure(s) are offered for use must provide information about how they were derived and describe the strengths and weaknesses in the method used to generate the numbers.

2) The denominators used to determine case rate estimates must likewise include descriptions of how they were generated and the strengths and weaknesses of the methods used. For this item there may be a variety of sources including USDA, National Agriculture Statistical Service data, state generated data or industry-developed figures used in arriving at the figure. Denominator estimates should also include a measure of error or confidence.

• Industry backing must exist to support the level of control desired
  1) This item considers the backing that the horse industry provides (philosophical, personnel, financial) to assist in monitoring compliance with regulations. Examples range from a group of lay people trained and authorized by the state to monitor testing requirements at congregation points to an EIA oversight committee formed by the state horse council to work with the state veterinarian.
  2) A determination of the level of participation/oversight as provided by the industry, state veterinarian and animal disease regulatory body is especially critical when test-positive equids are found, e.g., providing sufficient manpower to perform the epidemiologic analysis needed to identify the source and to follow contacts.

• Epidemiology investigations must be complete for full participation in the program - How complete are the investigations when test-positive equids are found? This point is considered critical to the success of a program and is covered under “authority” above. Today, this may be inversely related to incidence

• Movement of equids within and between areas is complex but manageable
  1) This is the most complex issue to consider, as the movement history of each individual must be tempered by the status of each equid encountered in the 60 days before
REPORT OF THE COMMITTEE

the move. Thus, if the equid moving has only been in an “EIA-free facility” for the 60 days, movement to any area should be facilitated.

2) In the absence of complete testing data, movement should be constrained according to the regional estimates (testing required when moving to an area of lower risk). Several scenarios are presented below as examples of movement within and between Risk Areas under several levels of testing.

3) The movement column requires additional individual definition, not just region-wide restraints. We must develop a means for rewarding those owners who have tested and not punish them for the incidence in the untested and non-commingled reservoir in their region. Thus, the designation and definition of EIA-free equid, facility, community etc. becomes important.

4) Once such entities are agreed to, then movement from low to high-risk areas and back again becomes refined according to the contacts encountered while in the high-risk area. For example, a horse moving from New York to an EIA-free facility in Louisiana (a closed, controlled race-track) can move back to New York without testing. By contrast, the New York horse moving to Louisiana and encountering horses on trail rides where testing is not required or not monitored, requires a retest and a quarantine period of up to 60 days is recommended. We will need to develop practical ways to deal with the multiple combinations to accommodate movement between situations according to risk.

An example of movement within zones with “A” being the lowest risk and C the highest follows:

<table>
<thead>
<tr>
<th>From Proposed Area</th>
<th>Proposed Movement</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Free within A, B and C</td>
</tr>
<tr>
<td>B</td>
<td>Free within B and C [Free within A, B and C (if certified free)]</td>
</tr>
<tr>
<td>C</td>
<td>Free within C [Free within A, B and C (if certified free)]</td>
</tr>
</tbody>
</table>

Number of Risk Designations:

This proposal recommends that the U.S. be separated into 5 regions or Risk Areas based, in part, on the previous ten year testing data. The relatively overtested Northeast U.S. nine states plus Alaska and Hawaii comprised Risk Area A. The states with historical data (ten-year averages) showing the highest rates, namely Louisiana, Texas, Oklahoma and Arkansas, comprised Risk Area C. The other 35 states have similar historic rates and we suggest they form 3 regions already extant within the USAHA organization. Thus B1, B2 and B3, are South-
eastern, Central, and West, respectively. These Risk Status assignments are the first step in establishing a National Control Program for EIA. We wish to foster viable cooperative programs between states and with the USDA. Thus, we prefer to wait until census data are compiled and real prevalence estimates can be made with accuracy before defined borders for the Risk Areas are established in cooperative programs between states and the USDA. Therefore, we consider it prudent to establish 5 zones initially.

Risk Areas (presented in the following map): (A) North East (plus Hawaii and Alaska), (B1) South East, (B2) Central, (B3) Western, and (C) South Central

Once the population estimates (census) are available, we can further define the parameters of risk within each of the areas, a point where “industry support” and “epidemiology” become important considerations.

Other considerations:

A future voluntary certification program (see Phase 3) would be a subordinate part of a comprehensive National Control Program as opposed to preceding the development of a control program. Currently, if supported by the states’ equine owners, individual states may choose to participate in “multi-state regional EIA arrangements” based on state assessments of EIA risks. The future certification effort should be based on devising a means of industry and state approval for a practical way to designate an “EIA free equid”, an “EIA-free facility” and so forth on which to base a rational plan for EIA control. This type of planning is consistent with the “Health Assurance Program” certification schemes in New York State.

An overriding consideration for our efforts should be the convincing evidence that owners in many areas of the country are “overtesting” for EIA according to the risk. It is agreed that testing at a lower frequency today (maybe every 2nd or 3rd year vs annual) would not increase the risk of acquiring EIA in many areas of the country. Therefore, encouraging regional efforts for control of EIA should be in the best interest of all involved parties.

Based on the above points, the EIA Subcommittee recommends the following Three Phase EIA Control Program with immediate implementation of Risk Areas A-C to facilitate early discussions between states within each Risk Area to take advantage of the projected savings to their industry.

The EIA Subcommittee recommends prompt review of population estimates and participation in a nationwide census to obtain population numbers with sufficient confidence to permit accurate estimation of the percentage of resident equids tested in each state over the last 3 years. These data will then be used to obtain accurate estimates of
the expected prevalence of EIA in contiguous states within Risk Areas. These data will be used to design tailored control efforts within states and to refine risk estimates between states. Once those data are accumulated and analyzed, refinements based on industry support and epidemiologic investigations will have meaning and relevance.

**Phase One Implementation:**
Phase One would utilize the cost-benefit analysis for a proposed National Control Program for EIA based on risk status assessments from prior years testing. These risk status assignments would divide the nation into 5 Risk Areas with no separation according to quantifiable information derived from a census (enumeration) or from “industry support” and “epidemiology”, as they do not seem to be appropriate. If this plan is adopted by states within the Risk Areas and “test-by-risk” plans are implemented, it is estimated to result in savings in excess of $10,000,000 per year to horse owners, while not increasing risks of EIA. We feel strongly that dividing the 35 mid-risk states into 3 sub-regions along the USAHA regional zones (Western, Central, South eastern) will facilitate discussions and tend to build better interstate regulations and/or cooperation.

**Phase Two Implementation:**
Phase Two would be developed once quantitative information (census, enumeration estimates) becomes available to calculate, within defined confidence limits, the ability of the state to accurately assess the true prevalence of EIAV infections within their jurisdiction. This sound knowledge can then be used to refine/define appropriate levels of EIA
Control and activate different levels of support from the USDA in a Certification Program (see Phase 3 below).

**Phase Three Implementation:**

Phase Three would involve the development of a voluntary EIA Certification Program. Should individual states elect to participate, two outcomes of such a program could logically follow:

- **Equivalency**—It would provide for states of equal certification status to implement the appropriate legislative/regulatory measures to move horses without EIA testing across borders to states and/or regions of equivalent status (regionalization).

- **Funding**—It would provide USDA funding for states/regions wishing to improve their certification status. Foremost, funding would be for a state or federal veterinary medical officer (VMO) assigned full-time to specific state/regional EIA programs in the form of salary, benefits, and travel expenditures. Such designated EIA Program VMO’s would define and develop testing, epidemiology and industry support for EIA programs in individual states/regions specifically to the needs of that area. Additionally, money would be available for educational materials and research. A proposed budget has already been designed and is ready for presentation to the VSMT once the industry supports the endeavor.

**EIA Regionalization Program: Benefit-Cost Analysis**

A regionalization scenario for EIA in the United States was proposed by the USAHA-EIA Subcommittee (Figure 1). The Subcommittee distinguished between three classifications of risk for the disease in the United States. The area of highest risk is comprised of the states of Texas, Oklahoma, Arkansas, and Louisiana. The area of lowest risk consists of a collection of the northeastern states, Hawaii, and Alaska. The remaining mid level risk states are located in the West, Central, and Southeast of the United States. For purposes of the regionalization program, these latter mid level risk states are divided into three subregions.
The following assumptions are made in this benefit-cost analysis of the proposed regionalization scheme.

- Reducing Federal and State requirements for EIA testing will cause horse shows and/or gatherings in the lowest and mid risk areas to reduce their EIA testing requirements without increasing the risk of EIA spread.

- In contrast to the current pattern of testing which requires horses be tested in their home states on a periodic basis, the certification program as proposed here would direct testing toward a pattern of testing horses as they move out of the highest risk areas into the mid and lowest risk areas. It is assumed that this testing will take place recognizing appropriate waiting periods for serological detection from time of exposure without the need for regulatory imposition of quarantine.

- Any unusual periodic increase in EIA positive tests in the mid risk area will be addressed by temporary reclassification as an area of highest risk and the reinstatement of locality based testing for within state gatherings.

- EIA testing at all changes of ownership will continue to be standard practice in all areas of the United States. The results of this testing would be employed in a continuing surveillance program for detection of EIA. A sample of 3,000 tests would be required for each area in order to detect 0.1 percent prevalence of EIA infection with 95.0 percent confidence. A sample of 4,600 tests would be needed in order to detect infection at the same prevalence but with 99.0 percent confidence.

- The National Animal Health Monitoring System (NAHEMS)
INFECTION DISEASES OF HORSES

Equine98 study estimates for management practices are frequently in terms of percent of operations rather than in terms of percent of horses. For purposes of this analysis, the NAHMS Equine98 database was used to generate new horse-level estimates of reasons for EIA testing and reasons for equine movement.

- States already joining together with other states to form areas for recognition of EIA testing continue to operate as areas. An example of such an arrangement is the cooperative agreement between the states of Oregon and Washington. Expansion of these areas is also considered desirable under the scenario examined here.

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Lowest Risk, Mid Risk, Highest Risk Scenario with 5 regions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regions</td>
<td>South</td>
</tr>
<tr>
<td>Risk</td>
<td>High</td>
</tr>
<tr>
<td>Number positive, 2003</td>
<td>159</td>
</tr>
<tr>
<td>Number of tests, 2003</td>
<td>432,753</td>
</tr>
<tr>
<td>Number of horses, 1999</td>
<td>905,000</td>
</tr>
<tr>
<td>% show testing within state</td>
<td>31.9%</td>
</tr>
<tr>
<td>% interstate test</td>
<td>12.7%</td>
</tr>
<tr>
<td>% moving &gt;500mi</td>
<td>17.1%</td>
</tr>
<tr>
<td>Tests Avoided</td>
<td>413,851</td>
</tr>
<tr>
<td>Tests Added</td>
<td>38,280</td>
</tr>
<tr>
<td>Net Savings</td>
<td>$11,139,751</td>
</tr>
<tr>
<td>Tests Remaining</td>
<td>432,753</td>
</tr>
</tbody>
</table>

South - Arkansas, Texas, Louisiana, Oklahoma

West, Central, and Southeast - all other states

NAHMS Equine 98 estimates found here use horse weightings rather than operation weightings.

Table 1 contains 1999 equine population estimates from NASS and 2003 EIA testing data for the lowest, mid, and highest risk classifications as shown in Figure 1. Using these classifications, horses in the highest risk area would continue to be tested as is currently the prac-
tice for horse shows and gatherings, sale, surveillance, and interstate movement. Horses in states with the mid-risk classification would be required to test for sale purposes and for interstate movement. Horses in states with the lowest risk classification would only be required to test for sale purposes. Any horses which enter states classified as highest risk from states in the lowest risk area would need to be tested in order to return to states of lowest and mid risk.

For the West and the Northeast regions of the United States as defined by the NAHMS Equine98 study, analysis of the NAHMS Equine98 survey data indicates that operations representing 31.9 and 60.8 percent of horses, respectively, gave within state show requirements as the primary motivation for EIA testing. For the Northeast, interstate testing requirements accounted for 12.7 percent of the responses. The remainder of the operations cited within state change of ownership, international movement, for personal knowledge, and veterinary recommendation due to equine illness, and other as their primary motivations. If EIA regulatory testing requirements for movement of horses to shows within lowest and mid risk states and requirements for testing for movement out of states considered to be of lowest risk are reduced, the percentages of horses testing is assumed to decline. Using the NAHMS Equine'98 estimates on primary motivation of operations for EIA testing, it is assumed that 31.9 percent of testing in the mid risk area and 73.5 percent of testing in the lowest risk area would no longer take place. This would mean a reduction of an estimated 582,785 EIA tests at a cost savings of approximately $14.4 million annually, if valued at $24.65 per test.

However, EIA testing in the highest risk area would be expected to increase above current levels due to horses having entered the highest risk area from the lowest risk area, desiring to return to the lowest risk area as well as for any flare up of EIA in the mid risk area. Again from the NAHMS Equine98 study, estimates provided that 17.1 percent of horses in the NAHMS Equine98 Northeast region were on operations that moved their horses a distance of 500 miles or more. If this percentage is applied to the equine population in this region, an additional 92,588 tests would need to be performed assuming these equine movements beyond 500 miles are into the highest risk area with the intention of returning to lowest or mid risk areas. These additional tests would offset the earlier reductions in costs by $2.3 million annually. In order to account for the costs of additional testing during flare ups of EIA in mid risk areas, the average equine population for one state of 120,000 is multiplied by the percentage of horses on operations which reported testing for shows within state of 31.9 percent and the per test cost to obtain an additional testing cost increase of $0.9 million annually. This assumes one anomaly outbreak of EIA in one state per year in the mid risk area. Taken together, the net benefits
of the regionalization scheme then would be $11.1 million, or $14.4 million in decreased testing costs minus $3.2 million in increased testing costs.

If states in the mid risk zone are able to be further regionalized such that requirements for interstate testing can be reduced within mid risk subregions, there would be additional savings from decreased EIA testing.

Continued testing of samples within the lowest risk area due to change of ownership and continued testing of samples within the mid risk areas due to change of ownership and interstate movement would be more than sufficient to continue surveillance for detection of EIA in these areas at 0.1 percent prevalence of EIA infection with 99.0 percent confidence.

Administrative expenses of this option have been estimated at $240,000 per year in the form of one full time Federal staff position plus expenses. These administrative costs as well as costs to the horse owner would be expected to increase substantially should testing upon exit from the highest risk area require regulatory enforcement of quarantines. Should such enforcement and owner costs reach only $120 per horse for the 92,750 horses involved, the net savings of $11.1 million from regionalization would be entirely offset by quarantine expenses.

In terms of the distribution of the benefits and costs of the proposed testing changes for EIA, horse owners in the lowest and medium risk areas, particularly those who do not move their horses into the highest risk zone, would enjoy an overall reduction in testing costs. Those who move their horses into the highest risk zone and then return to lowest or medium risk areas would incur testing costs similar to those of the past. The Federal government would be increasing its outlays by $240,000 annually in order to administer a new program. Because of the large benefits to horse owners of this option, it might be possible to consider channeling some of the savings from testing toward indemnifying or paying sanctuary costs for animals testing positive for EIA in the high risk zone, thus also achieving a reduction of risk of disease to the entire industry.

Summary:

Implementation of the proposed regionalization scenario for EIA indicates savings of $11.1 million to the horse industry from an overall reduction in testing. It is clear from this initial analysis, however, that the choice of regionalization scheme and its administrative costs have a marked impact on the estimation of costs and benefits of moving away from the current program.
REPORT OF THE COMMITTEE

CEAH contributors to this report include Ann Hillberg Seitzinger, Josie Traub-Dargatz, Al Kane, Lindsey Garber, George Hill, Bruce Wagner, John Green, and Ziad Malaeb.

EIA AND EQUINE INVENTORIES - 2/18/04
J. Trabu-Dargatz, L. Garber and G. Hill
Center for National Animal Health Surveillance (CNAHS)
Fort Collins, CO

This summary was prepared at the request of Drs. Tim Cordes and Chuck Issel for use by members of the Committee on Infectious Diseases of Horses.

The attached spreadsheet includes demographic data from the 1997 Agriculture Census and the January 1, 1998 and January 1, 1999 NASS inventories as well as historical EIA test data. The spreadsheet calculations use the NASS January 1, 1998 equine inventories to measure the coverage of the number of official EIA tests performed. Assuming the equine inventory has not changed over time, the number of EIA tests corresponds to 30.6 percent of the equine population in 1999, 33.7 percent in 2000, and 37.4 percent in 2003. If inventories have increased, the 2003 figure is estimated to be high by 2 to 3 percent. The conclusion from these data is that the US consistently tested about one third of its equine population between 1999 and 2003. This estimate of percent of horses tested for EIA in the U.S. is similar to NAHMS Equine '98 study estimate of 35.6 percent.

At the State level the number of tests performed relative to the equine population vary widely. Some States test a small percentage while others do a lot of testing. Examples include:

- <10 percent tested (6 States) AZ, CT, HI, ID, OR, WA
- =10 and <20 percent tested (6 States) CA, IA, KS, MT, NE, SD
- =70 percent tested (9 States) AR, DE, FL, GA, KY, MD, MO, NH, RI

While currently available inventory numbers of equids are adequate for a general comparison to number of EIA tests as was done in the NAHMS Equine '98 study, they are not adequate to enable Veterinary Services to perform up-to-date equine health monitoring activities. If the EIA program moves forward with a certification program, USDA needs to estimate the number of equids and the number of operations with equids at least every 5 years. Extrapolations from Census of Agriculture data which exclude horses located off of farms, or an estimated 39.1 percent of the equine population, will not accurately reflect equine population demographics. Because this estimation effort will require NASS list building efforts in the ag-urban sector, it will be expensive. Therefore, it may be advisable to request NASS and CEAH to look at the most cost effective scheme for equine estimation/enumeration.
EIA AND USE OF NAHMS EQUINE’98 SERUM BANK -
2/6/04
J. Traub-Dargatz, L. Garber, and G. Hill
Center for National Animal Health Surveillance (CNAHS)
Fort Collins, CO

This summary was prepared at the request of Drs. Tim Cordes and Chuck Issel for use by the members of the Committee on Infectious Diseases of Horses.

The following issues relate to use of the NAHMS Equine ’98 serum bank for estimation of prevalence of EIA infections regionally and nationally.

There are approximately 8,000 sera from just over 900 operations in 28 States banked at NVSL from the NAHMS Equine ’98 study. The operations include those with three or more resident horses as of spring 1998.

Since the national prevalence of test-positive equids is quite low, enough positive animals may not be found in the serum bank to make reliable regional estimates. For example, if the prevalence of EIA-positive horses in the serum bank is equivalent to the national prevalence in 2003 (approximately 0.01 percent), there would be only 1 positive sample in the serum bank of just over 8,000 samples. In addition, the samples represent about 900 premises which, given an expected low herd-level prevalence, makes it likely that no or very few positive premises will be in the sample. If the prevalence of test positives is higher in the serum bank samples, then using the weighting system for the biological samples as was applied to all of the NAHMS Equine ’98 data might allow creation of regional estimates. No State-by-State estimates of the prevalence of EIA would be possible.

To consider using this serum bank for the purpose of looking back in time regarding the prevalence of EIA-positive animals, the following would need to be kept in mind:

- NAHMS study data does not include a life-long history of individual horse movement, so for a given horse we could not say where it was exposed to EIA, only where it was when it was tested as part of the NAHMS Equine ’98 study.
- Support must be gained for testing, e.g. from the horse industry, from State Veterinarians and AVICs from the 28 States in the study, and from a national representative of the equine industry.
- The horses included in the NAHMS Equine ’98 study are more likely to represent the general equine population than do those now tested routinely for EIA, e.g. those that show or move
REPORT OF THE COMMITTEE

interstate. Thus, the prevalence of EIA among the horses sampled as part of NAHMS Equine’98 may be higher than that officially reported. Decisions need to be made in advance as to how to deal with this outcome if it occurs. A higher prevalence may be due to several factors. As the same horses year after year are in the EIA testing program, the prevalence of test-positive animals would go down, as positive animals are generally not retested in subsequent years.

- An agreement would have to be in place so that there would be no trace back of positive animals.
- There would have to be adequate funding for the serologic testing and a laboratory identified to do the testing. The test to be used would have to be agreed upon by all stakeholders.
- This serum bank represents a valuable asset that we must use judiciously.

This retrospective look could give us a bench mark for any future studies of EIA prevalence studies. There is a large amount of information available based on the NAHMS Equine ‘98 study that could be matched to these sera including but not limited to information on individual horses, such as signalment (age, sex, and breed). There is also information available for the premises or operations on which the horses resided, including location and management aspects, such as information about observation of insects, methods of insect control, proximity to surface water, and movement of horses on and off the operation.
Strangles is among the 3 most significant respiratory diseases of the horse throughout the world. Although the causative organism, Streptococcus equi of Lancefield Group C, is highly host adapted, rarely shows antigenic or other variation, survives only briefly in the environment, and is susceptible to most commonly used antibiotics, it nevertheless maintains its place as an ubiquitous and much feared equine pathogen. This reflects its ability to efficiently transfer, infect, and subsequently establish a carrier state in a small proportion of recovered horses. Perhaps of greater importance, however, is the inherent mobility of its host. In an era of rapid transportation, a S. equi infected horse may travel between hemispheres in less than a day and then initiate an outbreak of strangles thousands of miles from its farm of origin.

A high level of immunity to reinfection is generated in 70 to 80% of recently infected horses, a level much superior to that following vaccination with heat inactivated S. equi or with adjuvanated protein-rich extracts. The disappointing efficacy of these vaccines has forced a reliance on identification and separation of infected animals and interruption or reduction of direct or indirect transmission during outbreaks as a means of reducing the occurrence and impact of infection.

Environmental Survival. Older reviews, e.g. Stableforth and Galloway (1959), cite earlier studies that indicated that S. equi remained viable in pus for weeks. More recently, Jorm (1992) noted survival for up to 2 months on previously disinfected wood and glass at 2°C and 20°C. In our studies of S. equi CF32 in local soil (Lexington, KY), horse feces and in water, we have observed survival in soil and feces for less than 3 days. In sterilized feces, viable S. equi were detectable for 14 days suggesting a potently hostile effect of the fecal flora. Survival in water was detected for up to 40 days when a total die-off occurred similar to that noted by Jorm. Thus, drinking water and its container is potentially an important source of S. equi during an outbreak since nasal discharges from affected horses are certain to enter as they drink. Daily disinfection of the water trough is essential to minimize transmission during an outbreak.

Shedding of S. equi and its detection. Most horse farms enjoy extended periods of freedom from strangles, a situation that would not be possible were S. equi to survive for long periods in the environment or to be shed persistently by carrier animals. Nasal shedding begins 2 to 3 days after onset of fever and persists for 2 to 3 weeks for some but not all animals. Shedding from ruptured mandibular abscesses is very brief as the abscess cavity is quickly invaded by S. zooepidemicus.
Horses which develop empyema of the guttural pouch may continue to harbour viable *S. equi* for a year or longer. Shedding is intermittent and some shedder animals may have a unilateral nasal discharge or soft cough. Although transmission between guttural pouch carriers and susceptible horses has not been demonstrated experimentally, herds of horses in which these carriers have been identified and treated have become disease-free.

Culture on Columbia CNA blood agar remains the ‘Gold Standard’ for detection of *S. equi*. Nasal swabs are more convenient but less sensitive than nasal washes in detection of nasal shedding. Since shedding is usually not detectable until a day or two after onset of fever, daily monitoring of rectal temperature facilitates recognition and isolation of new cases to limit further transmission. A polymerase chain reaction (PCR) based on the *SeM* gene, a sequence specific to *S. equi* is about three times more sensitive than culture (Timoney and Artiushin, 1997). However, it does not distinguish between dead and live organisms. Culture accompanying PCR on a nasal swab/wash is used in control programs to select animals for guttural pouch endoscopy (Newton, *et al.* 2000). Since PCR is capable of detecting *SeM* DNA in guttural pouch lavages for weeks following disappearance of live organisms, culture should always be performed on samples positive by PCR. The cost of guttural pouch endoscopy precludes its widespread use as a tool in routine detection of chronically infected horses in herds experiencing a protracted outbreak, or with unexplained periodic recurrences. It is usually selected for animals identified by initial screening of nasal swabs by culture or PCR or that have an unexplained unilateral nasal discharge.

Detection and segregation of shedding animals during an outbreak is also of value in reducing transmission. Experimental data have shown that the greater the number of challenge organisms administered intranasally the shorter the incubation period and the more severe the disease that results. Observations during outbreaks indicate that the clinical attack rate, mortality, number of lymph node abscesses and complications such as purpura, guttural pouch empyema, and lower respiratory tract involvement are more frequent in outbreaks where there is overcrowding and lack of space to quarantine sick horses (Sweeney, *et al.* 1987).

*S. equi*-free status is eventually attained by most herds following a strangles outbreak, and is a consequence of clearance by a competent host immune response, poor environmental survival of *S. equi*, a low frequency of carriers and intermittent shedding by these carriers. Thus, large geographic areas, even countries, e.g. Argentina, Japan, Ireland, have been strangles-free for long periods during the past century.

*Future Research.* Besides a need for safer, more effective vaccines
to aid in prevention, control and management of strangles outbreaks would greatly benefit from the availability of a rapid, inexpensive horse-side test for detection of nasopharyngeal shedding of \textit{S. equi}. Progress in the identification of its unique antigens suggest that such a test is feasible.

**Bibliography:**


REPORT OF THE COMMITTEE

EQUINE INFECTIOUS ANEMIA AND CONTROL OF THE DISEASE: HOW MUCH IS ENOUGH?

Drs. C. J. Issell and S. J. Cook, Gluck Equine Research Center, University of Kentucky, Lexington, KY

Summary

The accuracy of serologic tests for equine infectious anemia (EIA) is the foundation upon which control strategies against this persistent lentivirus infection of equids have been built. The agar gel immunodiffusion (AGID) test for EIA developed in 1970 has been regarded internationally as the gold-standard serologic test for EIA. Statistics gathered by the United States Department of Agriculture (USDA) since 1972 document over 100,000 positive tests/equids and clearly document the progress made in reducing the numbers of positive equids found annually in the United States. Today, using test kits in AGID and enzyme linked immunosorbent assay (ELISA) formats, we expect that less than 0.02% of the 2,000,000 tests performed in a year will be positive. Testing for EIA and subsequent regulatory actions on test-positive equids has reduced significantly the threat of encountering EIA virus. With the huge successes in reducing the incidence of EIA in the mobile and tested population, what are the prospects for further improvements and at what costs? This presentation will focus on two areas where modest changes could assist in delivery of more accurate testing at a lower cost to the industry.

The first change would move testing toward a three-tier laboratory system advocated by the Committee on Infectious Diseases of Horses of the United States Animal Health Association (USAHA) where ELISA tests would be the preferred primary test. This system is advocated because ELISA tests are more sensitive than AGID tests in detecting antibody against EIA virus (EIAV), and ELISA test results are more objective than AGID test results, i.e., less affected by interpretation. If our analyses are correct and if the new system is adopted, accuracy of negative EIA test reports would be higher than today as the majority of errors appear to be false-negative AGID reports. These are most likely associated with samples with less intense AGID test-reactions, i.e., where a line of identity with the reference positive serum does not form, and where accurate interpretation is critical. In the vast majority of these cases ELISA test results are unequivocally positive.

The tradeoff for adopting the ELISA test formats as the primary test for EIA is the complication introduced when the initial positive ELISA test results are not confirmed by AGID testing. In the majority of these cases we would expect that additional testing, e.g., immunoblot, would fail to show recognition of viral proteins or would show recognition of no more than one viral protein, indicative of a false-positive ELISA test result. In other cases, multiple viral proteins would be recognized and
would indicate a false-negative AGID test result. We argue that at this stage in the control of EIA, it is preferable to have resolvable laboratory problems associated with occasional false-positive ELISA results than to release false-negative AGID horses to move and mingle freely. It is probable that such equids have helped perpetuate EIAV in the past.

In reviewing the data, it is clear that the power of a negative ELISA test result for EIA is greater than that of the negative AGID test. This fact should be recognized as such by international groups, e.g., placed in the “prescribed” diagnostic test group rather than “alternative test” group by the OIE (World Organisation for Animal Health) standards commission, and negative ELISA tests for EIA accepted for import by all nations. For the proposed three-tier laboratory system to function, equids with negative ELISA tests for EIA must be allowed to move freely; intrastate, interstate, and internationally. Today, only AGID tests have universal acceptance.

Testing has been required by many jurisdictions for movement on public roads, for congregations, for interstate travel, for change of ownership, et al. In two states, Louisiana and Arkansas, annual testing is required of all equids. The costs for EIA testing have been borne by owners and annually are estimated at greater than $50,000,000. Thus for the year 2003 when 273 positive equids were reported nationally, over $180,000 was spent to find each. In areas where EIA test-positive horses are rare, the average testing costs to find each positive is even higher; e.g., in the northeastern states over the last 3 years owners expended about $1,000,000 to find each positive. When such expenditures are reviewed critically, it is evident that testing should be applied more in line with risk, especially to deliver testing to those who have eluded surveillance testing to date, i.e., the so-called untested reservoir.

The second change utilizes projections by the USDA that indicated regionalization and reduced testing in low risk areas could dramatically reduce testing costs to the industry without increasing the risk of acquiring EIA. When coupled with increased accuracy of testing, the risk of acquiring EIA could be further reduced. An improved control program for EIA at a lower cost to the industry seems intuitive and overdue. We urge adoption of a national program utilizing the three tier laboratory system.

**Historical aspects**

Prior to 1970, EIA was a disease feared by veterinarians and horse owners because of its capacity to spread between horses without control because no practical and accurate diagnostic test was available. Today, the accuracy of serologic tests for EIA forms the basis for effective control strategies against this persistent lentivirus infection of equids. The AGID test for EIA developed in 1970 by Coggins and Norcross1
has been regarded as the gold-standard serologic test for EIA. The wide international acceptance of the AGID test was garnered because of the excellent correlation of AGID test results and horse inoculation tests for detection of EIAV using 250ml transfusions of whole blood. Guidelines for the control of EIA were drawn up by an inclusive industry and veterinary group led by the Committee on Infectious Diseases of Horses of the U.S. Livestock Sanitary Association (now the U.S. Animal Health Association) in 1966, adopted in 1967, and increased in scope in 1974 with an outline for an EIA state control program once the AGID test proved effective in detecting EIAV-infected horses.2 The guidelines have stood the test of time and were recently expanded as the Uniform Methods and Rules for the control of EIA promulgated by the USDA (issued first in 1998 and revised in 2002). These can be accessed from the USDA website http://www.aphis.usda.gov/vs/nahps/equine/eia as “UMR(PDF)”. An appreciation of the changing role of EIA to the horse industry can be gleaned by review of testing statistics since 1972. The database of statistics on EIA testing compiled by USDA-Animal and Plant Health Inspection Service (APHIS) can be accessed through the following web site: http://www.aphis.usda.gov/vs/nahps/equine/eia/web-mapping/Main.htm. When testing was first available, veterinarians often focused their testing on facilities where known or suspect cases had resided. The result was often the discovery of a high rate of reactors, many of which were inapparent carriers of EIAV. Even though the testing was biased toward positive initially, and today is biased toward negative because the same equids are tested each year, review of the numbers of positive tests (1972-1995), corrected in 1996 to be numbers of positive equids (1996-2003), and the numbers of total tests (1972-2003) reveals numerous points worth discussion.

In the early stages of testing for EIA, once the suspected/known foci were identified and removed the moniker “swamp fever” fit well, i.e., higher rates of infection were noted in the Gulf Coast states. Official test statistics from Florida and Louisiana show the historical perspective well and document the progress in control of EIA (see the web site for details.) Peak numbers of positives were noted in 1974 and 1976 for Florida and Louisiana respectively and nationally in 1975 when 10,381 positives were reported.

Nationally, over 100,000 positive tests/equids have been detected since 1972 and the compiled data show clearly the progress made in reducing the numbers of positive equids found annually in the United States. Today, we expect that less than 0.02% of the roughly 2,000,000 tests performed in a year will be positive (a rate of about 1 in 5000). Thirty years of intense testing for EIA has reduced significantly the threat of encountering EIAV-infected equids. With the huge successes in reducing EIA in the mobile and tested population, what are the pros-
INFECTION DISEASES OF HORSES

pects for further improvements? At what cost to the industry? This presentation will focus on two modest changes that could assist in delivery of more accurate testing at a lower cost to the industry, with an emphasis on explaining the differential strengths of available test kits for the serologic diagnosis of EIA.

Diagnostics for EIA

Today in the United States, in addition to three licensed AGID test kits, there are three licensed ELISA-based test kits marketed for detection of anti-EIAV antibodies. The AGID test and the ELISA-based kits all detect antibodies against the major core protein of EIAV, the p26 antigen. One ELISA test kit also includes determinants of the transmembrane protein of EIAV (gp45) but the final reaction does not discriminate between the two (the SA-ELISA II test kit from Centaur, Inc.) The power of the positive AGID test is higher than that of the ELISA tests because a positive AGID test is proven to be correlated with EIAV presence; all positive ELISA tests, therefore, must be confirmed by AGID. Results for AGID testing, however, are more subjective than for ELISA testing, and in AGID tests reagents are dispensed by eye not by volume. Although ELISA tests are currently labeled for visual reading, ELISA results can be easily made more objective by reading test plates with a spectrophotometer, with a permanent result in the form of a print-out.

Personnel who conduct laboratory tests for EIA must be initially trained and certified by the USDA, and successfully complete annual proficiency tests to maintain their certification. Today that entails reporting satisfactory results from 20 equid check-test serum samples. Because of statistical considerations, NVSL is forced to bias the testing in favor of clearly positive or negative tests, to the detriment of testing critically the technicians’ ability to accurately interpret results of samples with low levels of antibody.

We have monitored published results of proficiency testing of approved laboratories in the United States that have been conducted by the USDA over the past 20 years. The samples used in these exercises are carefully selected as representative field samples where no “abnormal” reactions are expected, i.e., they have proven to be clearly positive or negative in all official test formats. Although not possible to document with numbers because of purported confidentiality issues, it is clear that the error rate from EIA testing is higher when AGID tests are used than when ELISA tests are used. The majority of errors are false-negative AGID reports, especially common in samples with less intense AGID test-reactions, i.e., in samples where a line of identity with the reference positive serum does not form (see reaction intensity 1 in Figure 1).
In 2004, 7% of approved laboratories reported as negative the only sample included in the proficiency test set with a reaction intensity of less than 2. (see Figure 1) These errors were made when the laboratory technicians knew their certification was at stake and arguably used their keenest sense and skill to perform at the highest level. It is logical and reasonable to conclude that such errors in AGID test reporting occur at an even higher rate during routine testing. It is interesting to note that sales of ELISA test kits are reported to increase each year just prior to submission of check test results to USDA, suggesting that laboratories that report they are using AGID tests for the proficiency exam might be verifying their results with ELISA tests before filing their report with the USDA. We speak with authority on this subject because we used this strategy when ELISA tests were first available. More recently, however, our technical staff insists on only using ELISA tests for these exercises because of the ease of interpretation and high degree of accuracy.

Review of these “check test” results indicate an excellent correlation between reporting of ELISA tests as measured in proficiency testing and EIA status (Dr. Eileen Ostlund, USDA-APHIS-VS-NVSL; personal communication).

To minimize the impact of inaccurate AGID test reporting, we agree with the USAHA resolution for adoption of a three-tier laboratory system. In the proposed three-tier system for EIA testing, repeatedly positive ELISA samples would be forwarded to referral laboratories where further testing, including AGID tests, would be performed by individuals whose expertise in interpreting AGID test results is optimal. An algorithm is presented below to outline our perspective on optimal testing for EIA based on methods available today (Figure 2.) Use of the proposed three-tier laboratory system would permit development of a central repository of samples that pose diagnostic challenges that could be used to perform systematic critical evaluations of the effectiveness of available test kits. Such information would be invaluable for continuing dialog with test kit manufacturers to improve the accuracy of licensed kits.
Figure 2. Algorithm showing optimal testing procedures for EIA based on available tests – 2004

In the proposed 3 tier system
1. 1st tier labs (ELISA)
2. 2nd tier labs (Referral)
3. Reference labs
REPORT OF THE COMMITTEE

If initial testing for EIA utilized ELISA tests, the rate of false-negative reports is expected to be lower than with AGID testing. The tradeoff for adopting the ELISA test formats as the primary test for EIA is the complication introduced when the initial positive ELISA test results are not confirmed by AGID testing. In the majority of these cases we would expect that additional testing, e.g., immunoblot, would fail to show recognition of viral proteins or would show recognition of no more than one viral protein, indicative of a false-positive ELISA test result. In other cases, multiple viral proteins would be recognized and would indicate a false-negative AGID test result. We argue that at this stage in the control of EIA, it is preferable to have resolvable laboratory problems associated with occasional false-positive ELISA results than to release false-negative AGID horses to move and mingle freely.

In an attempt to make testing more standardized, the three-tier system would require spectrophotometric reading of ELISA test results with a permanent record kept for at least 3 years. This minor change would further increase the objective nature of ELISA test reporting. For the proposed three-tier laboratory system to work, equids with negative ELISA tests for EIA must be allowed to move freely: intrastate, interstate, and internationally. Thus, international acceptance of negative ELISA results must be pursued vigorously to effectively utilize the greater accuracy of negative ELISA test results.

Sensitivity of current tests for EIA

Because of the proven correlation of the AGID test to horse inoculation test results, any new test for detection of antibodies against EIAV is required to show results of equivalence to the AGID test. Thus, it is difficult if not impossible to develop procedures with higher sensitivity because producers would have to perform what many would refer to as unwarranted animal trials to prove EIAV presence, i.e., specificity. As a result of these constraints, manufacturers must make their new test kits as sensitive as the AGID, and in the process lose some of the inherent sensitivity of the new test format.

The differential sensitivity of the available test kits can be seen best in horses during the 20-45 days after exposure to EIAV and in foals with passive antibodies to EIAV. As the AGID test format has the capacity to detect both IgM and IgG antibodies, it may have an advantage in the early post-infection period over ELISA tests that use an IgG based detection system. Generally, antibodies against EIAV are detected first in immunoblot tests using an IgM detection system, then in immunoblot tests using an IgG detection system, then with available ELISA and AGID test kits with about equal results. The slight differences noted between accurate reporting of very weak AGID reactions that require interpretation (subjective) and ELISA results read by spectrophotometer (objective) are only worth mentioning because these
very weak AGID reactions are often interpreted incorrectly under routine conditions in approved laboratories. Thus, with the available test kits, we would expect the ELISA tests would be reported as positive from 1-3 days earlier than AGID tests. As few of the new cases of EIA found each year appear to be from recent infections, the differences noted are probably of minor consequence.

More illuminating, however, are results of detection of antibodies against EIAV acquired as a result of passive transfer, i.e., in uninfected foals out of test-positive mares. We have participated in numerous prospective studies of inapparent carriers of EIAV and have done comparisons of available test-kits for detection of anti-EIAV antibodies with the immunoblot test. In the most recent published analysis, results in the ELISA test kits for EIAV which are specific for the p26 antigen and still available today (CELISA from IDEXX Laboratories, Inc) were first reported negative a mean of 202 days, compared to 183 days for AGID (IDEXX Laboratories test kit), and beyond 210 days for immunoblot. We estimated that the first negative AGID reports for routine testing in the field would be about 30 days earlier, i.e., at 153 days of age. In that report, the first generation SA-ELISA test (Centaur, Inc.), specific for anti-gp45 antibodies, were first reported negative at a mean of about 82 days. The new generation SA-ELISA II incorporates both gp45 and p26 determinants and appears to have equivalent sensitivity to the other ELISA tests which are based on detection of anti-p26 antibodies only. Thus in our opinion, the available ELISA tests today would be expected to detect antibodies against EIAV in the serum of uninfected foals from 19-49 days longer than the AGID test. If we assume a half-life for IgG of 21 days, this suggests that the ELISA tests are about 2-4 times more sensitive than the AGID for detecting antibody against the p26 antigen of EIAV.

Another dataset that must be considered is that derived from a state where a representative (pseudonym JC, to maintain confidentiality) of the state veterinarian’s office took unidentified selected samples, provided by our laboratory, to 28 approved laboratories for testing by their routine methods. In this voluntary program, JC returned to each laboratory the following day and reviewed the AGID test plates and/or results, and/or the ELISA results or spectrophotometer printouts. These results were discussed together with expected results and photographs of the AGID test reactions of the positive samples (from EIAV-infected equids from our laboratory with reactions of 5, 3 and =1 as shown in Figure 1.) In this program, laboratories with ELISA tests had results in agreement with expected. By contrast, more than half of the 47 laboratory personnel that used the AGID test format would have reported as negative serum from our reference weak positive horse (Flicker)\(^4\), serum with a reaction of =1 in the AGID test, if this had been a routine sample. In the majority of cases, with coaching, the AGID test reaction
of this sample was interpreted as positive. In others the sample was negative, possibly because of operator error or antigen content issues (discussed below). One of the results of this exercise was that many of the laboratories voluntarily agreed to perform testing in only ELISA formats for the foreseeable future. Any sample positive by ELISA in those labs is forwarded to the state laboratory for confirmation by AGID.

The third major evidence for higher sensitivity of current ELISA tests over AGID reactions are derived from testing the USDA Reference weak positive serum and our reference weak positive serum (an EIAV-infected horse named Flicker). Serum from both horses was tested at serial two-fold dilutions by AGID and ELISA with licensed and commercially available test kits (companion AGID and ELISA kits from Synbiotics Corp. were used.) The USDA reference weak positive serum had an endpoint titer (last positive AGID test-positive interpretation) of 1:2 by AGID and 1:8 by ELISA. Undiluted serum from Flicker was interpreted as a weak weak positive by AGID with the same AGID test-kit; by contrast, a 1:4 dilution of serum was positive by the Vira-CHEK ELISA. Analysis of these results indicate an approximate 4-fold difference in sensitivity of detection of antibody against EIAV between these ELISA and AGID test kits, consistent with the approximate 2-4 fold difference noted through the testing of serum from foals of test-positive mares (using companion AGID and ELISA test kits from IDEXX Labs). A definitive difference cannot be calculated because neither the ELISA test formats for EIA nor the AGID test is quantitative. We have listed approximate differences in sensitivity as a guide for comparison. We realize that the sensitivity of the AGID test cannot be improved substantially. We are confident, however, that manufacturers of the ELISA test kits for EIA could meter their reagents and be able to interpret both the USDA reference W+ serum and serum from Flicker at 1:16 dilutions, albeit at the risk of increasing the rate of false-positive reactions.

Current diagnostic problem areas and discrepant results:

Some of the potential problems with AGID testing and interpretation can be ascribed to antigen content. When AGID testing was initiated for EIA in 1972, antigen for AGID testing was a relatively crude preparation extracted from splenic tissue of horses with acute EIA. Initially, it was difficult to obtain high enough antigen concentrations to get sharp lines of precipitation in agar, making interpretation of AGID test-reactions somewhat of an art form. This was remedied when EIAV production in vitro was made practical by Malmquist et al in 1973. Today, antigen for use in AGID tests is often of recombinant origin. As recombinant antigen is relatively inexpensive to produce, there is no problem getting enough antigen for sharp lines of reaction with reference positive serum. In fact, it is relatively simple to get very dense and
sharp lines of precipitation by increasing antigen and reference antibody concentrations. The problem now becomes one of metering antigen concentration so that samples with low levels of antibody against the p26 antigen of EIAV can still be interpreted as positive in all approved laboratories. Often the bias is toward dense sharp lines, because laboratory technicians appreciate the ability to discern the lines more clearly, i.e., it becomes a selling point. Over the years there have been several recalls of specific lots of AGID test kits because of this specific issue, sometimes, unfortunately, only noted after laboratory failures using the specific kits on proficiency tests.

We would suggest that USDA seriously consider adopting a quantitative standard reference weak positive antibody preparation against EIAV for use in qualifying/certifying AGID test kits, if not already in existence. The reference weak positive serum from Flicker or the international reference weak positive antibody standard developed by Professor Toma in France would seem to be excellent choices. One of the problems associated with attaining that level of sensitivity in the AGID test is that reactions would become more difficult to interpret, a known limitation of the AGID test format. Perhaps it is time to consider adopting more contemporary standards where test sensitivity is the major consideration, without abandoning the known strengths of the AGID test. At the very least, the reference labs should use AGID test reagents that are proven to have the highest sensitivity, while still retaining a sharp enough line for accurate interpretation. The proposed three-tier laboratory system would address this problem, as all ELISA positive – AGID negative samples would be tested further by immunoblot to resolve the discrepancy. We are fortunate to have options for EIA testing today; we should capitalize on their strengths.

As alluded to above, false-positive ELISA test results occur with higher frequency than with AGID, in part because in the AGID test lines of identity can be distinguished from lines of non-identity. With today’s more purified AGID test reagents, lines of non-identity are rarely encountered. ELISA tests results, on the other hand, are determined by a color change and anything that causes a color change in the right direction must be interpreted as positive. In some cases, repeat testing reveals operator error as the result is clearly negative.

In other cases, several explanations are tendered to help understand why samples would be positive by ELISA and negative by AGID. Samples that are repeatedly positive by ELISA, negative by AGID, and do not recognize EIAV proteins in research immunoblot tests are truly false-positive ELISA reactors. The rate and reason for these results appear to differ in the 3 ELISA test formats; thus, these samples, positive in one ELISA format, will often be negative in the other ELISA test formats. As the reason for the false-positive reactions appears to differ, if a field sample is repeatedly positive on all three ELISA test formats
and a negative AGID test interpretation is tendered, it is highly probable that the sample will recognize the three major EIAV proteins in immunoblot tests. To date, we have found no exceptions. The extra power afforded by using all 3 ELISA procedures is recognized by the Infectious Diseases of Horses Committee proposed three tier system (see Resolutions of the USAHA in 2002 and 2003).

Another class of discrepant reactions is from equids at no known risk for EIA whose serum is reactive only against the major core protein of EIAV (p26) in immunoblot tests, in one or more ELISA tests and occasionally in AGID tests. It is thought that this reactivity is due to equid exposure to related lentiviruses where interspecies determinants of the major core proteins stimulate cross-reactive antibodies. As these agents are not thought to multiply in equids, the low levels of antibody detected in immunoblot and ELISA tests (only rarely high enough to be detected by AGID) generally wane to lower, i.e., undetectable, levels in the AGID test in a relatively short time (30-60 days.) In our 30 years of experience with EIAV diagnostics, we have seen only 6 of these cases, hardly enough to mention except that one of them was presented one week before this meeting. In some cases, these types of reactions are noted in equids at risk for EIA; their p26 reactivity could potentially occur as a result of repeated exposure to low levels of inactivated EIAV on insect mouthparts.

A third class of discrepant results in official tests for EIA can occur in EIAV-exposed and EIAV-infected equids. Although there is no proven case of clearance of EIAV from a previously infected equid, there is a growing body of evidence that it may occur rarely. We have followed 3 such horses with field exposures and have monitored a gradual decline in antibody titer with time. We have been unable to demonstrate EIAV in blood, plasma or tissues from these horses in sensitive PCR tests for highly conserved genes of EIAV (unpublished results). In one case, the horse is now negative in AGID and 1 of 3 ELISA tests, although the serum still recognizes the 3 major proteins of EIAV in immunoblot tests. Additionally, we have evidence from experimental infections of horses and donkeys with a variety of strains of EIAV (fully virulent intact EIAV as well as specific gene-deleted mutants) that equids can be persistently infected with EIAV and escape immunosurveillance with some or all of the current licensed diagnostic tests. In all of these cases, antibody is detectable by research immunoblot tests (unpublished results). To date, such cases have not been reported in epidemiologic investigations of EIA, suggesting that such cases occur rarely in nature. It is probable that such cases would be discovered more readily if ELISA tests became the primary test of choice.

**Testing costs, risks and planning**

Testing has been required by many jurisdictions for movements on
public roadways, for congregations, for interstate movement, and for change of ownership. In two states, Louisiana and Arkansas, annual testing is required of all equids. The costs for testing for EIA have been borne by owners and annual testing costs are estimated at greater than $50,000,000. For the year 2003 when 273 positive equids were reported, over $180,000 was spent to find each positive equid. The average testing costs to find each positive equid in the northeastern states over the last 3 years was about $1,000,000. A cursory examination of those numbers suggests that testing may be in greatly in excess of the expected risk in many areas. Perhaps it is time reassess our strategy for control of EIA and design programs which address risk estimates based on accurate census data and which adjust testing across state lines according to equivalency, i.e., regionalization.

Projections by the USDA have indicated that regionalization and reduced testing in low risk areas could dramatically reduce testing costs to the industry (Anne Seitzinger, USDA-APHIS-Veterinary Services, Center for Epidemiology and Animal Health, personal communication.) When coupled with increased accuracy of testing, the risk of acquiring EIA could be further reduced. An improved control program for EIA at a lower cost to the industry seems intuitive and overdue. We urge adoption of a national program utilizing the three tier laboratory system. Incidentally, a proposal for a National State-Federal Cooperative Program for the Control of EIA will be discussed at this meeting and a resolution may be approved by this Committee and forwarded for approval and ratification by USAHA.

References cited:
REPORT OF THE COMMITTEE ON INTERNATIONAL STANDARDS

Chair: Dr. Joan M. Arnoldi, Brooklyn, WI
Vice Chair: Dr. Norman G. Willis, Ottawa, Ont., CAN

Dr. Michael J. David, MD; Dr. Peter J. Fernandez, DC; Dr. John R. Fischer, GA; Mr. Bob Frost, CA; Dr. Lonnie J. King, MI; Dr. Elizabeth A. Lautner, NY; Dr. Jim Logan, WY; Dr. Bret D. Marsh, IN; Dr. Alex B. Thiermann, France; Dr. Alfonso Torres, NY; Dr. Gary M. Weber, DC.

The Committee met on Sunday, October 24, 2004 from 1:30 pm to 5:30 pm. There were 30 attendees including 13 members. Chair Joan Arnoldi presided assisted by Vice Chair Norman Willis. The committee members and guests were welcomed to this second meeting of the Committee and each was given the opportunity to introduce themselves.

Dr. Alex Thiermann, current President of the World Organization for Animal Health (OIE) Terrestrial Animal Standards Commission presented an overview of current activities and directions taken in the OIE during the past year. He emphasized the strong focus on the Animal Health Standards (Code) development, particularly the shift from country disease freedom to mechanisms for safe trade in animal commodities. Of particular attention was the Code chapters on bovine spongiform encephalopathy (BSE) and bluetongue. In addition, harmonization of the Terrestrial and Aquatic Animal Standards are progressing.

The OIE is actively involved in the area of capacity building for developing countries with three specific projects funded by the World Bank and supplemental funding from three European countries.

The Regional Commission for the Americas will meet during the third week of November 2004. In addition, the development of the 4th Strategic Plan of the OIE, 2006-2010, has been initiated and Dr. Brian Evans is the representative for North America on the Administrative Commission.

Dr. Richard Willer, President-elect of the United States Animal Health Association (USAHA), offered his support to the International Standards Committee and stressed its importance.

Dr. Michael David of the United Stated Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) described the activities taken by the U.S. in response to OIE actions. This included full transparency of OIE documentation on the APHIS Web site, the active participation with industry and State counterparts on the commenting process of new or updated Code chapters, and the extensive U.S. participation on the OIE Specialist Commissions, Working Groups and ad hoc groups.
INTERNATIONAL STANDARDS

Dr. John Fischer, University of Georgia, described an example in each of five countries of wildlife reservoirs for bovine tuberculosis (TB). He concluded that for TB eradication programs to succeed in such environments, the programs must be aggressive and sustained.

Dr. Lonnie King, Dean of the College of Veterinary Medicine at Michigan State University, presented his thoughts and perspectives on the shifting “face” of agriculture and the need for “connexivity”, a combination of connectivity and complexity. He believed that the OIE is moving in the right direction with issues such as animal welfare, food safety, and emerging diseases, despite some discomfort with this. He also pointed out that the next future wave will be a direct involvement between animal health and public health.

Vice Chair Willis described concerns with a possible crisis in international trade as a result of countries not abiding by the scientific guidance of the OIE Code. The shift must be made away from zero risk for a given disease and to the management of risks. The dilemma is how to communicate the need and encouragement for full country participation. The threat is the potential loss of disease detection for fear of unjustified trade restrictions and resulting economic hardship.

Dr. Alfonso Torres, Associate Dean, College of Veterinary Medicine, Cornell University described the active progress of the Inter-American Group for the Eradication of Food-and-Mouth Disease (GIEFA) in South America. This involved strategic vaccination and identified levels of infection.

Dr. Peter Fernandez, Associate Administrator, USDA-APHIS defined regionalization and described examples of its use. He also described some of the difficulties and resource implications of this approach.

Chair Arnoldi drew attention to the mission statement of the Committee and asked for comments on its appropriateness. Discussion revealed a desire for broadening the scope, for raising more issues, for more industry involvement, and for more representation from other countries. The suggestion was provided that perhaps the Committee should emphasize global strategic issues more than just animal health standards.

Meeting participants expressed high interest in the subject matter with full and active discussion and satisfaction with the outcome.
REPORT OF THE COMMITTEE ON JOHNE’S DISEASE

Chair: Dr. William L. Hartmann, St Paul, MN
Vice Chair: Dr. Scott J. Wells, St Paul, MN

Mr. John B. Adams, VA; Mr. J. Bruce Addison, MO; Dr. Robert D. Angus, ID; Dr. Marilyn F. Balmer, MD; Mr. Nathan James Boehm, ND; Dr. William W. Buisch, NC; Dr. Todd M. Byrem, MI; Dr. Michael A. Carter, MD; Dr. Yung Fu Chang, NY; Dr. Michael T. Collins, WI; Dr. Thomas F. Conner, OH; Dr. Robert A. Cook, NY; Mr. Ed Corrigan, WI; Dr. William C. Davis, WA; Dr. John C. Doyle, OK; Dr. Robert J. Eisner, NJ; Dr. John I. Enck, Jr., PA; Dr. Kendal G. Eyre, ID; Dr. William H. Fales, MO; Dr. James M. Foppoli, HI; Dr. Thomas W. Freas, IN; Dr. Keith A. Friendshuh, MN; Mr. Bob Frost, CA; Mr. L. Wayne Godwin, FL; Mr. Steven G. Hennager, IA; Dr. Sharon K. Hietala, CA; Dr. Donald E. Hoenig, ME; Dr. Sam D. Holland, SD; Dr. John P. Honstead, CO; Dr. David L. Hunter, MT; Dr. John P. Huntley, NY; Dr. Bretagne Jones, MO; Dr. Susan J. Keller, ND; Dr. Tom Kellner, NE; Mr. Steve A. Larson, WI; Mr. John C.. Lawrence, ME; Dr. Pepi F. Leids, NY; Dr. Donald H. Lein, NY; Mr. Jay C. Lemmermen, FL; Dr. Thomas F. Linfield, MT; Dr. Mary Jane Lis, CT; Ms. Sharon L. Lombardi, NM; Mr. Gordon ‘Cobbie’ Magness, SD; Dr. Charles E. Massengill, MO; Dr. Clifford W. McGinnis, NH; Mr. Chris W. Murdock, MO; Mr. Richard E. Nelson, VT; Dr. Kenneth E. Olson, IL; Dr. James E. Oosterhuis, CA; Mr. Mark J. Owens, IA; Dr. Elisabeth Patton, WI; Dr. Janet B. Payeur, IA; Dr. Kristine R. Petri, MN; Dr. John R. Ragan, MD; Dr. Suellee Robbe-Austerman, IA; Mr. Paul E. Rodgers, CO; Dr. Christine A. Rossiter-Burhans, VT; Dr. Allen J. Roussel, Jr., TX; Dr. John J. Schiltz, IA; Dr. Andy Schwartz, TX; Dr. Sarah B. S. Shapiro Hurley, WI; Dr. David M. Sherman, MA; Dr. Sang J. Shin, NY; Dr. William P. Shulaw, OH; Dr. Shri N. Singh, KY; Dr. Theron G. Snider, III, IL; Dr. Judith R. Stabel, IA; Dr. Susan M. Stehman, NY; Dr. William D. Stouder, ID; Mr. Les C. Stutzman, OH; Dr. Deepanker Tewari, PA; Dr. Kenneth L. Thomazin, CA; Dr. John B. Thurston, IN; Dr. James A. Watson, MS; Dr. Gary M. Weber, DC; Ms. Diana L. Whipple, IA; Dr. Robert H. Whitlock, PA; Dr. Ronald B. Wilson, TN; Dr. Ching-Ching Wu, IN; Dr. Cristopher A. Young, KY; Ms. Ria de Grassi, CA.

The Committee met on October, 24, 2004 from 12:30 pm to 5:30 pm. There were 61 people in attendance. Chair William Hartmann presided assisted by Vice Chair Scott Wells. The Chair welcomed members and reviewed the structure of the Committee. The Committee has four subcommittees: Scientific Advisory Subcommittee, Finance and Budget Subcommittee, National Johne’s Working Group Subcommittee and the Strategic Planning Subcommittee.
JOHNE’S DISEASE

The Chair announced that a Committee Scientific Paper had been presented yesterday at the American Association of Veterinary Laboratory Diagnosticians (AAVLD) Epidemiology Scientific Session. Drs. C. Munoz-Zanzi and Scott Wells from the University of Minnesota presented a paper entitled, “Effectiveness of Pooling Strategies for Detection of Johne’s Disease Infected Cattle Herds.”

Dr. Michael Carter, United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), National Johne’s Disease Program Coordinator reported that in 1997, the National Johne’s Working Group (now the National Johne’s Working Group Subcommittee of the Committee on Johne’s Disease) appointed an Ad Hoc Committee to design an affordable and flexible program based on sound scientific knowledge. The result of that work was the U.S. Voluntary Johne’s Disease Herd Status Program (VJDHSP). Instead of trying to certify herds free of Johne’s disease, the VJDHSP provides minimum requirements for a program to identify herds of low risk with Mycobacterium avium subspecies paratuberculosis (MAP) infection. These guidelines are used as a model for the Uniform Program Standards for the Voluntary Bovine Johne’s Disease Control Program (VBJDCP) approved by USDA-APHIS in April of 2002. In FY2003, 34 States were considered in full compliance with the standards. More than 650 herds have been enrolled in the various status programs based on information through monthly conference calls and less than complete quarterly reports through the Generic Database (GDB). Over 4,722 control herds have been reported. Forty-five states had laboratories approved for Johne’s serology testing and 21 with laboratories approved for MAP fecal culture or DNA testing. In FY 2003, the reported volume of activities from these laboratories estimates Enzyme Linked Immunosorbent Assay (ELISA) testing above 549,810 samples and 97,057 fecal culture samples. By the end of FY2004, 41 States will be considered as in full compliance with these standards. Modifications are being made to the GDB to gain access to better quality data and to decrease the effort need by states to enter summary data and further evaluation of the GDB will continue to be made.

Currently 42 States (76 laboratories) have laboratories approved for Johne’s serology testing and 26 States (65 laboratories) have laboratories approved for MAP fecal culture or DNA testing. In FY2004, the reported activities include 455,680 cattle tested by ELISA and 61,244 cattle tested by fecal culture, 5,760 approved herd plans and 658 test negative herds. In FY2004 USDA-APHIS-VS received $16.4 million for Johne’s disease activities. Of this, $11.9 Million was distributed through cooperative agreements with the states for use with the National Johne’s Demonstration Project ($1.7 million – 18 States), Field projects ($0.54 Million - 9 projects), and state cooperative agreements
Dr. Mark Comacho, USDA-APHIS-VS Johne’s Disease Program Coordinator for the Eastern Region reported on Johne’s disease activities in that region. The demographics of cattle in the U.S. show that about 53% of the adult dairy cows are in the Eastern Region, mostly in the upper Midwest and the north-eastern states. Conversely, only about 26% of the U.S. beef cattle are in the Eastern Region, concentrated mostly in Kentucky and Tennessee and other states below the Mason-Dixon Line. The total herd plans reported from the Eastern Region through the 3rd quarter of the last FY = 4,967. This is compared to the 3,215 herd plans for the entire prior year, so there was significant increase in herd plan activity with 1 Quarter of data not yet reporting. This calculates to $1,966 spent per herd plan written. The total number of Test Negative Status Herds (TNSH) reported in the Eastern Region last FY = 587. The total reported TNSH for the entire U.S. is 658 so the vast majority of TNSH are in the eastern region, approximately 89% of the U.S. total. This calculates to $16,644 spent per TNSH. Currently, 15 Eastern Region states are reporting Johne’s disease data on the GDB in 2004, including Alabama, Vermont, Connecticut, Wisconsin, Delaware, Rhode Island, Florida, Virginia, Indiana, West Virginia, Maine, South Carolina, Minnesota, New York (via spreadsheet), Mississippi, Pennsylvania (in the process to upload), New Hampshire, Ohio (in the process to upload).

Dr. John Honstead, USDA-APHIS-VS Johne’s Disease Program Coordinator for the Western Region reported on Johne’s disease activities in his region. During the year, 9 states were visited to address problems with the Johne’s disease program. Montana, Wyoming, Arizona and Louisiana had not requested Johne’s disease funding and have no program in place. During the last year, total animals with Johne’s disease tests within the region were up from 145,052 to 187,520. Farms tested for Johne’s disease were also up from 1,511 to 3,147. Some of the challenges that the region faced included lack of interest in Johne’s disease, confidentiality with test positive data, the lack of value added incentives in the program and lack of motivation of local practitioners. The Western Region also faced problems with reports associated with the GDB. Solutions to the reporting problems offered were the 2004 GDB enhancement meeting at USDA-APHIS-VS Center for Epidemiology and Animal Health (CEAH) in Fort Collins, data management meeting, completion of a requirements document for the GDB and development of a web based reporting system (available in October of 2004). The Western Region reported the most active states in the Johne’s program were Kansas, Iowa, California, North Dakota, Missouri, Colorado and Texas.

Dr. Jason Lombard, USDA-APHIS-VS National Johne’s disease Epidemiologist reported on herd demonstration projects. During the
JOHNE’S DISEASE

past year, CEAH staff developed a Microsoft Access database and multiple Excel spreadsheets to capture necessary data for the National Johne’s Disease Demonstration Herd Project. Spreadsheets were constructed to expedite data capture from electronic sources that could then be uploaded directly into the database without re-entry of data. Data received from participating states was validated and initial data analysis performed for presentation at USAHA.

Dr. Bob Whitlock, University of Pennsylvania, National Johne’s Working Group Subcommittee (NJWGS) chair, reported on NJWGS activities. The NJWGS met for two full days on Thursday and Friday October 21 and 22, 2004. The meetings were attended by approximately 80 individuals on Thursday and 125 individuals on Friday. Membership of the NJWGS includes 59 individuals with 12 USAHA and 12 corresponding members. NJWGS report follows:

Thursday’s meeting was opened by John Adams, National Milk Producers’ Federation, followed by self-introductions. Bill Hartmann, Chair of Committee on Johne’s Disease, reviewed the follow-up to last year’s Committee resolutions (17-ELISA QC sera & 18-Curriculum for certifying veterinarians for conducting Risk Assessments and Herd Management Plans) and three recommendations (One to APHIS with 8 specific recommendations; one for ELISA Quality Control sera; and one on fecal check tests and Quality Control for fecal cultures).

Ken Olson presented the treasurer’s report. The current account balance was $32,538.26. Several expense items were outstanding. Approximately 767 Johne’s CD’s have been sold, which serves to enhance the level of understanding about Johne’s disease across the country. The Johne’s Disease web site is up and active.

Michael Carter, USDA-APHIS-VS, provided a detailed report about progress in the number of herds being tested, tests being done, states with Designated Johne’s Disease Coordinators in addition to the use of funds appropriated by Congress for Johne’s disease in cattle. From the $18.8 million appropriated for Johne’s disease in cattle, $11,100,000 was utilized by states through cooperative agreements.; $1.7 million was allocated to the National Herd Johne’s Disease Demonstration project; approximately $1.5 million to the Eastern and Western Regions of USDA-APHIS-VS; $540,000 for field studies (9 projects); $900,000 to the USDA-APHIS-VS-National Veterinary Services Laboratories (NVSL); $240,000 to USDA-APHIS-VS-CEAH; and $250,000 to the USDA-APHIS-VS Center for Veterinary Biologics (CVB). Two conferences for training state Designated Johne’s Coordinators were held; one in Ohio in July 2004 and the other in Wisconsin. Forty-one states are currently in compliance with the National Johne’s Disease Standards. Montana and Wyoming have no interest and Arizona is in the initial stages of implementation. Both New Mexico and Oklahoma remain non-compliant with the Standards. The National Johne’s dis-
ease report has failed to collect much of the data from the states, due in large part to problems with the GDB and states having the ability to connect to the GDB. APHIS sponsored two Johne’s disease meetings; one three-day meeting in Riverdale, MD on June 15-17, 2004 to develop the new strategic plan that was distributed to those in attendance; and a two-day meeting in Fort Collins, CO in July 2004 to facilitate implementation of the GDB. The later meeting was coordinated by VS Western Region epidemiologist John Honstead. Mike Carter reported that the new printed Program Standards for Johne’s disease approved last year will soon be available. Challenges for the Western Region includes: lack of interest by producers; confidentiality of test data; lack of added economic value for the producers and modest motivation by practitioners. Thirteen states do not use the GDB at this time. A GDB meeting was held in June 2004 at Fort Collins to help overcome some of the issues plaguing lack of compliance by the states. The Eastern Region has 15 states using the GDB and more states entering data using the web based data entry system. The following states received the largest allocation of funds through cooperative agreements: NY ($1.3 million), WI ($1.3 million), MN ($705 thousand), PA ($620 thousand) and OH ($817 thousand).

State reports include: Pepi Leids reported that NY State provided nearly $500 thousand in grants-in-aid to their farmers for projects (up to $4,000) designed to reduce the risk for Johne’s transmission on farms. The producers were required to support 25% of the funds for each project. Beth Patton reported that Wisconsin added more than $250 thousand instate funds for their program and that more than 280 veterinarians are being certified to conduct risk assessments (RA’s) and herd management plans (HMP’s) with more than 820 RA’s and HMP’s completed. Ned Cunningham reported that Ohio has done more than 259 RA’s and HMP’s. Seventy-three herds are in the status program and 134 veterinarians have been certified. Keith Friendshuh reported that Minnesota has completed more than 800 RA’s and HMP’s and that most producers in the status program will allow their farms to be listed on web sites as status herds.

On Thursday afternoon, specific “breakout discussion groups” were ably coordinated by Scott Wells for the “Demonstration Herd” project subgroup; Keith Friendshuh for the “Program Standards” subgroup; Dix Harrell for the Information Management subgroup; and Don Hansen for the Education subgroup. In addition, the new Strategic Plan Subcommittee of the Committee on Johne’s Disease had a breakout discussion group.

John Adams discussed a letter that had been sent to U.S. Representative Henry Bonilla, chair of the House Agriculture Committee, suggesting full funding for the Johne’s disease program at an estimated $49 million. The letter was signed by 11 members of the House sup-
JOHNE’S DISEASE

porting this request.

Don Hansen reported the education subgroup focused on the educational portion of the new proposed Strategic Plan.

Jason Lombard reported the National Animal Health Monitoring System (NAHMS) 2002 Dairy Study conducted by CEAH was nearly completed. In brief, cows with a strong positive ELISA value produced less milk than other cows ($620 less). The add-on study included 29 dairy operations that will provide additional data about Johne’s disease. Although the studies were comprehensive, neither of these studies was designed to provide any data concerning the current national prevalence of Johne’s disease on a herd basis or a cow basis.

For the ELISA check test, Heidi Schleicker from NVSL reported that 76 ELISA check tests were distributed to laboratories. Of the test kits, 56 used the IDEXX kits while 34 used the BIOCOR kits. For 2003, 54 used IDEXX and 31 used BIOCOR. Three labs did not pass the first round of ELISA check tests. Approximately 60 laboratories are participating in the ELISA quality control (QC) project and have purchased “low positive sera” from NVSL for the purpose to monitor their ELISA results. Several labs have reported that this QC has been a valuable aid to help detect variations in ELISA performance. From the earlier pilot study, 37% of the variation in ELISA values was associated with kit lots.

For the fecal culture check test, Janet Payeur reported that 72 laboratories requested check test sets, 65 from the United States. Typically, the set of samples includes 4 low shedders, 6 moderate shedders and 8 TNTC (too numerous to count) samples. Fifty-six laboratories passed the fecal culture check tests and 9 failed. Fifteen labs used PCR (polymerase chain reaction) with 4 labs failing the PCR tests. Twenty-one reported their colony forming unit count data at 8 weeks and 18 labs found no difference at 16 weeks. Five labs used MGIT 960, while 4 labs used the 460. Four labs still use sedimentation while 48 labs use centrifugation. Five labs reported results using Tetracore PCR and 13 labs used a PCR test. Five of the 13 failed the check test. NVSL strongly recommends that labs switch from sedimentation to centrifugation and that the inoculum volume be 200 microliters per tube. Becton-Dickinson may sell HEYM in flasks in the near future. NVSL held two training programs on fecal culture techniques for laboratory personnel.

Jay Ellingson from Marshfield Laboratory in Wisconsin reported that 2.8% of retail pasteurized milk samples were culture positive for MAP. These samples were obtained from retail markets in California, Minnesota and Wisconsin over a 12-month period. Four of 237 samples from Wisconsin, 7 of 235 samples from California and 9 of 234 samples from Minnesota were culture positive. Interestingly, more MAP culture positive samples were detected in the summer months compared to
REPORT OF THE COMMITTEE

the other seasons. The recorded colony counts were low and each positive isolate was confirmed by two PCR tests. Fifty-five percent of the different brands of milk tested were positive. The source of MAP contamination was not determined as the study was designed to detect if MAP was present in retail milk.

The laboratory subgroup recommended a change in the ELISA scoring procedure. The new scoring system will be based on the Z-score concept that will critically evaluate difference from the mean score of all labs. This system will provide greater feedback to labs participating in the annual ELISA check test. This proposed change was approved by the Program Standards subgroup. For next year's fecal culture check test, laboratories using solid media would be requested to provide cfu (colony forming units) for each culture tube of solid HEY media. Each laboratory would need to provide an assessment of shedding level of MAP in each positive fecal sample reported, especially those samples categorized as equivalent to TNTC equivalent or heavy shedders. A check test fecal sample would be classified as TNTC, if 50% of the laboratories that pass the fecal check test with current criteria, report the sample as TNTC or high shedder. Samples from laboratories reporting cfu per tube would be classified as TNTC or high shedder, if 2 or more tubes had more than 50 cfu per tube. Laboratories would be required to identify 50% of those “consensus classified TNTC fecal check test samples”. Laboratories that fail to detect 50% of the “consensus classified fecal check test TNTC (high shedder) samples” would be notified of their proficiency results with the intent to improve their detection techniques. If a laboratory fails to detect these consensus classified TNTC for the second year they would be required to take additional training at NVSL.

Scott Wells and Jeanette McDonald presented two of the four major components of the Johne's Disease Integrated Program [(JDIP) research award for $4.1 million over three years], the diagnostics and education components respectively. The JDIP program is being coordinated by Vivek Kapur the principle investigator. For more detailed information the reader is referred to the web site (JDIP.org). The priorities for the diagnostics section included: 1. Simulation model to determine efficient strategies to determine the presence of Johne's disease in cattle herds; 2. Field data, refined and improved culture methods for MAP (NVSL); 3. develop and validate molecular tests for MAP in fecal; samples, 4. Molecular Epidemiology of MAP bio-typing. For the Education and Extension module, McDonald reported on the specific modules that will be developed including modules for goats, sheep and Cervidae. RA's and HMP's are being incorporated into the on-line training web site.

Mike Collins provided a new model to help estimate which diagnostic tests are more appropriate based on new data collected from the
earlier Wisconsin-Minnesota study of more than 2,000 cows.

Dr. Dave Wiklund presented the report of the Information Management subgroup for chair Dr. Dix Harrell. He reported on the subgroup’s recommendations to USDA about how information should be handled. The recommendations are included in the strategic plan and are:

1. VS Regional Johne’s Disease Epidemiologists should coordinate with Area Veterinarians in Charge, State Veterinarians and Designated Johne’s Disease Coordinators to complete state level needs assessments and develop specific plans with timelines for accomplishing necessary data collection, data entry and reporting of Johne’s program data to the National Johne’s Disease Coordinator.

2. All states receiving cooperative agreement funds for Johne’s disease must submit accurate Johne’s disease program reports to the National Johne’s Disease Coordinator in accordance with the Program Standards. In order to be considered for renewal of Johne’s disease cooperative agreements in the future, state reports must accurate and up-to-date for the previous 12-month period.

3. Interactive GDB training materials should be developed and provided by USDA with the help of the new Johne’s Disease Education Coordinator. GDB training should be provided on the web and in CD format to improve access to those needing the training.

4. Laboratories that conduct Johne’s disease testing should be required to report all Johne’s test results back to the State Veterinarian’s office in the state of origin where the animals were tested. This will allow all states to capture this data for Johne’s disease reporting purposes and any follow up activities that may be necessary according to the states Johne’s program requirements.

Dr. Keith Friendshuh presented the report of the Program Standards Ad Hoc Group of the NJWGS. He reported on the recommend changes to the national program standards. Dr. Friendshuh reported on the nine recommended changes to the national program standards which were included in one of the recommendations passed by this committee. The full text of these recommended changes are included at the end of this report.

Vice Chair Scott Wells presented the report of the Demonstration Herd subgroup. He reported on the objectives of the National Johne’s Disease Demonstration Herd Project (NJDDHP) including: 1) evaluate the long term effectiveness and feasibility of management-related disease control on development of Johne’s disease on dairy and beef cattle operations; 2) provide information and materials for education and training of public and private practice veterinarians and cattle pro-
REPORT OF THE COMMITTEE

ducers; 3) develop and evaluate management, testing, and monitoring strategies for use in control of Johne’s disease in cattle herds; and 4) create the opportunity for add-on projects within states to address important research objectives. Significant progress has been made in capture of data from cattle herds participating in the NJDDHP. An objective for the next year is development of an information sheet providing a brief summary of results to date from the project, to be sent to study investigators and Area Veterinarians-In-Charge from study states, with baseline information such as the distribution of project herds by region and herd size and risk by management area. In addition, participant states with more than 3 years of data will be requested to develop state-specific summaries of results from demonstration herds. Participant states will also be requested to collect environmental fecal samples from demonstration herds at least annually for fecal culture. This information will be used to estimate the sensitivity and specificity of culture of environmental fecal samples from various parts of the country and different cattle herd types.

This concludes the report for the NJWGS.

Dr. Robert Ehlenfeldt provided a report for the Strategic Planning Subcommittee of the full Committee. The Strategic Planning Subcommittee met in Riverdale, MD June 15-17, 2004 to draft an updated Johne’s Disease Control Program Strategic Plan. A draft of the plan was presented to the NJWGS at the USAHA meeting and modifications were made to the plan based on input by the NJWGS. The Strategic Plan was presented to the Committee on Johne’s Disease on October 24, 2004. The Committee approved the plan and a resolution in support of the Strategic Plan. The major goal of the Committee on Johne’s Disease is to reduce the prevalence of Johne’s disease in the United States. To accomplish this goal, five objectives were set. Targets, milestones and activities to achieve the objectives are included in the Strategic Plan.

Dr. Judy Stabel reported on Scientific Advisory Subcommittee (SAS) activities. Members of the SAS met on October 23, 2004 to discuss two main issues. The first issue concerned the need for a new dairy survey to assess herd prevalence of Johne’s disease in the United States. This is very important as we do not have a current figure of herd prevalence. The most recent data stems from the NAHMS 1996 Dairy Survey that reported approximately 20% of herds infected at that time. However, this figure was based upon serologic data (ELISA) from a subset of cows within the herds tested (approximately 1000 herds). The sensitivity of the ELISA test for accurate diagnosis of M. paratuberculosis infection has been an issue with reports of sensitivity ranging from 25 to 50%, on average. Higher sensitivities are reported for clinically affected cows (85%) and lower sensitivities are reported for subclinical cows (15%). Culture detection methods have proven to be
JOHNE’S DISEASE

more sensitive and can detect a wider range of subclinically affected animals. However, fecal culture of individual cows would be too expensive and laborious for a national survey of this type. A suggestion made at the SAS meeting was to conduct the survey using environmental sampling of selected herds. A protocol or set of guidelines for conducting environmental sampling would be compiled based upon studies conducted by the University of Minnesota, Cornell University, and University of California-Davis. A study by the University of Minnesota showed that that 90% of infected herds could be identified by culture of 4 environmental samples obtained from cow alleyways and from manure storage areas. It is important to note that each sample obtained is a composite of many sub-samples (at least 5). Therefore, culture of environmental samples would provide a more efficient (time and cost) method for assessing herd status (infected versus non-infected) to provide a broad figure for prevalence rates in U.S. dairy herds. It is imperative that we obtain current estimates in order to put forth to the Congress the importance of continued funding for Johne’s disease. It is widely acknowledged that the current figure of 20% herd prevalence is vastly underestimated but we need definitive data to confirm this. With data to support that the herd prevalence of Johne’s disease is high in the U.S. it will be more likely that Congress will continue to support a program for research, education and control of this disease.

The second issue addressed by the SAS was to consider using environmental sampling as a tool for initial screening of dairy herds for Johne’s disease. This method would be used as an alternative to ELISA testing. The number of environmental samples required for detection of an infected herd is low relative to serum samples needed for the ELISA test. The reduced number of samples would lower testing costs and labor for sample collection. A standard set of guidelines for collection of environmental samples (number of samples, number of sub-samples per sample, location on the farm) would be defined. Suggestions were made for collection of 6 environmental samples with at least 5 sub-samples to pool per sample. Locations of sampling would include major areas where adult cows concentrate (alleyways, exit from the parlor) and manure storage areas including scrapers and spreaders. Using this methodology, producers would be able to enter a herd at Herd Status Level 1.

The Chair reported that significant progress was made in implementing all of the 2003 resolutions and recommendations.

Following the scientific program, the Committee considered and approved two (2) resolutions which were forwarded to the Committee on Nominations and Resolutions for approval by the general membership. The resolutions addressed:

1. An updated strategic plan for the National Johne’s Disease Control Program (NJDCP);
REPORT OF THE COMMITTEE

2. Conducting a Johne’s prevalence study during 2006 to guide the NJDCP.

The committee approved two (2) recommendations. They were:

1. Spending Plan for Federal Fiscal Year 2005 - The USDA-APHIS-VS Johne’s disease budget should focus on producer incentives. Priority should also be given to the national demonstration herd project which answers critical knowledge gaps in the management and control of Johne’s disease. Additional funds should be directed at expanding information technology capabilities specific to Johne’s disease at CEAH. A survey to determine the herd prevalence of Johne’s disease in the U.S. should be funded. Funding distribution should focus on the top 20 dairy states with 80% of the cooperative agreement money going to those states. States requesting a cooperative agreement must account for their improvements. Cooperative agreement work plans need to reflect participation of people, herds and animals. Improvement to producer education should be included in the plan. To meet these goals most states will need to allocate 70% of the funds to maintain and increase producer participation, 15% toward education and the residual funding to other program needs as identified by the state.

2. Changes to the Uniform Program Standards for the Voluntary Bovine Johne’s Disease Control Program

The following changes should be made to the Program Standards:

- Risk assessments should be required on years 1, 2, 4, 6, and 10 of program participation. An annual review of the herd plan and assessment of management changes is required.
- Test negative status herds should get an official test on clinical suspects when they are culled.
- Status follows herd not the owner.
- Delete fast track section.
- In herds with previous documented testing, the DJC, after evaluation of the testing and that introduced cattle are of low risk, may assign a herd a test negative status level up to level 3 after the herd has the required negative test to get that level and the owner signs a declaration stating: “No Johne’s disease was known or suspected in the herd during the last 5 years.”
- Laboratories would be requested to provide cfu for each culture tube of Herrold’s Egg Yolk media. Each laboratory would need to provide an assessment of shedding level of MAP in each positive fecal sample reported, especially those samples categorized as equivalent to TNTC.
- A check test fecal sample would be classified as TNTC, if 50% of the laboratories that pass the fecal check test with current
JOHNE’S DISEASE

criteria, report the sample as TNTC or equivalent. Samples from laboratories reporting cfu per tube would be classified as TNTC, if 2 or more tube had more than 50 cfu per tube. Laboratories would be required to identify 50% of those consensus classified TNTC fecal check test samples. Laboratories that fail to detect 50% of the “consensus classified fecal check test TNTC samples” would be notified of their proficiency results with the intent to improve their detection techniques. If a laboratory fails to detect these consensus classified TNTC for the second year they would be required to take additional training at NVSL.

- Z score calculation should be used to determine variation of quantitative results with laboratory reported values greater than the absolute value of 3 considered outside the range of acceptable results. Laboratories with more than 2 quantitative test results falling outside the acceptable range would not pass the proficiency test. A major advantage of the Z score grading system is that it allows lab feedback on whether labs are consistently above or below the consensus median value. Calculating absolute values allows a visual representation of consistency, since a lab that is not consistently above or below the median will still have a large absolute value of Z. Labs with an absolute average Z score of greater than 2 would be notified that quality control practices should be evaluated. Specific actions could include internal QC review using NVSL low positive sera, contacting the kit manufacturer and evaluating other equipment and procedures. The plan for 2004 is to introduce all labs to the procedure by providing Z score feedback and results of testing for 2003 and 2004 had the Z score system been in place. Each sample Z score, summed Z score and graphics depicting how well they scored relative to other labs will be provided. Any labs with questions or concerns can contact NVSL or CEAH.

- Replace testing procedures with minimum confidence levels to be obtained and add an Approved Testing Strategies section in the Appendix.
  - Level 1 – 85% confidence of having a non-infected herd
  - Level 2 – 95% confidence of having a non-infected herd
  - Level 3 – 98% confidence of having a non-infected herd
  - Level 4 – 99% confidence of having a non-infected herd

- Test strategies, that meet the confidence criteria, will be added to the program standards appendix after evaluation by the SAS.

The Chair announced that this was his 5th and final year as Chair of the Committee. He will recommend to USAHA President Rick Willer that Dr. Robert Ehlenfeldt, Wisconsin State Veterinarian, replace him as the next Chair.
REPORT OF THE COMMITTEE ON LIVESTOCK IDENTIFICATION

Chair: Dr. Bob R. Hillman, Austin, TX
Vice Chair: Mr. Kevin D. Maher, Ames, IA

Mr. Jim Akers, KY; Dr. J. Lee Alley, AL; Dr. Joan M. Arnoldi, WI; Ms. Teri N. Baird, CO; Dr. Nathan Bauer, TX; Mr. John R. Behrmann, PA; Mr. Paul Brennan, IN; Mr. Allen Bright, NE; Mr. Matt Brockman, TX; Mr. John S. Cargile, TX; Dr. James T. Case, CA; Ms. Karen Conyngham, TX; Ms. Caren Cowan, NM; Dr. Nancy E. East, CA; Dr. Anita J. Edmondson, CA; Dr. James J. England, ID; Ms. J. Amelita Facchiano, TX; Dr. Robert Foudraine, WI; Dr. Tony G. Frazier, AL; Mr. L. Wayne Godwin, FL; Dr. Larry M. Granger, MD; Mr. Robert R. Green, DC; Dr. Kent Haden, SC; Dr. Steven L. Halstead, MI; Mr. Neil Hammerschmidt, MD; Dr. E. Ray Hinshaw, AZ; Mr. Joe N. Huff, CO; Dr. John R. Irby, FL; Dr. Julie Ann Jarvinen, IA; Mr. Jon G. Johnson, TX; Mr. Dick Jurgens, IL; Dr. Susan J. Keller, ND; Dr. Cleon V. Kimberling, CO; Mr. Ken Klippen, DC; Dr. Ralph C. Knowles, FL; Mr. Steve A. Larson, WI; Dr. Maxwell A. Lea, Jr., LA; Mr. James W. Leafstedt, SD; Mr. Jay C. Lemmermen, FL; Dr. Jim Logan, WY; Ms. Kelli S. Ludlum, DC; Ms. Jodi A. Luttrell, VT; Ms. Amy W. Mann, DC; Mrs. Phyllis Menden, WI; Mr. Terry R. Menlove, UT; Dr. William Mies, FL; Mr. David A. Miller, IA; Dr. Harry C. Mussman, MD; Mr. Richard E. Nelson, VT; Mr. Tim Niedecken, FL; Mr. Tom Nunes, CA; Dr. Kenneth E. Olson, IL; Dr. Angela Pelzel, TX; Dr. John R. Ragan, MD; Dr. Valerie E. Ragan, MD; Ms. Nancy J. Robinson, MO; Mr. Bill Sauble, NM; Mr. Charly Seale, TX; Mr. J. Gary Shoun, CO; Dr. Rick L. Sibbel, IA; Mr. Glenn N. Slack, KY; Dr. Bob Smith, OK; Dr. Mark Spalter, KS; Dr. Joe Starcher, WV; Dr. Robert Stout, KY; Mr. Scott Stuart, CO; Mr. Richard C. Taylor, TX; Mr. Victor L. Velez, CA; Dr. Elizabeth K. Wagstrom, IA; Mr. David C. Warren, FL; Dr. Gary M. Weber, DC; Dr. John F. Wiemers, IL; Dr. Gary W. Wilson, OH; Mr. Ross Wilson, TX; Dr. Cindy B. Wolf, MN; Dr. Taylor Woods, MO; Mr. John F. Wortman, Jr., NM; Dr. Cristopher A. Young, KY.

The Committee met on October 26, 2004 from 8:10 am to 4:30 pm. There were over two hundred committee members and guests in attendance. Chair Bob Hillman presided, assisted by Vice Chair Kevin Maher. The Chair welcomed the Committee members and guests to the meeting, discussed the Committee meeting expectations and addressed United States Animal Health Association (USAHA) Committee policies and procedures.

William Hawks, Under Secretary, Marketing and Regulatory Programs, United States Department of Agriculture (USDA), provided open-
LIVESTOCK IDENTIFICATION

ing remarks to the Committee members and guests. In his remarks he
discussed the fourteen listening sessions on animal identification that
USDA conducted around the United States. Mr. Hawks discussed three
key, common issues which were identified through the listening ses-
sions. These were confidentiality, cost and flexibility.

Mr. Hawks reported that $18.8 million was allocated for initial imple-
mentation of the National Animal Identification System (NAIS) during
2004, with over $12 million going to states in the form of cooperative
agreements for premises identification and implementation projects.
He also stated that $33 million was included in the 2005 President's
Budget for continued implementation of the NAIS. The listening ses-
sions revealed the imperativeness that the animal identification sys-
tem meet producers' needs while allowing USDA to do their job with a
very small amount of data they require to safeguard animal health.

Dr. John Weimers, USDA, Animal and Plant Health Inspection Ser-
ice (APHIS), Veterinary Services (VS), NAIS Coordinator, presented
a summary of the progress on the implementation of NAIS that was
announced by Secretary Ann Veneman in December, 2003. The com-
ponents of the national system were reviewed with updates provided
on the status of each. The National Premises System is well under way
with 13 states or tribes having either a compliant state system or the
Standardized Premises Registration System (SPRS) in place. Fifteen
additional states have requested the use of the SPRS, and 13 states
have their state or 3rd party system under evaluation for compliance
with NAIS data standards.

The progress on the development of the National Animal Identifica-
tion and Tracking System was discussed. An interim rule is being re-
viewed for publication that will recognize numbering systems described
in the NAIS as official for interstate movement and animal health con-
trol programs but will not mandate their use. USDA will receive recom-
pendations from USAHA and other sources on the development of a
Uniform Methods and Rules (UM&R) for NAIS.

An update on the progress of current NAIS cooperative agreements
indicated that 11 of the 29 agreements are completed with signatures,
17 have been sent out with notices of award for signature, and 1 is still
being processed. An additional $1.5 million is being made available to
the states that submitted proposals but were not initially funded. These
funds will focus on premises registration.

Continued funding for FY 2005 is expected with approximately $16
million earmarked for cooperative agreements. These funds will sup-
port continued field trials and premises registration and will be equita-
bly divided among all states. Administration of the agreements will be
through the VS Regions.

Recommendations to USDA on the implementation of NAIS will be
coordinated through the NAIS Subcommittee of the Secretary of
REPORT OF THE COMMITTEE

Agriculture’s Advisory Committee on Foreign Animal and Poultry Diseases (SACFAPD). Confidentiality remains a high priority for USDA. To this end, the agency has drafted language for a bill protecting NAIS data and sent it forward to the House and Senate for sponsorship.

Two new USDA brochures dealing with NAIS were shared with the committee, and other outreach efforts were reported.

Mr. Jim Niewold, Tri-Chair of the NAIS Subcommittee of the SACFAPD, presented a report on formation and activities of the NAIS Subcommittee. In July 2003, USDA established the NAIS Subcommittee. The objective of the NAIS Subcommittee is to provide recommendations to the SACFAPD regarding high-level strategies and objectives for the NAIS. This would include suggestions for the scope of the program, its development, and its implementation—including how the program should be implemented within various segments of the industry. Additionally, the Subcommittee will provide recommendations for the development of a UM&R.

Members
- Mr. John Adams (member SACFAPD) - National Milk Producers Federation
  Ms. Linda Campbell - American Dairy Goat Association
  Dr. Mark Engle - National Pork Board
- Dr. Robert Fourdraine - Wisconsin Livestock Identification Consortium
  Dr. Bob Hillman - Texas Animal Health Commission
  Ms. Amy Mann - American Horse Council
  Ms. Marcine Moldenhauer - Excel Corporation
- Mr. Jim Niewold (member SACFAPD) - Swine Producer
  Dr. Clarence Siroky - Idaho Department of Agriculture
  Mr. Scott Stuart - National Livestock Producers Association
  Mr. Gary Wilson - Cattle Producer, Ohio Department of Agriculture
  Dr. Cindy Wolf - University of Minnesota, Center for Veterinary Medicine
  Dr. Taylor Woods - Missouri Department of Agriculture

Subcommittee Tri-chairs

USDA-APHIS-VS Resources
- Mr. Neil Hammerschmidt – NAIS Program Staff
  Dr. Valerie Ragan – Assistant Deputy Administrator
  Dr. John Wiemers – NAIS Program Staff
**LIVESTOCK IDENTIFICATION**

- **USDA-APHIS-VS Liaison**

  The Subcommittee plans to meet two to four times annually with frequent conference calls between meetings. The Subcommittee values the continued input and feedback from stakeholders and recommends that the Species/Segment Working Groups and Issue Based Working Groups, previously established through the National Identification Development Team, be maintained. Additionally, the Committee on Livestock Identification of the USAHA and the National Institute for Animal Agriculture (NIAA) Identification Committee will provide recommendations through the Board of Directors (BOD) of each organization.

  The Subcommittee held their first meeting from September 7-8, 2004, at the USDA-APHIS-VS office in Riverdale, Maryland. The following summarizes the actions and discussion of the Subcommittee meeting.

  — Confirmed the overall goal of complete animal trace back and trace forward within 48 hours, recognizing that implementation actions to achieve this goal will be determined as the strategic plan is developed.

  — The implementation of NAIS is contingent on funding, regulations, etc., and will need to be established through a phased-in approach:

    • Premises Identification
REPORT OF THE COMMITTEE

- Animal Identification/Tracking
- Validation of the system
- Full implementation

  - Regarding confidentiality, reaffirmed that protection of data must be achieved before requiring premises or animal identification.

  - The establishment of an NAIS UM&R is a priority. Acknowledged the formation of the UM&R Subcommittee of the USAHA Committee on Livestock Identification, which will provide recommendations to the NAIS Subcommittee through the USAHA BOD.

  - Technology Neutral: While acknowledging the “technology-neutral” position of USDA, the Subcommittee will recommend that technology standards determined by industry through species working groups be established in the NAIS. The technology standards must:
    - Support the 48-hour traceback goal
    - Be cost effective for each species
    - Automate the collection of animal identification and movement data in a way that does not impede the flow of livestock through marketing channels.

  - Data management issues:
    -APHIS should continue to develop the NAIS information system as outlined in the U.S. Animal Identification Plan 4.1
    - Focus specifically on needs of animal health
    - Any additional information in the system will be the responsibility of those who need it
    - The Information Technology Working Group will provide a final report at the Subcommittee’s next meeting.

  - Future priorities:
    - Completion of UM&R (Early 2005 distribution of draft)
    - Develop a NAIS Strategic Plan that contains time line for full implementation
    - Identify financial needs and prepare a long-term budget.

The NAIS Subcommittee is committed to an industry-stakeholder feedback structure that ensures “grass-roots” input that provides direction to the successful implementation of the NAIS!

The Cattle Work Group (CWG) strongly encourages the continuing development, implementation and funding of the National Animal Identification System (NAIS) to proceed as a partnership between the livestock industry and state and federal animal health officials. Confidentiality of producer information and animal movement data remains a key issue for resolve. Relative to confidentiality, the CWG expects private data management to play a role in the recording of animal data and subsequent reporting of pertinent cattle movements through commerce. The CWG recommends that all dairy and beef animals be individually identified in the left ear with official RFID ear-tag technology and movements reported at change of ownership or interstate movements or when multiple owners commingle cattle. All imported and exported cattle are to be officially identified with the same RFID ear-tag technology and pertinent tracking data reported to the NAIS database. Access to the data will be granted to state and federal animal health officials only under the following criteria: positive determination of a List A Disease; declaration of an animal health emergency by the Secretary of Agriculture; or tracking the origin of program diseases brucellosis, tuberculosis, Johne’s, etc.


Scott Stuart, leader of the NAIS Market / Processor Working Group, reported that group had identified the following primary areas of concern in the implementation of a national animal identification system:

- Costs associated with ID should not impose an undue burden on any segment of the industry.
- Competitive disadvantages cannot be created in marketing channels due to ID.
- Events which require that an animal’s identification to be “read” must be clearly defined and required equitably among the industry segments and participants.
- Animal welfare should be of utmost importance in the application and reading of identification devices.
- Safety of personnel at marketing facilities and packing facilities should be ensured as related to applying, reading, and harvesting identification devices.
- Compliance respective to the recording of animal movements by those outside fixed facility marketing and processing chan-
REPORT OF THE COMMITTEE

nels should be expected.

- Determination of the responsible party for application of identification devices should be clearly defined.
- Radio Frequency Identification (RFID) should be fully evaluated and its practical application to cattle movements through auction markets is determined.
- Technologies should continue to be evaluated in order to ensure the most cost-effective and appropriate systems are used.

In addition, Stuart reported the Market / Processor working Group had made the following observations:

- A national animal identification system, to be optimally effective and manageable for animal owners, managers, marketers, and processors, must operate as simply as possible.
- Therefore, reported movements should be kept to a minimum necessary to ensure adequate records to facilitate traceback and traceout functions.
- Very clear, unambiguous definitions of reportable events and responsible parties are critical for industry stakeholders to understand their responsibilities and what changes it may mean in their operations.
- Attention at this time should be focused on reporting events most necessary to achieve the goals of the USAIP.

Lastly, Stuart reported the Working Group had made the following specific recommendations:

1. Animals moving through markets should be read only one time to indicate an animal has been at a given premises on a given date.

   This should only be required if there is adequate technology available that will not slow the marketing process and reading at the market does not cause excessive negative economic impact on individual markets.

2. Radio Frequency Identification (RFID), adequately tested and proven workable, should be the recommended identification technology used in the beef and dairy cattle industries.

3. A long-term economic impact study should be required as a part of any ID pilot project being funded. The study should seek to determine the impacts on all levels of producers and stakeholders associated with the ID system being tested.

4. Application of identification devices to animals should be the responsibility of the owner/operator of the animal’s premises of origin.
LIVESTOCK IDENTIFICATION

Such tagging could occur at authorized tagging stations or auctions if available, but responsibility would still reside with the original premises owner/operator.

5. The term “receiving premises” be used in establishing the responsible party for reporting movement to the National Animal Identification Database.

Definition: Receiving Premises – The premises to which animals are moved and at which a responsible party (not necessarily the buyer) is responsible for reporting to the National Animal Identification Database that identified animals have arrived at that premises.

6. Any movement of an animal to a distinctly different premises and to a premises where commingling may occur must be reported to the National Animal Identification Database, regardless if a change of ownership has occurred.

7. It is recommended that all cattle be individually identified. The potential for cattle to be commingled is significantly higher than in other species and it is strongly felt that by having all cattle individually identified, this potential inequity could be averted.

Swine Working Group Report(SWG) – Presented by Mark Engle, Chair

The NAIS has evolved from the USAIP. In regards to swine, the NAIS identifies the need for a National Premises Identification System. Due to the nature of the pork production a premises ID will provide the majority of our industry with 48 hour traceback. The NAIS describes a “Phase-in Plan” to advance swine identification. The National Premises Identification System would provide for standardized and unique premises identification for all locations housing swine across the nation. This will allow for more efficient disease surveillance and timely health management for the benefit of all producers and animal health officials.

The “Phase-in Plan” is divided into three phases:

- Phase I refers to enhancement of swine ID through premises identification of breeding swine and identification of market swine to the last premises rather than the owner.
- Phase II provides for a standard for Group/Lot ID and production records to allow pigs to move in groups without individual identification. Standardized Group/Lot ID will be necessary if electronic group ID becomes a production advantage to producers and/or USDA-APHIS develops an electronic animal movement permit system.
- Phase III provides for tracking of all swine movements in the event USDA has the appropriate system developed to manage the data and can address confidentiality concerns. The
timelines for each Phase will be dependant upon funding, the establishment of premises IDs and resolution of data concerns. The highest risk population for health management are show pigs, “out of market” pigs and “off swine” due to the increased probability of commingling outside of the production system. Most likely individual ID will be necessary in these populations however the ideal system for each category will need to be researched for a better understanding.

Finally, the swine industry has had mandatory identification for interstate commerce since 1988. The mission of the Pork Industry Working Group is to expand and enhance swine ID as described in 9CFR71.19 to develop an effective yet affordable ID system for our industry.


The Sheep Industry Working group recommends continuation of the existing ID requirements of the USDA national scrapie eradication program until field trials determine the best application of electronic identification and associated tracking. A majority of sheep premises have been identified on a national level. With the gearing up of the NAIS, the scrapie program’s flock ID number will need to be converted in a computer to a nationally standardized premises number. The group anticipates that within the next few years electronic ID will be applicable for use for disease surveillance purposes in the breeding flock. ID and movement reporting would be required when breeding flock ewes and rams change ownership or move to any exhibitions. Group or lot ID is applicable to the lamb feeding industry where they originate from a single source and are maintained intact as a unit. If a lamb leaves this group prior to the endpoint, then it needs to be individually identified. The working group recognizes that exhibitions pose a significant potential disease threat and focused attention should be given to these activities. Findings from a current field trial being conducted by Jay Parsons and Cleon Kimberling from Colorado State University have begun to demonstrate the functionality and potential uses of electronic ID for both ewes and lambs. The industry has observed that ID compliance appears to be dependent on the effectiveness of an ongoing educational campaign, the perceived benefits of the program which are not limited to program purpose, i.e., scrapie control but are also related to the management benefits, and active inspection that animals are identified.
While sheep and goats have many similarities, there are differences between breeds and management types. Working with the goat industry to establish a workable plan helps to build industry support which can later result in better participation and cooperation. Forms of identification currently in use by those people who raise goats include: unique registration tattoos, neck tags, plastic and metal ear tags and electronic implants. The industry’s ultimate goal is to have a combination of visible and electronic identification. While ear tags could most efficiently provide both visual and electronic identification, the problems with retention, infections and the issue with the LaMancha breed, currently make it not acceptable as the only method of identification. Identification methods in use today include: registration numbers, DHI Identification, herd management identification, Scrapie Eradication Program (mandatory), and the Scrapie Flock Certification Program (voluntary). It is the goal of this group to merge these existing systems and ID methods into the National Animal Identification System. There is concern of the cost of the producer-born ID program components versus the value per head. Recommendations include: continuing with currently approved types of ID being used for Scrapie program, and incorporate them into the National System Standards, but also include ages and groups of goats not currently included with Scrapie Program. Conduct field trials to fully test devices with different breeds and management systems. To establish approved site for electronic implants (recommend tail, with removal of tail post-slaughter). To provide approved devices to producers. Where applicable, allow Group/Lot ID. To allow continued use of current tattoo and electronic ID for shows while requiring tags for sale purposes. To move toward using existing scrapie tags for kids under 60 days of age and use RFID tags for older animals, when suitable RFID tags are available. Successful implementation will require: allowing flexibility with ID methods beyond phase-in period, continuing involvement with industry representatives as the NAIS develops, working with organizations to integrate with existing ID systems, incorporating existing production/management information and current industry practices to ensure greater participation, implementing reasonable record keeping requirements, protecting producer confidentiality of records, initiating comprehensive educational effort that targets specific groups such as producers, markets and consumers.

Equine Working Group Report – Presented by Amy Mann, Chair

The Equine Species Working Group (ESWG) was established in March of 2004. It evolved from the American Horse Council’s Task
Force on National Equine Identification. There are 41 members, including representatives from 30 breed registries or organizations. The goal or focus of the ESWG has been to determine what the horse industry's participation should be and what it will look like. Like other species working groups we have been working on what the framework of the horse industry's participation will be.

The concept of a national ID system for horses has been discussed at equine industry meetings for the last several years. In the Fall of 2003, the American Horse Council organized a task force that included nearly thirty national equine organizations. Its purpose is to evaluate the concept of a national ID system and to determine if the horse industry could develop standards for equine identification that would benefit the industry and be compatible with the plans being considered.

Through the ESWG, the horse industry is evaluating the overall concept, its benefits and costs, as well as determining how the industry can participate and what standards for equine identification would fit into the system and help the industry.

The ESWG has held four face-to-face meetings and numerous conference calls. It has formed subcommittees to review in detail the many issues that still need to be thought through fully. The subcommittees formed and their purpose include:

- Identification and Technology Subcommittee to review what identification methods are appropriate and the technology available.
- Premises Identification and Responsibilities Subcommittee to review what premises should be included in any equine tracking system and what responsibilities the premise managers should have.
- Movement Recording Subcommittee to recommend what movements of horses should be tracked and how.
- Communications Subcommittee to keep the industry informed of developments regarding the national animal identification system (NAIS) through media and educational materials on a national plan for the equine industry.
- Implementation Projects Subcommittee to monitor progress of state implementation projects that include equine and to plan and draft an application when appropriate to USDA for federal funds to test the initial effectiveness of an identification system for the horse industry.
- Breed Registries to facilitate the coordination between registries in implementing a national equine identification system.
In May, when asked to give an update on the ESWG, we had many unanswered questions remaining. Today, as you can see by this slide, we have addressed twelve of them. There are others that must yet be addressed and we are working steadily toward that goal.

Much of the focus of the ESWG has been on communication and education to the equine industry on the NAIS and why the horse industry might participation in it. We’ve also worked to gain an understanding of the current ID methods in use in the horse industry. Many of the breed registries have recognized that they will be key entities in the implementation of the NAIS and a subcommittee specifically to address issues surrounding the coordination between these organizations has been established. Most recently, the ESWG has proposed some recommendations with regard to participation in a national animal identification system. These recommendations have been sent to all ESWG members, asking them to take them to their organizations for review and approval.

As part of our Communication and education efforts, the ESWG has produced several documents aimed at providing information on why the horse industry would participate in the NAIS. One of these documents lists the benefits to the horse industry. We’ve also produces an industry specific Frequently Asked Questions (FAQ). One of the questions we so often get asked is “why should horses participate as there are no diseases common to horses and other livestock or humans”. This is a common misconception and the ESWG is now working on developing publications that will help educate our industry with regard to this issue.

The American Horse Council (AHC) has agreed to host a website where this information can be housed. This has proved to be beneficial to those in the industry looking for background on equine ID.

One area that the ESWG needed was a clearer understanding of Equine ID technologies and the current use of identification in the horse industry. We established the ID and Technologies Subcommittee. This subcommittee surveyed nearly 100 breed registries and industry organizations on their requirements for equine identification. The survey contained 60 questions. Twenty-three responses were received giving us a reasonable picture of identification requirements in the horse industry.

The Subcommittee also recently sent a survey to RFID vendors to learn more about the availability of RFID for use in horses. Information has also been provided to the ESWG on current brand inspection practices throughout the country.

At the same time, Breed registries have been evaluating their current ID requirements and database capabilities. This was supported by the survey conducted by the ID subcommittee. The breed registries have also been evaluating the use of the Universal Equine Lifetime
REPORT OF THE COMMITTEE

Number, which has been implemented among breed registries world-
wide. The use of the UELN would ensure compatibility between data-
bases throughout the world.

At its most recent meeting the ESWG overwhelmingly agreed to
twenty-one recommendations that have been sent out to each mem-
ber with a request that their organization review and evaluate the rec-
ommendations for approval. A response deadline of 10 December 2004
was established with responses to be sent to the AHC for compilation.
Approved recommendations will be forwarded to NAIS, USDA by mid-
December. Recommendations not receiving approval will be returned
to the ESWG for reconsideration.

The ESWG asked that three of the proposed recommendations be
brought to the attention of the USAHA. Those recommendations are
as follows:

- Recommendation 1: To enhance disease surveillance through
  a successful identification and tracking program, standardized
  requirements for Certificate of Veterinary Inspection (CVI) must
  be established among the states. The standards for compli-
  ance shall be established and enforced both for intrastate and
  interstate movement. The USDA and the state animal health
  officials should work with the American Horse Council (AHC)
  to expeditiously establish these standards, and report their
  recommendations to the Equine Species Working Group
  (ESWG).

- Recommendation 2: Currently, for interstate and some intrast-
  ate movement of horses, a CVI is required. Proper identifica-
  tion should be associated with the CVI. At the time of veteri-
  nary inspection, any horse that has not been previously iden-
  tified or assigned an Animal Identification Number (AIN) shall
  be identified with an official form of identification.

- Recommendation 3: Accredited veterinarians completing the
  Equine Infectious Anemia (EIA) form VS 10-11 shall be re-
  quired to include the animal identification number, any elec-
  tronic identification and a more complete description of the
  horse’s coat color, white markings and any unique identifying
  marks including cowlicks, brands and tattoos. Whenever pos-
  sible, a digital photograph should be included.

Other recommendations being considered address questions of
equine premises, number recording/reporting responsibilities, use of
the Unique Equine Life Number (UELN), identification modalities and
implementation schedules.

The ESWG and its work groups continue to work to answer ques-
tions. We continue to communicate and cooperate with USDA to en-
LIVESTOCK IDENTIFICATION

sure the horse industry involvement in this process of developing the NAIS. Areas yet to be address include, but are obviously not limited to, database issues and costs (including who will pay for those costs) and finally an implementation schedule.

We've made significant progress but there remains a lot to do. It's a complicated issue, more so than most people on the outside recognize. Those of you in this room certainly recognize this.


Camelids-llamas and alpacas-are domestic farm animals, members of the order Artiodactyla, suborder Tylopoda, family Camelidae that also includes guanacos and vicunas. Their average lifespan is 15-25 years; estimated US population is about 300,000 animals with approximately 33,500 owners. The average herd size is 9-10 animals. There are 3 registries: International Lama Registry (ILR) (llamas, guanacos, vicunas and crossbreeds), Alpaca Registry Inc. (ARI) (alpacas only) and the Canadian Llama & Alpaca Association Registry (CLAAR) which includes all species and U.S. animals may be registered.

Camelid are used for fiber production, breeding and show stock, companions, pack animals (llamas) and livestock guardians (llamas).

Camelid premises are farms/ranches where 1 or more camelids are kept; shows/fairs/exhibitions; sales/auctions; transport vehicles; on-farm events; veterinary clinics; public lands and social events such as parades or nursing home visits. The CWG considers the latter two premises to have minimal epidemiological significance.

Methods of ID currently used for camelids include 124-128 kHz implanted microchips, tattoos, neck tags/collars, ear tags (bangle or clip), DNA or blood typing, photos and owner recognition. The registries recommend microchip implantation at the back of the base of the left ear. About 44% of all registered alpacas are already microchipped; about 10% of llamas are reported microchipped but reporting chip numbers to the ILR is optional. The alpaca registry will require microchipping as a prerequisite for registration in 2005. The CWG is hopeful that existing microchips will be accepted by the NAIS.

Camelid industry concerns with permanent identification voiced to the CWG include confidentiality; cost; the potential impact on 4-H, youth activities, rescue operations and independent shows – youth may not be able to afford to ID their animals so will not participate in activities and small events could fail from lack of participants. There is a concern about possibly losing access to trails and parks if those locations cannot afford to handle tracking requirements. The NAIS is seen by some owners as being a food animal program – camelids are not food animals. Others feel that current tracking using certificates of
REPORT OF THE COMMITTEE

veterinary inspection and registry data are sufficient for movement tracking.

Working group challenges include educating owners about the NAIS as it develops; obtaining more input from owners; reaching owners of unregistered animals and reaching consensus on the best methods of camelid ID. Microchips are the current method of choice. The Alpaca Research Foundation has issued a call for research proposals to evaluate ID methods through peer-reviewed research. Emerging ID technologies will also be evaluated, as they become available. For these reasons, the CWG is not yet in a position to make recommendations to the USDA on a camelid identification plan.

Poultry, Bison, Cervidae, and Aquaculture Working Groups

Chairman Hillman reported that the Bison Working Group (BWG) had developed a Working Group Report and submitted it to the Advisory Subcommittee for consideration, however, neither the chair nor the vice-chair were able to attend the meeting of the Committee on Livestock Identification. Chairman Hillman reported that the Working Group Chair had indicated the Bison report was consistent with the Cattle Working Group Report, except for a few special issues specific to bison.

Chairman Hillman reported that Working Groups had been established for Poultry, Cervidae and Aquaculture, but that these working groups had not yet developed a report or recommendations relative to the NAIS.

REPORT OF THE EQUINE SUBCOMMITTEE OF THE COMMITTEE ON LIVESTOCK IDENTIFICATION

Chair: Maxwell Lea, Jr.
Baton Rouge, LA

At the 2003 Annual meeting in San Diego, Committee on Livestock Identification Chairman John Wortman appointed a Sub-Committee to address equine ID as it relates to the United States Animal Identification Plan (USAIP). The Sub-Committee members are: Amy Mann, Amelita Facchiano, Angela Pelzel, Neil Hammershmidt, Tim Cordes, Peter Timoney, Steve Halstead, John Wortman, and Mack Lea, Chairman.

The Sub-Committee met by telephone conference call on Monday, March 15, 2004. Present on the call were Steve Halstead, Amelita Facchiano, Peter Timoney, John Wortman, Angela Pelzel, Neil Hammershmidt and Mack Lea.

The overwhelming sentiment of the Sub-Committee was that it
LIVESTOCK IDENTIFICATION

should work together with other equine ID groups to formulate a broad overall plan for equine ID. Efforts should be made to communicate with the American Horse Council (AHC), National Institute of Animal Agriculture (NIAA) and any/all other groups, organizations or committees interested in and working on equine ID at the national level. Integration of efforts to avoid duplication of work and accomplishments need to be priority.

It was agreed that the horse industry has time to develop a program, that the available time will allow the program to be developed correctly in an effort to satisfy as many factions as possible and to take advantage of the experience other species groups gain who are on a faster track.

Priorities need to be: education of the equine owning public, the development of a list of sound reasons why ID is important and what advantages ID will provide.

The question of confidentiality seems to be a concern of all involved. The prevailing thoughts are that this issue will probably have to be handled with legislation if owners and producers, regardless of species, are going to accept animal ID.

The AHC facilitated the formation of the National Equine ID Task Force (NEIDTF) at its January 2004 meeting in Los Angeles, California. The NEIDTF met in Dallas, Texas on March 18 and 19th, 2004. Eighteen people, each representing different equine groups, continued discussions concerning ID. Neil Hammerschmidt and Mack Lea were present representing USDA and state animal health officials. A number of decisions were made, the most important being that the industry has overwhelmingly bought into the ID program with conviction and enthusiasm. Minutes of the meeting are attached.

The NEIDTF met April 5, 2004 in Salt Lake City, Utah and made recommendations for the formation of the Equine Species Working Group (ESWG). As a result of the recommendations, the ESWG was established with representation from industry, state and federal entities. The Committee on Livestock Identification Committee Sub-Committee on Equine Identification is represented on the ESWG by Amy Mann, Amelita Facchiano, Neil Hammerschmidt, Tim Cordes, Peter Timoney, Steve Halstead, and Mack Lea.

With the inclusion of seven members of the Sub-Committee on the ESWG, the Sub-Committee feels it can best serve USAHA and the equine industry by continuing the work within the ESWG to develop a functional, realistic and acceptable program for the identification of the nation’s horses.
The concept of electronic health certificates developed as a result of state veterinarians growing concerns for foreign animal diseases in the mid 90’s. The USAHA supported this initiative more than five years ago. Concurrently, the Government Paper Elimination Act (GPEA) in 1998 initiative requiring electronic paperless interaction with various publics by 2003, aids the achievement of real-time ability to trace disease issues related to ongoing food safety concerns. Today electronic Interstate Certificates of Veterinary Inspection (ICVI) are being implemented by the United States Department of Agriculture (USDA)-Animal and Plant Health Inspection Service (APHIS)-Veterinary Services (VS)-Center for Epidemiology and Animal Health (CEAH) are fully coincide with the United States Identification Plan (USAIP).

Electronic health certificates offer the ability to create complete and legible documents, in corporate digital images and signatures of practitioners and laboratory technicians, compile real time data, allow for ease of data analysis and disseminate documents to the appropriate animal health officials with the same ease as sending e-mail. Reduction of paper work and time/cost benefits to administrative staff accomplishes the goals supported by USAHA, which are now in national implementation states by USDA-APHIS-VS. This project compliments the goals of the National Animal Health Laboratory Network (NAHLN) and their partnership with state and federal agencies to safeguard animal health as well as fully coincides with the USAIP and NIAS.

Program for Electronic ICVI’s have been implemented in 6 states (California, Colorado, Florida, North Carolina, Texas and Wisconsin). Sixty five accredited veterinarians in these 6 states have issued 2628 electronic ICVI’s for movement of 110,060 animals thru October 19, 2004.

Dr. Hillman asked what the acceptance level was at the veterinary practice level and Ms. Facchiano indicated that it varied based on practice level of knowledge and other issues.

Dr. Larry Williams asked when data can become available real-time – and Ms. Facchiano indicated it was available real-time now – States were just being sent a weekly/monthly summary of activities. Dr. Williams indicated that notifying once per day would be sufficient. Dr. Larry Coffman- industry asked for it to be used, and advancement of the process is due to hair off of people’s head. Voids occur at Ft. Collins. Until an investment is made in this process – it will stagnate.

Dr. Hillman asked if the system was capable of moving electronic
LIVESTOCK IDENTIFICATION

ID information from collection devices? Ms. Facchiano indicated it will happen in phase II.

REPORT FROM THE STATE PROGRAM STANDARDS FOR IMPLEMENTATION OF A NATIONAL ANIMAL IDENTIFICATION SYSTEM (NAIS) SUBCOMMITTEE

Taylor Woods, Subcommittee Chair
Jefferson City, MO

The report provided information gathered from all of the available species reports. The task of the subcommittee was to utilize the species reports in development of the state standards without changing the intent of the species reports. The goal of the subcommittee was to develop one document for all species, with specific species information placed in addendums to the document.

The subcommittee wanted to insure inclusion of the following areas in the state standards:
1. Introduction
2. Definition-Nomenclature
3. NAIS key data element standards.
4. Part III, Information system overview.
5. Part IV, Administrator roles and responsibilities.
6. Part V, Regulations and Policies
7. Part VI, Species Specific programs, producers and other stakeholders responsibilities.
8. Identification of commonalties among the species working group recommendations.
9. Addendum for the cattle species group.
10. Addendum for the swine species group.

Dr. Woods reviewed the NIAS State Standards draft. A copy is included as part of this Committee Report.
REPORT OF THE COMMITTEE

THE STATE’S STANDARDS FOR IMPLEMENTATION OF THE NATIONAL ANIMAL IDENTIFICATION SYSTEM (NAIS) PROGRAM

Subcommittee of NAIS Subcommittee of the Secretary of Foreign Animal Disease Committee

Report of NAIS Standards Subcommittee of the National Animal ID Steering Subcommittee of the USDA Secretary’s Foreign Animal Disease Advisory Committee.

This document represents the system standards which can be used by States and Tribes for NAIS implementation. The composition of this document reflects the efforts of the species working groups (as addendums) as well as commonalities between these reports.

This document will be presented to the United States Animal Health Association’s (USAHA) Animal Identification Committee in Greensboro, North Carolina, on October 22, 2004.

NAIS Standards Subcommittee Members:
Dr. Taylor Woods Dr. Joan Arnoldi
Dr. Kent Haden Mr. Kevin Maher
Dr. John Ragan Mr. Scott Stuart
Ms. Nancy Robinson Dr. Maxwell Lea, Jr.
Mr. Neil Hammerschmidt Mr. L. Wayne Godwin
Mr. Mark Engle Mr. Jay Lemmermen
Mr. Bill Sauble Mr. Kent Waters
Mr. Jim Akers

Table of Contents

Introduction 1

Part I: Definitions 3

Part II: NAIS Standards
A. Numbering Systems 7
B. Information System – Components/Data Elements 7
C. Official Identification 7

Part III. Information System Overview
A. National Premises System
B. National Animal System

Part IV. Roles and Responsibilities
A. Administration of Premises Registrations
B. Administration of Animal Identification
LIVESTOCK IDENTIFICATION

C. Administration of Non-producer participants
   1. AIN Managers, Distributores
   2. Tagging Sites

D. xxxxx

Part V.
Regulations and Policies
A. Confidentially
B. Release/access of data
C. Transition of official numbering systems
D. Xxx
E. Xxxx
F. Xxxx
G. 

Part V.
Species Programs, Producer and Other Stakeholder Responsibilities
A. Cattle
B. Equine
C. Goats
D. Sheep .................................................................
E. Swine
F. Other
   -Markets
   -Slaughter Plants
   -Order Buyers
   -Tagging Sites

Appendix
A. xxxx ...........................................................................
B. xxxxx ..........................................................................
C. xxxxx ..........................................................................
D. xxxx ..........................................................................

Introduction
Protecting American animal agriculture by safeguarding animal health is vital to the well being of all US citizens. It promotes human health; provides wholesome, reliable, and secure food resources; mitigates national economic threats; and enhances a sustainable environment. Essential to achieving this goal is an efficient and effective animal identification program.

The United States Department of Agriculture initiated the implementation of a National Animal Identification System (NAIS) in 2004. The goal of the National Animal Identification System is to have the capability to identify all animals and premises that had direct contact with a foreign animal disease (FAD) or disease of concern within 48 hours after discovery.
The identification of individual animals or a group of animals with unique numbers and associating or linking those numbers to a premises (location) throughout each animal’s life in an information system is the basis of the NAIS. This basic and limited data will support the objective of achieving timely animal tracebacks and trace forwards when responding to an animal disease concern. The system will focus on all livestock within the represented industries regardless of their intended use as seedstock, commercial, pets or other personal uses. Initially, the program will be implemented on a voluntary basis, and eventually with requirements for premises and animal identification.

Traceback refers to the ability to track an animal’s location over its lifespan and the ability to determine which animals may have been in contact with the diseased animal or shared a contaminated feed supply. Trace forward data provides locations of animals moved out of the premises of concern that may have been exposed to the disease. The ability to achieve the 48 hour goal is directly related to the completeness of animal movement data that is reported to the national system (Neil, this is not a true statement. I let it go last conf. call because of the beef database confusion but one call to Smithfield and you have the movements of 700,000 sows and 14,000,000 pigs. 39 producers represent 80% of our swine inventory. Not sure this statement needs changed but this is not a true statement for us or poultry. Just so you know my position.). The identification of premises and animals, while requiring significant resources, is fundamental and straightforward. However, the collection and reporting of animal movement information to establish a record of the locations for each animal’s life is an enormous undertaking. This activity will require significant development, testing and substantial infrastructure. Due to this complexity, a phased-in implementation plan is scheduled to provide a timely and cost-effective program while ensuring it is functional, practical, and reliable. The implementation strategy must evolve through producer and stakeholder input and participation.

The establishment of national identification standards is key to the success of the NAIS. When applicable, such standards will follow those already in place internationally. The program must remain practical and flexible for the producers and animal health officials, and will incorporate new and proven technologies as they become available.

**NAIS Uniform Methods and Rules**

The NAIS Uniform Methods and Rules (UM&R) are cooperative procedures and standards adopted by the Animal and Plant Health Inspection Service (APHIS) and States to coordinate a national animal identification program. These UM&R are intended to assist State and Federal animal health personnel in implementing the NAIS consistently and equitably throughout the United States.

Additional information may be obtained from state or federal animal
LIVESTOCK IDENTIFICATION

health officials or at http://www.aphis.usda.gov/nais/ (site pending).

Part I. Definitions

American Identification Number
The American Identification Number was adopted in 1998 by the Council on Dairy Cattle Breeding to facilitate developing national programs that not only enhance genetic progress but also animal disease control and eradication. The number is defined as a 12 character field prefixed with “USA”. The American ID number, as an alphanumeric field, cannot be encoded in the ISO transponder. The American Identification Numbering system will be phased out (or merged with) the Animal Identification Number as it is implemented.

Animals
Consist of those species listed in the Species Codes definitions in Part.II.B.

Animal Identification Number (AIN)
The Animal Identification Number (AIN) will evolve into the sole national numbering system for the official identification of individual animals in the United States. The format contains 15 digits with the first three being the country code (840 for the United States).

AIN Allocator
The program administered by APHIS that allocates Animal Identification Numbers to AIN Managers.

AIN Managers
AIN Managers are companies that receive allocations of Animal Identification Numbers, are authorized by the USDA to manufacture approved identification devices or provide approved identification technologies that contain the Animal Identification Number and has responsibilities for the distribution of AIN Tags through AIN Distributors.

Note: AIN Managers that distribute AIN numbers to a premises will also be an AIN Distributor.

AIN Tag
Official identification devices that have the Animal Identification Number (AIN) printed on the identification device. Only official identification devices may carry the US Shield.

AIN/RF Tags
AIN Tags that have an RFID transponder encased and is configured so it can be attached to an animal’s ear.

AIN Tag Manufacturer
Manufacturer approved by APHIS to produce identification tags with the AIN.

AIN Tag Distributors
AIN Distributors are individuals, organizations or companies that
provide AIN Tags to a premises that manages or holds livestock. The AIN Distributor must have an AIN Tag distribution agreement with an AIN Manager(s) to be eligible to be an AIN Distributor. AIN Distributors may include state departments of agriculture, breed associations, producer organizations, service providers, veterinarian clinics, etc.

**Brand Inspection Entity**

**Breeding Stock**
- Sexually intact animals of either sex. Veal calves and females of any species moving direct to a terminal feedlot are exceptions.

**Check Digit**
- A decimal (or alphanumeric) digit added to a number for the purpose of detecting the sorts of errors humans typically make on data entry.

**Compliant Premises Registration System**
- A premises registration system developed by a State, Tribe or third party that, through evaluation conducted by USDA/APHIS, is compliant with the NAIS data standards and that meets established security communication requirements.

**Country code**
- A 3-digit numeric code representing the name of a country in accordance with ISO 3166.

**Electronic Identification (EID)**
- An identification method that utilizes electronic technology including, but not limited to, bar codes, 2-D symbology, and radio frequency.

**Group/Lot Identification Number (GIN)**
- The identification number used to uniquely identify a unit of animals of the same species that is managed together as a group throughout the preharvest production chain. The GIN consists of a seven-character Premises Identification Number and a six-digit representation of the date on which the group or lot of animals was assembled (MM/DD/YY).

**Individual Animal Identification**
- A means of identification that provides unique identification of an animal so to differentiate one animal from another. Official individual animal identification uses methods that meet the definition of official identification.

**Identification Methods**
- A means of identifying an animal, including ear tags, biometrics, brands and brand inspection records, breed registry certificates, etc.
LIVESTOCK IDENTIFICATION

Interstate Movement
Movement that crosses state lines, regardless of ownership at either shipping or receiving premises.

Intrastate Movement
Movement that does not cross a state line and does not meet criteria for entering interstate commerce.

Intrastate Commerce
Movement that involves commingling or change of ownership, but does not cross a state line nor meet criteria for entering interstate commerce.

ISO
International Organization of Standards.

ISO Transponder
RFID device that transmits its transponder code according to ISO 11784/11785 when activated by an ISO transceiver and that has been evaluated and approved for conforming to these standards by the International Committee on Animal Recording.

ISO Transceiver (Reader)
Transceiver that reads at least both ISO FDX-B and ISO HDX transponders as defined in ISO 11784/11785.

Mandatory Identification
A state and/or federal identification requirement that defines which livestock must be identified according to established protocols.

National Animal System

National Premises System
The National Premises System is the overall premises system, consisting of Premises Number Allocator, the Premises Registration Systems and the National Premises Information Repository.

Non-producer Participant
A person or entity who will engage in the NAIS in one or more designated roles, that in many instances will require that they provide data to the national identification database. Such entities include USAIN Manager, AIN Distributor, Animal Health Official, Brand Inspection Entity, Diagnostic Laboratory, etc.

Official identification Devices and Methods
Means of officially identifying an animal or group of animals using devices or methods approved by the Administrator, including, but not limited to, official tags, tattoos, and registered brands when accompa-
REPORT OF THE COMMITTEE

nied by a certificate of inspection from a recognized brand inspection authority.

Officially Identified
The point in time when an official animal identification number is applied to an animal by means of an identification method or device approved by the Administrator for purposes related to official disease control programs or animal movements in interstate or international commerce.

Official Identification Numbers
Numbering systems recognized in the CFR; alpha-numeric National Uniform Ear tagging System or valid premises identification number that is used in conjunction with the producer’s livestock production numbering system. The NAIS directs the establishment of the Animal Identification Number as the sole official identification number over an agreed-to period of time.

Premises
A premises is an identifiable physical location that, in the judgment of the State Animal Health Official or Area Veterinarian in Charge, and when appropriate in consultation with the affected producer, represents a unique and describable geographic entity where activity affecting the health and/or traceability of animals may occur.

Premises Identification Number
The official premises identification number for the United States. The number is nationally unique and has no meaning itself. The premises number is associated with an address or legal land description. The field specification for the Premises Identification Number is:
- 7 characters (right most character is a check digit)

Premises Identification of Individual Animals
Based on the species, the class of animals and the diseases of concern, premises identification of individual animals can be adequate to achieve the traceback objective, for example sows and boars going to a cull market. In these cases an official identification device bearing the last premises ID number is attached to the animal prior to its movement and identify that animal to its source farm.

Premises Number Allocator
The program administered by APHIS to allocate the Premises Identification Numbers through interfaces with the Standardized or a Compliant Premises Registration System.

Radio Frequency Identification (RFID)
An ID device that utilizes radio frequency technology. The RFID device or method of identification includes ear tags, bolus, implants (inject), and tag attachments (transponders applied during the tagging process).
LIVESTOCK IDENTIFICATION

Standardized Premises Registration System
The Premises Registration System made available to the State and Tribes by APHIS.

Terminal Feedlot (Designated Feedlot)
A livestock feeding operation in which all animals, upon exit of the operation, move directly to a slaughter plant.

Transponder code
Code as programmed in the transponder and defined in ISO 11784 (Table 1) and ISO 11785.

Write Once Read Many (WORM)
Distinguishing a transponder that can be partly or totally programmed once by the user, and thereafter only read.

Part II. NAIS Data Standards for Key Components
II. A. Data Elements and Numbering Systems
To achieve the “48-hour” traceback objective, the movement of individual animals, or “units of animals”, must be recorded. Reporting this information to the national information system is necessary to achieve timely response to animal disease concerns. Standards for certain data elements are essential for a successful information system in which data is shared among States and the Federal government, as well as being provided or linked through certified commercial service providers.

Specifications for the key data elements are summarized in the chart below followed by more explanation.

<table>
<thead>
<tr>
<th>Key Data Element Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data Element</td>
</tr>
<tr>
<td>---------------------------</td>
</tr>
<tr>
<td>Premises Identification Number</td>
</tr>
<tr>
<td>Non-Producer Participant Number</td>
</tr>
<tr>
<td>Animal Identification Number</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Group/Lot Identification Number</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
II. A.1. Premises

Tracing a subject animal or a group/lot of animals to its origin and determining other potentially exposed premises and animals can only be achieved with a complete record of all locations that manage or hold livestock. Such locations are referred to as “premises”. Identifying these premises with a single and unique number is essential to trace animals potentially exposed to disease. If more than one premises number is used for the same location, animals subject to contagious disease can go undetected. Therefore, the assignment of a unique number for each premises is essential.

The diversity of the environments in which we manage livestock makes the definition of such locations quite complex. From a general perspective, the following defines a premises:

“A premises is an identifiable physical location that, in the judgment of the State Animal Health Official or Area Veterinarian in Charge, and when appropriate in consultation with the affected producer, represents a unique and describable geographic entity where activity affecting the health and/or traceability of animals may occur.”

More specific premises definitions will be established to define livestock operations and environments as the NAIS is developed. In addition to farms, ranches and other production units, markets, packing plants, quarantine facilities, ports of entry, veterinarian clinics, etc. will be registered in the national premises system.

Premise Identification Number

The official premises identification number for the NAIS. The number is nationally unique and has no meaning itself. The premises number is associated with an address or legal land description. The field specification for the Premises Identification Number is:

- 7 characters (right most character is a check digit)
- Example: A123R69

II. A. 2. Non-producer Participants

The NAIS provides for the establishment of Non-producer Participants who have authorized responsibilities. These participants may submit information to the designated databases. Data they supply will be associated with their Non-producer Participant Number so proper controls and integrity measures of the data can be maintained. The USDA will establish enrollment/application procedures for Non-producer Participants and will be responsible for the allocation of unique Non-producer Participant Numbers to such entities/individuals.

A Non-producer Participant number must be obtained from USDA/APHIS or cooperating State/Tribe before data can be uploaded to the national system. This allows the submitting Non-producer Participant
LIVESTOCK IDENTIFICATION

to be contacted in the event of error in the file they submit.

Non-producer Participant Number
The field specification for the Non-producer Participant is:
• 7 characters (right most character is a check digit)
• Example: H892345

The Non-producer participant number is generated through the same computer program that generates the premises number.

II. A. 3. Animal Identification
Two types or levels of animal ID are necessary to support animal disease management programs: individual animal and “group/lot” identification. Individual animal identification is needed for tracking animals that are destined to be commingled with animals outside of the production system in which they were born as they move through the production chain. While certain traceback functions can be achieved with Premises ID alone it cannot be used to record an individual animal's movement through multiple marketing and commingling points. In this instance, individual animal identification is necessary.

Group/Lot ID can be used in species where groups of animals are assembled from within the same production system and tracking is achieved through recording of group movements and the maintenance of required production record elements. In the event animals identified through Group/Lot ID become commingled with animals outside the production system, unique individual animal identification becomes necessary.

• Individual Animal Numbers

The collective livestock industries agree that a national numbering system is most effective when individual ID is required. However, with several “official” numbering systems in use today, achieving a single national numbering system can only be accomplished through a planned transition.

Current numbering systems considered official for the interstate movement of livestock include:
• USDA uniform state series code
• Breed registration numbers
• Premises ID used in combination with a unique herd management ID

The standard for the single national numbering system must:
• Be compatible with national numbering systems already established in other countries;
• Avoid duplication of any existing numbers.

Animal Identification Number
The field specification for the Animal Identification Number is:
REPORT OF THE COMMITTEE

- 15 digits (first three digits is the country code, plus 12 digit national number)
- Example: 840123456789012

The AIN will become recognized in the Code of Federal Regulations as an official number for identifying individual animals. A transition plan to establish the AIN as the sole numbering system for individual identification will be established in the future. Additionally, over time all official animal health programs will incorporate the AIN.

The American Identification Number (USA plus 12 digits) and the RFID code number (3 digit manufacture code plus 12 digits) in ISO compliant transponders will be recognized as an official number by an interim rule during a transition period.

**Group/Lot Identification Numbers**

Group/Lot ID (GIN) is used in industries where production practices involve management by groups. In such cases, there is no traceback advantage to individual identification. Thus, individual animals will not be identified; instead, groups of animals can be tracked using appropriate group identifiers and production records. A unique and standardized number is necessary to track groups of animals in the national system. Group/Lot ID is an option for certain species in which animals move as a group through the production chain and when such identification will meet the requirements of 48-hour traceback. Requirements for Group/Lot ID may vary by species.

An animal production system can use Group/Lot Identification if the producer is able to demonstrate to the satisfaction of state animal health officials that, through group identification and production records, 48-hour traceback can be accomplished to all premises with animals potentially exposed to disease.

**Group/Lot Identification Number**

The field specification for the Group/Lot Identification Number is:

- 13 Characters combining the Premises Identification Number (7) of the premises where the groups was assembled and the date (6) the group was assembled (mmddyy)
- Example: A234567100302 (Group assembled on October 3, 2002)

If more than one group of animals is assembled on a particular day at a given premises, the animals will still be considered a single group for the purpose of assigning a GIN.

**II. B. Information System – Components/Data Elements**

The National Animal Identification System (NAIS) requires the collection of data, interfaces to exchange data and the data repositories to support the 48-hour traceback objective. The overall system must allow for the identification of each premises, and the recording and re-
LIVESTOCK IDENTIFICATION

porting of the animal identification and animal movement data. Additionally, the system must associate or link the animal ID data to each premises where the animal or group was located and the specific dates the animal(s) was at the premises (locations).

The primary information system components of the NAIS include the National Premises and National Animal Systems.

II.B. 1 National Premises System

The National Premises System includes the Premises Number Allocator, the Premises Registration Systems and the National Premises Information Repository.

• Premises Number Allocator

The national uniqueness of each premises identification number is achieved through this program that the Premises Registration Systems interfaces with when administering the registration of premises. Assigning premises numbers to a valid address or legal land description will help avoid having multiple numbers assigned to the same operation, regardless of species.

• Premises Registration Systems

The Premises Registration Systems (databases) provides for the administration of premises enrollments according to the national requirements. The States and Tribes who are responsible for administering the registration of premises within their geographic areas (or boundary of the multiple states working together) may use either of the following system options:

Standardized Premises Registrations System: The USDA will provide a Standardized Premises Registration System that a State and Tribe may elect to use. This web based system, housed at the Centers of Epidemiology (CEAH), provides each State/Tribe using the system with its own administrative functions to establish access authorization, user privileges, etc.

Compliant Registration Systems: States and Tribes may use premises registration systems other than the one provided by the USDA. Such systems, developed with the state departments, or provided through contractual arrangements of third parties, must be evaluated for compliance with the NAIS data standards. USDA will support the establishment of the interfaces of systems that meet the data and security criteria. When the interfaces are functioning properly, these Compliant Premises Registration System may be used by States or Tribes to register premises in the NAIS.

All systems will ensure compatibility is achieved through adherence to the NAIS data standards. The States and Tribes are responsible for the administration of premises registration, and as a minimum collect and maintain the information defined in the following chart.
Do we need date “sold” or “transferred”? I guess the contact person will change in a sale so not sure we need more than that.

In addition, the historic data is to be maintained for 20 years. This will provide Animal Health Officials with the proper contact reference when the current contact person was not associated with the premises during the period being researched in a traceback situation.

States and Tribes may also establish various means for collecting and entering the data into the system they elect to operate. These cooperative efforts may be with industry organizations, brand inspection entities, third party service providers, etc.

- National Premises Information Repository

The National Premises Information Repository centralizes agreed-to data from the Standardized and Compliant Premises Registration Systems. A real-time subset of all Premises Registration Systems is necessary to support the national infrastructure. For example, the National Premises Repository will enable the functionality necessary to administer the allocation of Animal Identification Numbers (AIN) to a premises. AIN Distributors will have look up capabilities in the National Premises Repository to confirm that a producer has a valid Premises Identification Number before distributing Animal Identification Numbers to a producer.
LIVESTOCK IDENTIFICATION

The following chart defines the fields (data elements) that are required by the National Premises Information Repository.

<table>
<thead>
<tr>
<th>National Premises Information Repository - Data Elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field Name</td>
</tr>
<tr>
<td>------------</td>
</tr>
<tr>
<td>Premises ID Number</td>
</tr>
<tr>
<td>Name of Entity</td>
</tr>
<tr>
<td>Owner or Appropriate Contact Person*</td>
</tr>
<tr>
<td>Street Address</td>
</tr>
<tr>
<td>City</td>
</tr>
<tr>
<td>State</td>
</tr>
<tr>
<td>Zip/Postal Code</td>
</tr>
<tr>
<td>Contact Phone Number</td>
</tr>
<tr>
<td>Operation Type</td>
</tr>
<tr>
<td>Date Activated</td>
</tr>
<tr>
<td>Date Retired</td>
</tr>
<tr>
<td>Reason Retired</td>
</tr>
</tbody>
</table>

* The contact person should be the person the animal health official is to communicate with when performing a traceback (as determined by the entity).

IV.B.2. National Animal System

The National Animal System includes the AIN Allocator, Animal Identification and Tracking Systems (Animal ID/Tracking) and the National Animal Records Repository (Animal Repository).

- **AIN Allocator:** The AIN Allocator supports the allocation of Animal Identification Numbers to AIN Managers. Only authorized AIN Managers have access the system. The AIN Allocator maintains a record of all animal numbers allocated to each AIN Manager. AIN Managers, may be AIN Distributors or have marketing agreements with independent AIN Distributors who provide the AIN devices to the producers.

  Note: Animal Identification Numbers are only allocated to AIN Managers by APHIS.

- **Animal Identification and Tracking Systems:** The Animal Identification and Tracking Systems are administered at the state/regional level and provides required animal records to the National Animal Records Repository. APHIS will provide a Standardized Animal Identification and Tracking System that States/Tribes may elect to use. States and Tribes, through cooperative efforts with industry, may elect to have their information administered at the local or regional level through their own system or ones provided by third parties. Systems that meet the data standards and communication security requirements will be designated as a Compliant Animal Identification and Tracking System. Such systems most likely will maintain additional information as determined by the industry. However, the
REPORT OF THE COMMITTEE

data submitted to the National Animal Repository will be consistent from both systems. (See File Format xx in the NAIS Technical Supplement).

- National Animal Records Repository: This repository is a centralized database that receives records direct from producers and Non-producer Participants, from Standardized and Compliant Animal ID/Tracking Systems. Such data includes, but not limited to, the allocation of AIN to a premises, records of animal sightings, movements, and terminations. Access to the repository is restricted to state and federal animal health officials when information is required to perform their responsibility for maintaining the health of the US herd.

The following table lists the fields that are maintained for individual animals on the National Animal Records Repository.
## LIVESTOCK IDENTIFICATION

<table>
<thead>
<tr>
<th>Field Description</th>
<th>Data Type</th>
<th>Size</th>
<th>Required</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Event Type Code</td>
<td>Numeric</td>
<td>2</td>
<td>Y</td>
<td>1 (see following event code table)</td>
</tr>
<tr>
<td>Sighting/Reporting Premise ID</td>
<td>Character</td>
<td>7</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>Source/Destination Premise ID</td>
<td>Character</td>
<td>7</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>Event Date &amp; Time</td>
<td>Numeric</td>
<td>12</td>
<td>Y</td>
<td>YYYYMMDDHHMM</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>200308011223</td>
</tr>
<tr>
<td>Animal ID number</td>
<td>Numeric</td>
<td>15</td>
<td>Y</td>
<td>Until AIN number is the only approved animal ID identifier, Other official IDs need to be reported as alternate ID fields</td>
</tr>
<tr>
<td>Species</td>
<td>Character</td>
<td>3</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>ID Electronically Read</td>
<td>Boolean</td>
<td>1</td>
<td>Y</td>
<td>0 (False default) / 1 (True)</td>
</tr>
<tr>
<td>Animal Date of Birth</td>
<td>Character</td>
<td>8</td>
<td>N</td>
<td>YYYYMMDD</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>20020101</td>
</tr>
<tr>
<td>Age of Animal</td>
<td>Character</td>
<td>3</td>
<td>N</td>
<td>(M)onth, (D)ay, (Y)ear i.e. M1</td>
</tr>
<tr>
<td>Sex</td>
<td>Character</td>
<td>1</td>
<td>N</td>
<td>(M)ale, (F)emale, (C)astrated/neutered male,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(S)payed/neutered female</td>
</tr>
<tr>
<td>Remarks</td>
<td>Character</td>
<td>50</td>
<td>N</td>
<td>Description/other comments</td>
</tr>
<tr>
<td>Status</td>
<td>Character</td>
<td>1</td>
<td>N</td>
<td>(C)orrection</td>
</tr>
<tr>
<td>Alternate Animal ID 1</td>
<td>Character</td>
<td>17</td>
<td>N</td>
<td>Alternate pre-existing official Identification number if USAIN not available, Lot ID number if animal has USAIN number and was moved out of a lot, old USAIN number if tag replaced</td>
</tr>
<tr>
<td>Alternate Animal ID Type 1</td>
<td>Character</td>
<td>1</td>
<td>N</td>
<td>(A)merican ID, (U)SDA eartag, (R)FID, (B)reed registry number, (L)ot number, (T)tattoo, required if Alternate ID (field 15) is provided, R(E)placement USAIN number if event code 6 used</td>
</tr>
<tr>
<td>Alternate Animal ID 2</td>
<td>Character</td>
<td>17</td>
<td>N</td>
<td>Second alternate pre-existing official Identification number if USAIN not available, or Lot ID number if animal has USAIN number and was moved out of a lot</td>
</tr>
<tr>
<td>Alternate Animal ID Type 2</td>
<td>Character</td>
<td>1</td>
<td>N</td>
<td>(A)merican ID, (U)SDA eartag, (R)FID, (B)reed registry number, (L)ot number, (T)tattoo, required if Alternate ID (field 17) is provided</td>
</tr>
</tbody>
</table>
REPORT OF THE COMMITTEE

- Animal Event Codes

<table>
<thead>
<tr>
<th>Event Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tag allocated – National USAIN number is allocated to a premises</td>
</tr>
<tr>
<td>2</td>
<td>Tag applied - National Animal ID tag is applied to an animal</td>
</tr>
<tr>
<td>3</td>
<td>Moved in – Animal is moved into a premise</td>
</tr>
<tr>
<td>4</td>
<td>Moved out – Animal is moved out of a premise</td>
</tr>
<tr>
<td>5</td>
<td>Lost Tag – New tag is applied to an animal that lost a tag and previous USAIN is unknown</td>
</tr>
<tr>
<td>6</td>
<td>Replaced Tag or Re-Tagged – New tag is applied to an animal that lost a tag and previous USAIN is known</td>
</tr>
<tr>
<td>7</td>
<td>Imported – Animal is imported into the U.S.</td>
</tr>
<tr>
<td>8</td>
<td>Exported – Animal is exported out of the U.S.</td>
</tr>
<tr>
<td>9</td>
<td>Sighting – Animal has a confirmed sighting at a location, no movement has occurred. (Ex: vet sighting)</td>
</tr>
<tr>
<td>10</td>
<td>Slaughtered – Animal was sent to slaughter.</td>
</tr>
<tr>
<td>11</td>
<td>Died – Animal died of natural causes or euthanised at the farm/ranch</td>
</tr>
<tr>
<td>12</td>
<td>Tag retired – Tag retired by producer, packing house, etc.</td>
</tr>
<tr>
<td>13</td>
<td>Animal Missing (lost stolen, etc)</td>
</tr>
<tr>
<td>14</td>
<td>ICVI – Certificate of veterinary inspection</td>
</tr>
</tbody>
</table>

- Group/Lot Event Codes

<table>
<thead>
<tr>
<th>Event Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Begin Group/Lot, Group/Lot of animals was established at a premise</td>
</tr>
<tr>
<td>2</td>
<td>Moved Group/Lot in, Group/Lot of animals was moved into a premise</td>
</tr>
<tr>
<td>3</td>
<td>Moved Group/Lot out, Group/Lot of animals moved out of a premise</td>
</tr>
<tr>
<td>4</td>
<td>Sighting Lot has a confirmed sighting at a location, no movement has occurred (i.e. vet sighting)</td>
</tr>
<tr>
<td>5</td>
<td>End Group/Lot, Group/Lot inventory is zero</td>
</tr>
</tbody>
</table>

National Animal Records Repository - Group/Lot Data Elements

<table>
<thead>
<tr>
<th>Field Description</th>
<th>Data Type</th>
<th>Size</th>
<th>Required</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Event Type Code</td>
<td>Numeric</td>
<td>2</td>
<td>Y</td>
<td>1 (see following event code table)</td>
</tr>
<tr>
<td>Premise ID</td>
<td>Character</td>
<td>7</td>
<td>Y</td>
<td>(Required when event code is 2, 3, or 4)</td>
</tr>
<tr>
<td>Event Date &amp; Time</td>
<td>Numeric</td>
<td>12</td>
<td>Y</td>
<td>YYYYMMDDHHMM 200308011223</td>
</tr>
<tr>
<td>Lot ID number</td>
<td>Character</td>
<td>13</td>
<td>Y</td>
<td>G/L ID number is comprised of Premises ID and date the lot was established</td>
</tr>
<tr>
<td>G/L Subset Identifier</td>
<td>Character</td>
<td>30</td>
<td>N</td>
<td>Used to identify subset such as a barn</td>
</tr>
<tr>
<td>Group Type</td>
<td>Character</td>
<td>1</td>
<td>Y</td>
<td>(S)tatic, (D)ynamic</td>
</tr>
<tr>
<td>Species</td>
<td>Character</td>
<td>3</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>Event Remark</td>
<td>Character</td>
<td>50</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>Status</td>
<td>Character</td>
<td>1</td>
<td>N</td>
<td>(C)orrection</td>
</tr>
</tbody>
</table>

376
### LIVESTOCK IDENTIFICATION

- **List Codes**

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Species</th>
<th>Type List Options</th>
<th>Length Stored As</th>
<th>Field Name</th>
<th>Sex</th>
<th>Type List Options</th>
<th>Length Stored As</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bovine</td>
<td>Species</td>
<td>BOV</td>
<td>3</td>
<td>Male</td>
<td>M</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Camelid</td>
<td>Species</td>
<td>CAM</td>
<td></td>
<td>Female</td>
<td>F</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equine</td>
<td>Species</td>
<td>EQU</td>
<td></td>
<td>Neutered/</td>
<td>C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Porcine</td>
<td>Species</td>
<td>POR</td>
<td></td>
<td>castrated male</td>
<td>S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ovine</td>
<td>Species</td>
<td>OVI</td>
<td></td>
<td>Neutered/</td>
<td>S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caprine</td>
<td>Species</td>
<td>CAP</td>
<td></td>
<td>spayed female</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cervids</td>
<td>Species</td>
<td>CER</td>
<td></td>
<td>Mixed (used in groups)</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deer</td>
<td>Species</td>
<td>DEE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elk</td>
<td>Species</td>
<td>ELK</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Equine industry will expand as necessary

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Operation Type</th>
<th>Length Stored As</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poultry</td>
<td>Clinic</td>
<td>C</td>
</tr>
<tr>
<td>Chickens</td>
<td>Exhibition</td>
<td>E</td>
</tr>
<tr>
<td>Turkeys</td>
<td>Laboratory</td>
<td>L</td>
</tr>
<tr>
<td>Geese</td>
<td>Market/Collection</td>
<td></td>
</tr>
<tr>
<td>Ducks</td>
<td>Point</td>
<td>M</td>
</tr>
<tr>
<td>Pheasants</td>
<td>Production</td>
<td>P</td>
</tr>
<tr>
<td>Guinea</td>
<td>Port of Entry</td>
<td>B</td>
</tr>
<tr>
<td>Quail</td>
<td>Quarantine</td>
<td>Q</td>
</tr>
<tr>
<td>Pigeon</td>
<td>Facility</td>
<td>Q</td>
</tr>
<tr>
<td>Aquaculture</td>
<td>Non-producer</td>
<td>N</td>
</tr>
</tbody>
</table>

* Hunt Ranches, etc, included

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Reason Retired</th>
<th>Length Stored As</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trout</td>
<td>Error (Reported in error)</td>
<td>E</td>
</tr>
<tr>
<td>Salmon</td>
<td>Developed (Operation terminated resulting from commercial development)</td>
<td>D</td>
</tr>
<tr>
<td>Catfish</td>
<td>Merged</td>
<td>M</td>
</tr>
<tr>
<td>Tilapia</td>
<td>Sold</td>
<td>S</td>
</tr>
<tr>
<td>Striped Bass</td>
<td>Split</td>
<td>X</td>
</tr>
<tr>
<td>Shrimp</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crawfish</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oysters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clams</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scallops</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mussels</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

377
REPORT OF THE COMMITTEE

Certain fields are predefined for list standards that will allow the data to be selected and stored consistently. Such list standards are presented below.

II.C. Official Identification

Official identification requirements, as well as methods and devices, vary among species. The means of officially identifying an animal or group of animals using devices or methods are those approved by the APHIS Administrator, including, but not limited to, official tags, tattoos, radio frequency identification, and registered brands when accompanied by a certificate of inspection from a recognized brand inspection authority.

Animals identified as individuals versus a group or lot of animals will have different requirements. These specifications are defined through species specific standards. Such standards and definitions are provided in the species section of this UM&R.

AIN Tags will become the “defacto” standard for species when visual unique individual animal identification is necessary. The following chart lists the minimum standards for the AIN Tag. Certain species may incorporate other technologies as part of the AIN Tag. For example, the cattle industry has established RFID ear tags as their identification standard which meets these minimum standards.

<table>
<thead>
<tr>
<th>AIN Tags</th>
</tr>
</thead>
<tbody>
<tr>
<td>• the tag must bear the entire 15 digit number</td>
</tr>
<tr>
<td>• the tag must be designed for one-time use (tamper evident)</td>
</tr>
<tr>
<td>• the tag may not be readily altered or otherwise tampered with</td>
</tr>
<tr>
<td>• the national identification number must be easily and reliably readable</td>
</tr>
<tr>
<td>• the tag will have the US Shield imprinted</td>
</tr>
</tbody>
</table>

Is it the US shield or the USDA shield? I think the shield needs to be in the definitions.

Part III. Information System Overview

III.A. National Premises System

States and Tribes, responsible for the administration of premises registration in their area, may elect to integrate data from existing databases (brand registration and records, milk permits, etc), implement processes to initiate premises enrollments from “scratch” or they may utilize a combinations of the two. Premises registration procedures may include options for producer, or agents on their behalf, to register their premises through the internet, paper application forms, etc. While States/Tribes have flexibility in how they collect, update and administer
LIVESTOCK IDENTIFICATION

premises registration within their geographic area, compliancy with the NAIS standards will ensure nation-wide compatibility.

Each State and Tribe will use either the Standardized Premises Registration system or a Compliant Registration System. The following flow charts provide an overview of how the premises registrations are administered.

National Premises Registration System: Flow Chart Description

1: The premises identification data is administered in a Premises Registration System used by the State/Tribe. In some states/reservations the producer, or agent for the producer, may provide the information. Other states may “merge” or integrate data from existing data bases or use a combination of both methods to obtain the premises information.

2: The Premises Registration System being used by the State/Tribe, through a machine-to-machine interface, passes the address (or land description if no address is exist for the premises) to the Premises Number Allocator. The Premises Allocator determines if the address is valid and if the address has previously been allocated a Premises Number.

Illustration III.A.

Components of the NAIS Premises Registration Systems

When the address is valid and has no premises ID on record, the Premises Allocator returns the next available sequential premises number to the Premises Registration System. If a Premises ID Number is on record for the premises being processed, the Allocator will return the premises number already on file for that premises. In cases where
REPORT OF THE COMMITTEE

the premises does not have an address, an exception process will be established to assign a premises number to the appropriate locations of the livestock enterprise.

The Premises Registration System completes the identification/enrollment process of the premises, collecting as a minimum the data elements required by the National Premises Information Repository.

3: The Premises Registration Systems updates the National Premises Information Repository according to prescribed update procedures and file format specifications. This includes updates of new and revised premises records daily and monthly “master” updates. The “master” updates contain all records from each Premises Registration System.

The file format of the upload file from the Premises Registration System to the National Premises Information Repository is defined in the file format, “Premises Upload Record Format” (File: Prem #1) in the NAIS Technical Supplement.

III. B. National Animal System
III.B.1. Allocation of Animal Identification Numbers and Distribution of AIN Tags

APHIS will administer the authorization of AIN Manager and will assign them a Non-producer Participant Number.

4: The AIN Manager accesses the AIN Allocator for a pre-approved volume of Animal Identification Numbers. The AIN Allocator maintains a record of the numbers and the date the numbers are released to each AIN Manager. The AIN Manager may manufacture AIN Tags for their supply distribution chain or may provide the AIN Tags as they are ordered by their distributors.

5. The Premises representative request AIN Tags from an AIN Distributor and provides their Premises Identification Number. Note: AIN Mangers who sell AIN Tags direct to premises will also be AIN Distributors.

6: The AIN Distributor, through an authorized lookup access to the National Premises Information Repository, validates the reported premises number of the producer. If the Premises ID Number is correct, the AIN Distributor provides official identification devices to the producer/premises. Note: Official Identification devices can only be provided to entities that have a valid premises identification number.

7: The AIN Distributor reports the Animal Identification Numbers printed on the AIN Tags to the National Animal Repository. The “AIN/Animal Transaction” file (File: ID #1) is used to upload
LIVESTOCK IDENTIFICATION

the data from the AIN Distributor to the National Animal Records Repository.

8: The AIN Tags are shipped or delivered to the premises (or sold at the retail outlet to the representative of the premises).

III.B.2. Reporting Animal Events

Animal movements and sightings are reported to the National Animal Records Repository using ID File #1.

TO BE COMPLETED FROM USAIP 4.1 chart/text page 20.

Part IV. Administration Roles and Responsibilities

APHIS may execute cooperative agreements and/or Memorandum of Understanding (MOU) with the animal health authority of any State or Tribe to administer the NAIS. The NAIS will be achieved through shared responsibilities of State, Tribal governments and Federal agencies, producers and non-producer participants. These government responsibilities are summarized in the following chart.

IV.A. Premises Registration

The following general principles apply to the administration of a premises:

- Premises information shall be kept confidential and only partial data will be available to authorized officials.
A location will maintain the same Premises Number when sold intact. A historic record providing the previous contact information and the dates that information was associated with the premises must be maintained by the State administer the premises record.

Production locations that have multiple species must have one unique Premises Identification Number.

Owners with multiple production units and/or holding units will consult with their State Animal Health Official or Area Veterinarian in Charge to determine if multiple premises identification numbers are required. Establishing multiple premises identification numbers should be based on epidemiologic links and/or the likelihood of disease transmission among the premises.

The owner of the premises, or person designated by the owner of the premises, must register the location(s) and must keep the required information current.

### IV.A.1. APHIS Responsibilities for Premises Registration
- Administration of Premises Identification Numbering Systems

APHIS is responsible for the allocation of nationally unique premises identification numbers in accordance with the national standard. The Premises Allocator Program, through a secure web-based interface with the Standardized and Compliant Premises Registration Systems, will be administered by USDA/APHIS. The functionality, interface specification, etc. for the Premises Allocator is explained in the NAIS Technical Supplement.

The Premises Allocator, in addition to allocating unique premises
LIVESTOCK IDENTIFICATION

numbers to an address or legal land description, will maintain a record of the premises identification numbers allocated and the address or legal land description associated with each Premises number.

• Standardized Premises Identification System

APHIS will provide a Standardized Premises Registration System that States and Tribes may utilize to administer the identification of premises within the area they are responsible. The system will be available through the internet. APHIS will maintain and operate the application and make enhancements to the system. A “configuration control board”, made up of users from the States and Tribes utilizing the system, will be responsible to establish and prioritize enhancements to the Standardized Premises Registration System.

• Compliant Premises Registration Systems

APHIS will evaluate other premises registration systems to determine their compliancy with the establish data standards and communication security requirements that Compliant Premises Registration systems must adhere to. When the system is determined as being compliant, APHIS will support the administrator of the system to establish the interface with the Premises Allocator and National Premises Information Repository.

• National Premises Information Repository

USDA/APHIS is responsible for the administration of the National Premises Information Repository. All data maintained in the National Premises Repository is obtained from States and Tribes that use the Standardized or Compliant Premises Registration systems.

The USDA will establish access authorizations for certain Non-producer Participants that need access when performing their roles. For example, AIN Distributors must have lookup access to the Premises Repository to confirm that a producer has a valid Premises Identification Number before processing the distribution AIN Tags to that producer.

IV.A.2. State/Tribal Governments Responsibilities for Premises Registration

Each State/Tribe is responsible for the administration of the premises within the geographic area for which it has authority for animal health programs and related activities.

• Premises Number

The States and Tribes will identify each premises within their geographic area with the Premises Identification Number. Each premises number will be obtained through an interface with the Premises Number Allocator following established protocols. The State/Tribe that utilize the Standardized or a Compliant Premises Registration System will have authorized access to the Premises Number Allocator.
REPORT OF THE COMMITTEE

- Premises Registration

The State/Tribe will identify each premises in accordance with data standards defined in the Part II of this UM&R. They may maintain their premises data on the Standardized Premises Registration System provided by USDA or a Compliant Premises Registration system. Regardless of which system is used, the States/Tribes have the responsibility to identify premises and managing the premises data within the geographic area for which they are responsible.

The States will maintain the historic data for 20 years. This will provide Animal Health Officials with the proper contact reference when the current contact person was not associated with the premises during the period being researched in a traceback situation.

States and Tribes shall submit data on all premises as defined in Part II.A. to the National Premises Information Repository using the file transfer protocols provided in the NAIS Technical Supplement. The transmission of data will include new and revised premises records daily and monthly “master” updates. The “master” updates contain all records from the State premises database.

While each state will be required to adhere to the national standards and requirements, other functionality and data collection is at the discretion of the state.

The State Animal Health Authority and Tribal Governments will determine how the registration of premises will be administered on reservations in the states geographic boundaries.

IV.B. Animal Identification Components

IV.B.1. APHIS Responsibility for Animal Identification Components

- Animal Identification Numbering System

USDA/APHIS will administer the Animal Identification Numbering (AIN) System and have final authority to make decisions regarding the administration of the AIN System. It is imperative that APHIS implement proper controls that will ensure the uniqueness of the individual AIN numbers and that necessary information relative to the distribution of the numbers is properly maintained. USDA/APHIS, through a formal Agreement, will only allocate Animal Identification Numbers to AIN Managers and will maintain a record of the numbers allocated to each AIN Manager.

USDA/APHIS will also enforce compliance with the AIN Manager Agreement, and deny or withdraw the approval of an AIN Manager for noncompliance with the Agreement, including failure to maintain required records, failure to upload required information to the National Animal ID Database or failure to correlate AINs with premises and/or issuing duplicate numbers. Following a decision to suspend or terminate a noncompliant AIN Manager, any Animal Identification Numbers
not yet assigned to a premises would be retracted and the non-compliant AIN Manager would immediately be denied access to the National Premises Information Repository. The denial or withdrawal of approval of an AIN Manager could be appealed to USDA/APHIS through an appeal process.

• AIN Tags

IV.C.1. State/Tribe Responsibility for Animal Identification
To be Completed

IV.D. Administration of Non-producer Participant
The NAIS provides for the establishment of “Non-producer Participants” to establish individuals and/or entities that will have certain roles and responsibilities in the administration of the program.

IV.D.1. APHIS Responsibility of Non-producer Participants
The USDA will establish enrollment/application procedures for Non-producer Participants and will be responsible for the allocation of unique Non-producer Participant Numbers to such entities/individuals. The enrollment of certain Non-producer Participants will be administered through the State/Tribe Premises Registration Systems in which the individual or entities maintains their primary business office.

The Non-producer Participant Number is a unique 7-character field and is defined in the Part I. The Premises Allocator program that assigns premises identification numbers to a premises will be used to allocate numbers to Non-producer Participants.

• Non-producer Participant Type Codes

The following entities and individuals who may participate in the NAIS have been assigned Non-producer Participants Type Codes. These codes will be used to establish authorization levels to the appropriate databases.

IV.D.2. Non-producer Participants Involved in the Administration of the Animal Identification Numbers

• AIN Managers

AIN Managers are companies that are authorized by the USDA to manufacture approved identification devices or provide approved identification technologies that contain the Animal Identification Number. Additionally, they are AIN Distributors themselves and/or have formal agreements with AIN Distributors. The AIN Managers have access to the AIN Allocator to obtain numbers for use on the devices they manufacture or provide.

AIN Managers must:

• Demonstrate a functioning computerized system, compatible with NAIS standards, that ensures the uniqueness of the Ani-
REPORT OF THE COMMITTEE

Non-producer Participants – Type Codes

<table>
<thead>
<tr>
<th>Name</th>
<th>Non-Producer Participant Type</th>
<th>Role and/or Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Animal Health Official</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>- Government</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Animal Health Official</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>- Accredited Veterinarians</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AIN Managers</td>
<td>3</td>
<td>Have certain roles in the management of Animal Identification Number.</td>
</tr>
<tr>
<td>Identification Number.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AIN Identification Companies</td>
<td>4</td>
<td>Companies that have identification technologies that are used to identify animals utilizing the Animal Identification Number. Note: May also be AIN Managers.</td>
</tr>
<tr>
<td>AIN Distributors</td>
<td>5</td>
<td>Distributes identification devices with the AIN imprinted on a device approved by the USDA that is attached or adhered to an animal.</td>
</tr>
<tr>
<td>AIN Distributors</td>
<td>5</td>
<td>Distributes identification devices with the AIN imprinted on a device approved by the USDA that is attached or adhered to an animal.</td>
</tr>
<tr>
<td>Laboratories</td>
<td>6</td>
<td>Diagnostic laboratories that submit data to the national databases</td>
</tr>
<tr>
<td>Order Buyers/Dealers</td>
<td>7</td>
<td>When individuals act as agents for the purchasing of livestock they will have their Non-producer Participant Number recorded at markets in lieu of a premises number</td>
</tr>
<tr>
<td>Service Providers</td>
<td>8</td>
<td>Submits animal records to the National Animal Identification Database</td>
</tr>
<tr>
<td>Identification Services/Sites</td>
<td>9</td>
<td>Identifies animals with using the AIN on behalf of producer and submits File ID#1 to National ID DB</td>
</tr>
</tbody>
</table>

- Submit a record of all Animal Identification Numbers provided to an AIN Distributor using File: ID#1 to the National Animal ID Database in accordance with prescribed protocols.
- Maintain a database of the manufacturer product code for all devices that contained an Animal Identification Number.
- Agree to use only Animal Identification Numbers allocated to them on or with devices approved by the USDA.
- Furnish official identification devices to producers as prescribed by the policy on official identification devices.
- Educate customers on the proper use of official identification devices.

**AIN Distributors**

AIN Distributors are individuals, organizations or companies that provide AIN Tags to a premises that manages or holds livestock. The AIN Distributor must have an AIN Tag distribution agreement with an AIN Manager(s) to be eligible to be an AIN Distributor. As an authorized AIN Distributor, the individual or firm agrees to:
LIVESTOCK IDENTIFICATION

- Validates the Premises Identification Number of the premises that are to receive AIN Tags.
- Submit an Animal Transaction File to the Animal Identification Repository to report the distribution of all Animal Identification Numbers distributed to each premises.

Part V. Regulations and Policies
V.A. Confidentiality
Producer’s data/information must be kept confidential / exempt from current Freedom of Information Act (FOIA) requirements including a FOIA exemption to block data from passing among varied governmental agencies.

V.B. Release and Access on data
Only approved animal health authorities at the federal and state level will have access to the NAIS information system. Only information essential to the enhancement of animal disease surveillance and monitoring shall be stored in any state or federally managed database under the NAIS.

Event(s) that will trigger access to the data management system must be characterized as a regulatory need to accommodate disease traceback / traceforward under one of the following:
1. A confirmatory positive test for List A diseases.
2. The declaration of an animal disease emergency by the Secretary of Agriculture.
3. Program diseases (Brucellosis, TB, etc.) traceback to determine the origin of infection.
4. Domestic or emerging disease surveillance as determined by an industry and government agreement.

V.C. Transition of Official Animal Numbering Systems
The Animal Identification Number will be recognized in the Code of Federal Regulations as an official numbering system late 2004. Through a transition plan numbers with manufacturer codes and “USA” as the first three characters will be considered as official. The implementation of the Animal Identification Number containing 840 as the first three digits will be initiated in 2005.

V. D. Phase out of existing official numbering systems
The USDA/APHIS and states will terminate the distribution of all identification tags with the Uniform State Series number by July 1, 2005. The recognition of any number other than the USAIN for unique and official identification of an individual animal within certain species groups will be ended July 1, 2006 (see Section V.B. Implementation by Species Group). After this date, such animals requiring unique individual identification will meet the identification requirements according
V. E. Official Identification Devices

The AIN and the US (or USDA?) shield will be imprinted on official identification devices. Identification devices will be approved by APHIS as recommended by the NAIS Subcommittee.

APHIS and all cooperating state animal ID agencies shall promulgate regulations, as appropriate and/or necessary, that will permit state and federal animal health authorities to enforce the following current provisions of federal law relative to regulations governing the NAIS, so as to prohibit any person from:

- Removing an official identification device or causing the removal of one unless the animal is terminated (exception: unless the AIN is illegible or the device malfunctions)
- Causing the application of an official AIN Tag to an animal that is currently carrying an official AIN tag
- Altering an official AIN Tag to change its number or to make the number unreadable
- Selling or providing an identification device bearing the US Shield unless so authorized

VI.G. Animal Identification Requirements

USDA/APHIS will work with the states and industry to develop standards for official identification of animals moving in interstate commerce requirements, and the reporting of those movements by July 2005. These standards shall also specify that such movements are reported to the National Animal Identification Database.

Part VI. Species Specific Programs, Producer and Other Stakeholder Responsibilities

VI.A. Introduction

VI.A.1. General Producer Responsibilities

The following explains the general responsibilities of the producers. The specifics requirements are provided in Species Specific Program section.

- Premises Registration
  The owner of the premises, or person designated by the owner of the premises must register their location(s) and must keep the required information current. All individuals who own or lease livestock are responsible for having a Premises Number for the holding location(s) of their livestock.

- Animal Identification
  Producers should have any animal or lot of animals properly identi-
LIVESTOCK IDENTIFICATION

... fied under the NAIS. The regulations shall clearly indicate that the producer holding the animal(s) at the current premises must be held solely responsible for ensuring that each animal or lot of animals is properly identified when required prior to its movement. Producers are urged to utilize identification methods described in the NAIS as soon they become available.

When proper identification requires an AIN Tag, the tag must be properly attached to the individual animal prior to the animal leaving its current premises or at the location of an approved tagging site. The NAIS permits approved tagging sites for producers to utilize if facilities are not available to permit animals to be properly identified at current premises, provided such movement is approved by the appropriate state animal health authority. An approved tagging site is a location that has applied to and been approved by USDA/APHIS to provide this service. In such situations, animals must be moved to the authorized facility directly from their herd of origin without commingling with other animals.

Auction markets are not required to tag cattle that arrive at their facility untagged; however, they are not prevented from applying to become an approved tagging site if they desire. (Feeder pigs at auction markets do require tags and the auction is responsible for putting them in. The producer pays the market.)

1 Pertains to the individual who owns the animal. For leased animals the person leasing the animal is responsible. (move when page breaks are final)

VI.B. Cattle
VI.B.1 Method of Individual Identification

The NAIS Cattle Working Group (CWG) fully endorses the utilization of ISO compliant radio frequency identification (RFID) ear tags as the standard for implementing the NAIS in the U.S. cattle industry. The CWG considers RFID ear tags to be the most practical technology today to automate the collection of individual animal identification for cattle. However, the industry remains receptive to other technologies that may prove to be both effective and efficient in either replacing or augmenting RFID.

The official AIN Tag with an RFID transponder incased in the eartag that is compliant with ISO 11784 and 11785 is referred to as the AIN/RF Tag. The 3 digit country code (or manufacture code) and the 12 digit animal number imbedded in the transponder code is also to be printed on the AIN/RF Tag.

- AIN/RF Tag Distribution

AIN/RF Tags may become available through any qualified person, group or organization that becomes authorized by USDA to meet the requirements established for authorized AIN Distributors. Official iden-
REPORT OF THE COMMITTEE

Performance Standards for AIN/RF Tags (Cattle)

<table>
<thead>
<tr>
<th>Description</th>
<th>Performance measurement/requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read Rates and Range (transponder)</td>
<td>100% read rate in best orientation at 24 inches (60 cm), in a stationary test and a moving test of 1 m/sec over a passage length of at least 20 inches (50 cm).</td>
</tr>
<tr>
<td>In a field test environment</td>
<td>Transponders must be reliably machine read without regard to orientation by a standardized dual HDX/FDX reader, as cattle move by in single file in a passage 48 inches (1.2 m) wide with animals moving at 4 mph (1m/sec) at a read rate of 99.5%.</td>
</tr>
<tr>
<td>Transponder security</td>
<td>The official number encoded within each transponder must not be able to be altered and must be contained within tag. Tags will be tamper-evident and impossible to unseal without visible evidence of tampering. The tag is designed for one-time use. The tag design makes it impossible to remove and re-apply the tag securely without damaging the portion containing the transponder.</td>
</tr>
<tr>
<td>Tag toxicity/animal injury</td>
<td>Tags shall do no harm to animal or affect its health or well-being. Tags will not cause chemical contamination of meat or edible offal or damage the hide.</td>
</tr>
<tr>
<td>Tag deterioration</td>
<td>There will be no diffusion of colorant from tag There will be no apparent physical deterioration (other than color) due to detrimental effects to UV light, rain, heat (45°C) and cold (-30°C) or other environmental influences such as chemicals, mud, urine and manure for at least 5 years of wear.</td>
</tr>
<tr>
<td>Tag plasticity</td>
<td>Devices will not split or crack under normal use.</td>
</tr>
<tr>
<td>Transponder failure rates</td>
<td>Transponder within the tag shall be reliably machine readable for the expected lifetime of animal</td>
</tr>
<tr>
<td>Tag retention rates</td>
<td>When applied in a manner approved by the manufacturer, the average tag loss shall not exceed 1% per annum under normal field conditions</td>
</tr>
<tr>
<td>Tag coupling/tensile strength</td>
<td>Evaluation standards conform to ICAR testing standards and at minimum ISO standards 37 and 527.</td>
</tr>
<tr>
<td>Tag abrasion resistance</td>
<td>Tag shall not exhibit damage or change due to wear and will be subjected to ICAR testing standards and at minimum ISO standard 9352.</td>
</tr>
<tr>
<td>Tag applicator devices</td>
<td>A single action applicator that provides minimal risk of pain or distress, that safeguards animal and operator from danger, guards against the spread of disease.</td>
</tr>
<tr>
<td>ID device visual characteristics</td>
<td>The tag color shall be white. Print color shall be black or in contrast to the background color or pattern. Printed information on the tag will require a visible US logo and the animal identification number (AIN). Print size for bovine tags shall be a minimum height of 0.2 inches (5 mm) for numbers, letters and the official logo. The US Shield shall have a minimum width of 0.2 inches (5 mm). The printing and color contrast of the US Shield, lettering and numbers are to remain readable at a distance of 30 inches (0.75 m) for the expected lifetime of the tag.</td>
</tr>
</tbody>
</table>

390
VI.A.2. Individual Animal Identification Requirements:

Three basic events “trigger” the requirement for official individual animal identification of cattle:
1. Change of ownership
2. Interstate movement
3. Multiple owners commingle their cattle.

When individual identification is required, the owner / seller is the person ultimately responsible for applying the official RFID tag to all individual animals offered for sale, moved interstate or commingled with other owners cattle. This responsibility may be accomplished at the location where the cattle reside prior to change of ownership or at some other intermediate tagging station or at first point of concentration, but always prior to commingling with other cattle including when commingled on trucks or trailers, livestock markets, exhibitions, rodeos, joint grazing agreements, etc.

SPECIAL NOTE: The combined logistical issues of location, management and transportation may mean that, as a condition of trade, individual ID when required, gets installed at some later point at the receiving facility and reported by the buyer for the seller utilizing only the sellers AIN tags as the official ID.

The establishment of approved tagging services and tagging sites may provide alternatives for producers to tag their cattle in cases when facilities at one’s premises are not available.

Producers are encouraged to identify calves at birth or at the earliest date possible and to report birth dates to the National Animal Identification database to support animal disease issues when the age of an animal is needed. When the precise date of birth is not known, the approximate birth date within 2 to 3 months is recommended. However, the “date of birth” remains an optional field for reporting to the National Animal Records Repository.

Producers are encouraged to utilize and record a second visible tag as a matter of “best management practices”. This additional visible tag could enhance day-to-day management needs and could serve as a cross reference in the event of a lost official tag.

Exceptions To The Individual ID Requirements Include:

- Cattle moving under a Brand Inspection Certificate that officially identifies the premises and owner, with individual identification occurring at the receiving location, if required.
- Cattle moving to another premises when they remain under the same person’s control (ownership) and when they are not
REPORT OF THE COMMITTEE

co-mingled with cattle from another owner’s premises

- When adjoining premises under the same ownership and/or control cross state lines, cattle may move among the premises without requiring official individual identification with approval of the respective animal health authorities.

VI.B.3. Reporting Cattle Movements (minimum requirements)

Three basic events trigger the need for reporting cattle movements:

1. Change of ownership
2. Interstate movement
3. When multiple owners commingle their cattle.

All cattle that change ownership, move interstate, or are commingled with other producer’s cattle are to have their official identification and subsequent movement reported to the National Animal Identification Database. Forms of reporting may include electronic Interstate Certificate of Veterinary Inspection (ICVI), (where available), electronic or hardcopy invoice, and/or other methods as deemed appropriate by state animal health authorities.

Reportable commingling includes, but is not limited to; cattle commingled with other producers cattle on trucks or trailers, livestock markets, exhibitions, rodeos, joint grazing agreements, etc.

The reporting of cattle movements shall be the sole responsibility of the receiving premises or person responsible for the animals at the receiving premises. The receiving premises are the premises to which animals are moved and at which a responsible party (not necessarily the buyer) is responsible for reporting that identified animals have arrived.

SPECIAL NOTE: In private treaty transactions, where a marketing agent may not exist, the seller is encouraged to also report such movement events under the NAIS. If the receiving premises fail to report, this self-policing crosscheck will help maintain the integrity of the NAIS, protect against liability of not knowing the final destination premises when cattle are sold, and verify that the reports are accurate and complete.

Required movement events are to be reported within 24 hours or the close of the next business day in order to track all animal movements within the 48 hour goal of the NAIS.

Confirmation shall be available to both the seller and buyer involved that the reported movement has been entered into the National Animal Records Repository.

State Brand Inspection Programs will continue to play an integral role in the cattle industry. The Cattle Work Group believes that the integration of State Brand Inspection protocol with the NAIS can work for the benefit of all. To assist in the recognition / integration of the two
identification systems, the Work Group recommends that the State Brand Inspection Certificate number be included in the NAIS database.

Private enterprise providers are expected to have a role in supporting the data collection and information system infrastructure. However, the ultimate oversight authority and responsibility for the tracking capabilities of the NAIS information system, remains vested with the USDA/APHIS, Tribal Nations, State animal health authorities, State animal identification agencies and/or other entities authorized by State law.

Reporting of Cattle Movements is **OPTIONAL** (not required) when:

- Cattle moving within premises or to other premises under the same person’s control and / or ownership, even when commingled with other cattle under the same control or ownership.
- When adjoining premises under the same ownership and/or control cross state lines, cattle may move among the premises without officially reporting the movement, provided the approval of the respective animal health authorities.

**VI.B.4. Import / Export Identification and Reporting Requirements**

All cattle being exported from the U.S. must be identified with an AIN/RF Tag prior to being loaded for export. The Animal Identification Number, the Premises Identification Number from where the animal was last received, and the Premises Identification Number of the export facility must be reported to the National Animal Records Repository. The AIN of the animals being exported and the Premises ID Number of the export facility will also be recorded on the U.S. Origin Health Certificate which accompanies the animal(s) to the country of destination. USDA/APHIS port veterinarians will report to the National Animal Records Repository the AINs of the animals being exported, date of export shipment and validation that the animals have been received at the export destination location.

All cattle arriving into the U.S. must be identified with an official individual number of the country of origin and/or official RFID tag of the country of origin and be accompanied by a USDA/APHIS approved International Certificate of Identification which shall include a listing of the age and sex of all such cattle being imported. If an animal or groups of cattle do not contain any official RFID individual animal identification from the country of origin, the animal(s) shall be off-loaded at the U.S. border, or final destination location, and be individually identified with an AIN/RF Tag. USDA/APHIS animal health officials or port veterinarians will assume responsibility for reporting to the National Animal Records Repository all official individual numbers of imported cattle with
or without RFID tags, including any cross-referenced number on the animals at the time of entry, the date of import, date of tagging with the official AIN/RF Tag (if not previously tagged), premises of last destination prior to being imported into the U.S. and the destination premises within the U.S. where the cattle are to be shipped, with subsequent validation that the cattle have been received at their designated U.S. premises.

**DRAFT OF THE STATE’S STANDARDS FOR IMPLEMENTING THE NATIONAL ANIMAL IDENTIFICATION PROGRAM (NAIS)**
(Common Features Among Species)
Subcommittee of NAIS Subcommittee of the Secretary of Agriculture’s Foreign Animal Disease Committee

- All involved species groups and governmental agencies have agreed to the goal of being able to trace individual animals or animal groups to their origins within **48 hours** of a foreign or reportable animal disease discovery.
- Premises registration numbers will be allocated by a federal system. Premises data storage and management information may be done either at the state level, federal level, privately or a combination of one or more of the aforementioned. Premises registration is the responsibility of each state or tribe.
- Clear consensus of data storage location of animals and group/lot could not be reached. The subcommittee moved to refer this decision to the USAHA ID committee.
- ID device locations for other species will be designated by the species working groups.
- Animals will be group/lot identified where production systems warrant. Animals will be individually identified where production systems warrant. RFID technology with individual visual number systems will be used where appropriate, however, may later be replaced by improved methods. RFID devices (tags, implants, etc.) when used will be ISO 11784 and 11785 compliant.
- Recording and reporting animal movement and sighting events will be determined by state and federal animal health officials minimally, however, **change of ownership** involving intrastate and interstate commerce, **interstate movement** and **animal commingling** by multiple owners such as occurs at exhibitions, markets, transport, rodeos or joint grazing will require reporting to the system. Consideration should be made to states or tribes which can demonstrate their Brand Inspections Program’s ability to accomplish the **48 hour** trace back goal.
LIVESTOCK IDENTIFICATION

Current customary production practices will be considered in these decisions.

- Information will be accessed and used solely by state and federal officials for management of foreign or program animal disease occurrences.
- Auction markets and buying stations are not required to tag animals that arrive at their facility untagged; however, they are not prevented from applying to become an approved tagging facility if they desire.

PROGRAM STANDARDS FOR STATE IMPLEMENTATION OF THE NATIONAL ANIMAL IDENTIFICATION SYSTEM

ADDITIONAL SUPPORTING CATTLE INDUSTRY IMPLEMENTATION

Implementation Guidelines:

- The NAIS will be conducted through cooperative agreements involving USDA/APHIS, State Animal Health Authorities, Tribal Nations and U.S. cattle industry utilizing the recommended USAIP standards for premises ID and (ISO code 11784 based) individual animal ID.
- Producer’s data/information will be kept confidential / exempt from current Freedom of Information Act (FOIA) requirements including a FOIA exemption to block data from passing among varied governmental agencies.
- Only approved animal health authorities at the federal and state level will have access to the information system(s) supporting the NAIS.
- Only information essential to the enhancement of animal disease surveillance and monitoring shall be stored in any state or federally managed database under the NAIS.
- Event(s) that will trigger access to the data management system must be characterized as a regulatory need to accommodate disease traceback / traceforward under one of the following:
  1. A confirmatory positive test for List A diseases.
  2. The declaration of an animal disease emergency by the Secretary of Agriculture.
  3. Program diseases (Brucellosis, TB, etc.) traceback to determine the origin of infection.
- Existing State Brand Inspection Systems will be recognized and utilized, whenever possible, for traceback. USDA/APHIS will integrate State Brand Inspection with the NAIS and State
Implementation of the NIAS will be directed by the establishment of Uniform Methods and Rules.

Methods of Identification:

- All premises that produce, manage and/or hold cattle are to be identified through the State or Tribal animal health authority to achieve a standard national premises system.
- ISO compliant RFID ear tags of distinct color, so as to readily disclose that the official ID device is intact, will be the technology used to officially individually identify cattle.
- The RFID code (3 digit country code for the United States - 840 and a 12 digit animal number) imbedded in the transponder is also to be printed on the RFID Tag.

Tag Distribution:

- Official RFID ear tags may become available through any qualified person, group or organization that becomes certified by USDA to meet the requirements established for official US Animal Identification Number (USAIN) Managers or USAIN Tag Distributors.
- Official identification devices should be distributed under a certified USAIN distributor and be readily available for producers to purchase directly, via telephone, electronically or written order from the retail sector.
- All certifiable distribution systems must have the ability to securely associate the USAIN to the appropriate premises number.

Individual Animal Identification Requirements:

- Any one of three basic events trigger the need for official individual animal identification:
  4. Change of ownership
  5. Interstate movement
  6. Multiple owners commingle their cattle.
- The owner / seller is the person ultimately responsible for applying the official RFID tag to all individual animals offered for sale, moved interstate or commingled with other owners cattle.
- It is considered commingling when multiple owners mix their cattle at a common place and time including when commingled on trucks or trailers, livestock markets, exhibitions, rodeos, joint grazing agreements, etc.

SPECIAL NOTE: The combined logistical issues of location, management and transportation may mean that, as a condition of trade,
LIVESTOCK IDENTIFICATION

individual ID when required, gets installed at some later point at the receiving facility (but prior to commingling with other cattle) and reported by the buyer or seller’s agent for the seller utilizing only the seller’s AIN tags as the official ID.

- Producers are encouraged to identify calves at birth or at the earliest date possible and to report birth dates to the National Animal Identification database to support animal disease issues when the age of an animal is needed.
  - When the precise date of birth is not known, the approximate birth date within 2 to 3 months is recommended.
- Producers are encouraged to utilize and record a second visible tag as a matter of “best management practices” to enhance day-to-day management needs serve as a cross reference in the event of a lost official tag.

Exceptions To The Individual ID Requirements Include:

- Cattle moving under a Brand Inspection Certificate that officially identifies the premises and owner, with individual identification occurring at the receiving location, if required.
- Cattle moving to another premises when they remain under the same person's control (ownership) and when they are not co-mingled with cattle from another owner’s premises.
- When adjoining premises under the same ownership and/or control cross state lines, cattle may move among the premises without requiring official individual identification with approval of the respective animal health authorities.

Reporting Cattle Movements (minimum requirements):

- Three basic events trigger the need for reporting cattle movements:
  4. Change of ownership
  5. Interstate movement
  6. When multiple owners commingle their cattle.
- All cattle that change ownership, move interstate, or are commingled with other producer’s cattle are to have their official identification and subsequent movement reported to the National Animal Identification Database.
- Forms of reporting cattle movements may include:
  - electronic Interstate Certificate of Veterinary Inspection (ICVI), (where available)
  - electronic or hardcopy invoice
  - Other methods as deemed appropriate by state animal health authorities.
REPORT OF THE COMMITTEE

- Reportable commingling includes, but not limited to, cattle commingled with other producers cattle on:
  ♦ trucks or trailers
  ♦ livestock markets
  ♦ exhibitions
  ♦ rodeos
  ♦ joint grazing agreements etc.

- The reporting of cattle movements shall be the sole responsibility of the receiving premises or person responsible for the animals at the receiving premises.

  The receiving premises are the premises to which animals are moved and at which a responsible party (not necessarily the buyer) is responsible for reporting that identified animals have arrived.

  **SPECIAL NOTE:** In private treaty transactions, where a marketing agent may not exist, the seller is encouraged to also report such movement events under the NAIS. If the receiving premises fail to report, this self-policing crosscheck will help maintain the integrity of the NAIS, protect against liability of not knowing the final destination premises when cattle are sold, and verify that the reports are accurate and complete.

- Required movement events are to be reported within 24 hours or the close of the next business day in order to track all animal movements within the 48 hour goal of the NAIS.

- **Confirmation shall be available to both the seller and buyer involved that the reported movement has been entered into the National Animal Identification Database.**

Reporting of Cattle Movements is **OPTIONAL** (not required) When:

- Cattle moving within premises or to other premises under the same person's control and/or ownership, even when commingled with other cattle under the same control or ownership.

- When adjoining premises under the same ownership and/or control cross state lines, cattle may move among the premises without officially reporting the movement, provided the approval of the respective animal health authorities.

**Export Identification and Reporting Requirements:**

- All cattle exported from the U.S. must be identified with an official NAIS RFID tag prior to being loaded for export.
LIVESTOCK IDENTIFICATION

- The official tag number, the premises number from where the animal was last received, and the premises number of the export facility must be reported to the NAIS Database.
- The official individual numbers of the animals being exported and the premises ID number of the export facility will also be recorded on the U.S. Origin Health Certificate which accompanies the animal(s) to the country of destination.
- USDA/APHIS port veterinarians will report to the NAIS Database the official individual numbers of the animals being exported, date of export shipment and validation that the animals have been received at the export destination location.

Import Identification and Reporting Requirements:

- All cattle imported into the U.S. must be identified with an official individual number of the country of origin and/or official RFID tag of the country of origin.
- All cattle imported will be accompanied by a USDA/APHIS approved International Certificate of Identification which shall include a listing of the age and sex of all such cattle being imported.
- Imported cattle lacking an official RFID individual animal identification from the country of origin shall be off-loaded at the U.S. border, or final destination location, and be individually identified with an official NAIS RFID tag.
- USDA/APHIS animal health officials or port veterinarians will assume responsibility for reporting to the NAIS Database all official information to include:
  - Individual numbers of imported cattle with or without RFID tags, including any cross-referenced number on the animals at the time of entry.
  - The date of import, date of tagging with the official NAIS RFID tag (if not previously tagged).
  - Premises of last destination prior to being imported into the U.S. and the destination premises within the U.S. where the cattle are to be shipped, with subsequent validation that the cattle have been received at their designated U.S. premises.
REPORT OF THE COMMITTEE

STANDARDS FOR STATE IMPLEMENTATION OF THE
NATIONAL ANIMAL IDENTIFICATION SYSTEM

SWINE
Identification of Feeder Swine

Phase I and II
1. 9CFR 71.19 requires interstate movement of swine to be accompanied by a Certificate of Veterinary Inspection (CVI) or movement certificate. The sellers name and address is required to be recorded on the CVI or movement certificate. The sellers premises ID must be recorded on the CVI or movements certificate.
2. Pigs moving to market, must be accompanied with travel documents that have the sellers premises ID number recorded in a visible numeric format and in a barcode format (both on the same label to avoid mistakes). Upon arrival at the packer, the premises number will be scanned or recorded, linking the packer’s lot tattoo number and the animals’ owner to the premises ID.
3. Intrastate and interstate movement of feeder swine. NAIS must comply with 9 CFR.

Farrow to Finish Operations
1. Swine that were born and raised on one premises may go to slaughter accompanied by travel documents carrying the premises ID of the premise of origin.

One off-site feeding premises (nursery/finisher operations, wean to finish barns, farrow to finish farms with light pig floors)
1. Upon arrival of pigs to the feeding floor (either nursery or wean to finish barn), a lot number or group/lot identification (G/L ID) should be created. A lot number or G/L ID can be generated for groups of pigs arriving from multiple shipping premises. These numbers may be created for both static and dynamic groups [Note: The G/L ID may eventually be recorded into a database and will need to be a standardized, unique number. During Phase I and II, it will not be mandatory to assign a unique G/L ID rather any numerical identifier of groups or lots of swine will be acceptable for farm records. However, due to the fact that it is an easy means to create a unique number, production systems will be encouraged to adopt this system.]
2. The receiving farm and production company must also maintain records capturing the date pigs were received, the num-
LIVESTOCK IDENTIFICATION

ber received and their origin, pig removals and destinations etc.

3. Swine moving to slaughter must be accompanied by a travel document carrying the premises ID of the last feeding premises. It is the responsibility of the last premises to have the link to or the actual documented history of the group.

Two off-site feeding premises (three site systems, nursery - light pig floor, finisher-light pig floor)

1. One or two Static groups moved to a Static group: For all movements, the pigs may arrive with travel documents bearing the individual animal numbers (if interstate out of production system) or the lot number or the G/L ID generated at the previous site. The second premises and/or production system will maintain records of dates, animal additions, removals, source premises and destination premises, etc. When the animals go to slaughter, the travel documents will bear the last feeding premises.

2. Static Groups or pigs from static groups to a Dynamic group: If the dynamic group exists within a production system, regardless if this occurs intrastate or interstate this may be allowed without individual animal ID, provided that proper pig movement records are maintained on site as well as within the production company. Thus, like 1 above, the pigs will arrive with travel documents bearing the individual animal numbers or the lot number or the G/L ID generated at the previous site. The second premises and/or production system will maintain records of dates, animal additions, removals, source premises and destination premises, etc. When moved to harvest, the travel documents will bear the last feeding premises. It is understood by the production system that if a trace-back is necessary, it may involve the whole system, when pigs from multiple sources are commingled.

When pigs move outside of a production system during transfer from a static to a dynamic group, unique individual ID is required, be it an interstate or intrastate transfer. For individual identification of feeder swine, USAIP will recognize metal tags, ear notches plus NPID tag of source premises, ear tattoo plus NPID tag of source premises and AIN tags. [Note: the working group will re-address the ID devices.] The second premises will maintain records of shipping premises, shipment dates, number of animals added and removed etc, linking the individual ID with the shipping premises. When animals from this site are moved to harvest, the travel documents will bear the last feeding premises ID.
REPORT OF THE COMMITTEE

3. Dynamic Group or pigs from dynamic group to Static Group: Pigs arrive with travel documents bearing the individual animal numbers (if interstate out of production system) or lot number or G/L ID generated at the previous site. The second premises will maintain records of shipping premises, shipment dates, number of animals added and removed, etc. When they move to harvest, the travel documents will bear the last feeding premises.

4. Dynamic Group to Dynamic Group: Pigs are allowed to exist in one Dynamic group in their lifetime. Movement from one dynamic group to another will require unique individual ID. For individual identification of feeder swine, USAIP will recognize metal tags, ear notches plus NPID tag of source premises, ear tattoo plus NPID tag of source premises and AIN tags. [Note: the working group will re-address the ID devices.] On farm records must link the individual unique ID with the shipping premises. When animals move from this site to harvest, the travel documents will bear the last feeding premises. Official tags should be collected at the plant and stay with the carcass as long as possible.

Three off-site feeding premises (nursery to finisher to light floor, nursery to finisher to isolation unit)
1. Static to Static to Static: See 1 above
2. Static to Static to Dynamic: see 2 above
3. Static to Dynamic to Dynamic: see 4 above
4. Static to Dynamic to Static: see 2 and 3
5. Dynamic to Static to Dynamic: see 4 above
6. Dynamic to Dynamic to Static: See 4 above
7. Dynamic to Dynamic to Dynamic: See 4 above

Phase III
Once the infrastructure is in place to allow for effective reporting of animal identification information, feeder swine that are required to carry a unique individual identification will be encouraged to use an AIN number. Ear notches may be used as a backup for or in support of a unique identifier.

Identification of Breeding Stock
1. Presently there are multiple forms of official identification approved for use in breeding stock during interstate commerce outside of a production system (9CFR). These include metal ear tags with unique numbers, ear tattoos, ear notches, ear tags and back tags. One goal of the NAIS is to provide for a unique, recognizable, and uniform ID system for cull breeder
LIVESTOCK IDENTIFICATION

swine. Another goal is to allow rapid trace-back of cull sows and boars to the breeding farm in the event of a disease outbreak. USAIP will not negate other individual identification regulations from 9CFR for interstate commerce.

2. 9 CFR allows for multiple official ID devices. NAIS recommends three forms of official tags in breeding animals – a back tag, a national premises identification number (NPID) and an animal identification number (AIN). To enable uniform ID recognition through the marketing system one form of tag must be selected for the initial implementation. It is recommended that the NPID tag be used for the initial implementation in culled breeding swine.

3. NAIS NPID tags will remain with the animal from the breeding farm, through any collection channels and on to slaughter. NPID tags should be easy to remove at harvest with minimum hazard to the abattoir operator. The NPID tags should also be visibly distinct, easy to recognize as a NPID tag, yet at the same time adaptable enough to allow for the adoption of new technology. Industry recommends that a working group of packers and tag manufacturers conduct a USDA-funded implementation study to evaluate tag materials and styles with acceptable retention histories for ease of harvest. Based on the pilot results suitable tag system(s) will be recommended.

4. Regardless of which NAIS tag system is used, on-farm movement records must be maintained for introduction and removal of breeding stock from each premises.

5. It is recognized that replacement animals move interstate outside of production systems with required official individual identification. In addition, replacement animals may also move interstate within a production system without individual identification (9CFR). A NPID tag must be inserted, preferably on entry to the breeding herd, but at minimum, before they enter the marketing channels as cull animals.

6. 9 CFR requires first point of collection to be responsible for applying identification to cull swine via back tagging. Cull animals that arrive at collection points with NPID tags meet this identification requirement. All cull swine without NPID tags must be back-tagged at the collection point. The collection point will be reimbursed by the non-compliant producer/owner. Failure to properly apply a NPID tag before delivery is a process non-compliance which may require regulatory action against the submitting producer. [Note: the NAIS Subcommittee has asked the Pork Industry Work Group to consider the need for unique individual ID applied at the farm for cull sows/boars delivered to an auction market or those that may not go directly to slaugh-
7. Animals that do not go to harvest after commingling will require identification to the collection point. Assurance of properly identified animals re-entering the market channels in this manner is the collection point’s responsibility. Failure to properly apply identification before re-entering market channels is a process non-compliance which may require regulatory action against the submitting collection point. [Note: the NAIS Subcommittee has asked the Pork Industry Work Group to consider the need for unique individual ID applied at the farm for cull sows/boars delivered to a collection point where re-entry into market channels is a possibility.]

8. For animal welfare purposes it is vitally important to quickly and visually determine if sows and boars are bearing official identification, especially during hot weather. Since some animals will lose tags in transit/handling, any cull animals without a NPID tag will be required to be back-tagged by the collection point. This back-tag process will be available until replaced with superior alternatives. All collection points will maintain records of who they purchased animals from, the number purchased and the date of delivery, and to whom they sold animals, the date and the number sold, in accordance with the Packers and Stockyards regulations. Records must be kept for two years. There will be no need to routinely report this information, but it must be made available upon request for trace back purposes.

9. At the abattoir, practices must be implemented to: a) maintain the integrity of the lot and individual carcasses through the harvest process to the inspection station, b) collect swine ID and samples from the carcasses segregated by submission lot and c) record in-coming lot size. Official tags will be removed at the point at which mandatory blood samples are drawn and then will be physically associated with the carcass to meet USDA requirements.

10. The packers will maintain records of whom they purchased animals from, the number of head and the date, in accordance with the Packers and Stockyards Act. Records must be kept for two years. There will be no need to routinely report this information, but it must be made available upon request for trace back purposes.

11. When an electronic format for NAIS tags or other emerging technology is to be implemented, systems and responsibility assignments may be altered but the basic lot and carcass data described above must be captured.
LIVESTOCK IDENTIFICATION

Purebred and Crossbred Swine Identification – Show and/or Sale

Phase I and II

1. Count, state or national terminal market hog show
   a. Purebred pigs can be identified by ear notches and registration papers and/or carries another form of official identification upon arrival. Records reflecting past movements must be made available upon request.
   b. Crossbred pigs require official unique identification upon arrival. Records reflecting past movements must be made available upon request.
   c. Prior to shipping, show management will ensure the terminal show pigs have unique tattoos or official tags (depending on skinning vs. scalding market destination) positively correlating the pig's identification to its previous premises history.

2. Prospect pig show and sale
   a. Purebred pigs brought to the event can be identified by ear notch/registration papers.
   b. Crossbred pigs will require official unique individual identification.
   c. Show management will record the individual animal identification and the source premises. Premises identification labels provided by exhibitors and sellers may be required by show management to facilitate recording all sources of animals at the event.
   d. The pig owner will make records available concerning the pig's previous premises and movements upon request to show management or animal health officials. Upon sale, copies of the animal's movement records will be provided to the pig buyer.
   e. Pig buyer will be required to maintain animal movement and premises records for trace-back purposes for 24 months.

3. Jackpot (non-terminal) show
   a. Purebred pigs brought to the event can be identified by ear notch/registration papers.
   b. Crossbred pigs will require official unique individual identification.
   c. Show management will record the individual animal identification and the source premises. Premises identification labels provided by exhibitors and sellers may be required by show management to facilitate recording all sources of animals at the event.
d. The pig owner will make records available concerning the pig’s previous premises and movements upon request to show management or animal health officials.
e. Exhibitors must document all events that the pig has been exhibited at during the past 24 months.

4. **Breeding stock show and sale**
   a. Purebred breeding stock brought to the event can be identified by ear notch/registration papers.
   b. Crossbred breeding stock will require official unique individual identification.
   c. Show management will record the individual animal identification and the source premises. Premises identification labels provided by exhibitors and sellers may be required by show management to facilitate recording all sources of animals at the event.
   d. The breeding stock owner will make records available concerning the animals’ previous premises and movements upon request to show management or animal health officials. Upon sale, copies of the records will be provided to the pig buyer.
   e. Buyers will be required to maintain animal movement and premises records for trace-back purposes for 24 months following sale or termination.

5. **Private treaty seed stock sales**
   a. Swine must be identified by official methods.
   b. Source premises identification and destination premises identification records must be maintained by both seller and buyer for 24 months following sale or termination.
   c. A premise tag identifying the current owner must be present at the first point of sale for food animal market purposes.

**Phase III**

Once the infrastructure is in place to allow for effective reporting of animal identification information, purebred animals will be required to carry a unique individual identification for shows or sales. Ear notches do not represent a unique number and therefore will not be a functional means of identification in a database. The use of an AIN number will be encouraged. Ear notches may be used as a backup for or in support of a unique identifier.

**Identification of Out and Off Market Swine**

**Definition of “Out Market” Swine:**

Out market swine are those swine that are not accepted for slaughter at the first or subsequent receiving packer for processing. Many of these hogs were unintentionally shipped to the packing plant. Reasons for non acceptance can include but are not limited to the follow-
LIVESTOCK IDENTIFICATION

ing:
1. Swine whose live and or projected carcass weights are above or below the specification set forth by the receiving packer
2. Swine with physical abnormalities and or blemishes
3. Swine who show evidence that their carcass composition will not meet receiving packer specifications
4. Swine who show evidence of not possessing desired genetic heritage

Definition of “Off” Swine:
“Off” swine are those swine that have been identified at the farm as not conforming to the specifications of a standard packing facility (see list above) and are thus sent through alternative marketing channels directly “off” the farm. These alternative markets comprise light or blemish hog auctions, collection stations and dealers. When a large enough group is assembled from multiple sources, the swine will be transported to a packing plant set up to receive non-standard animals. In some cases, the swine will be concentrated through two collection points in order to create a large enough load to enable transport to a packing plant.

Identification of “Out Market” Swine
Upon arrival at the first receiving packer those swine that are not accepted for processing and are intended to be transported from the first receiving packer premises to either a collection point or a second packer, will be tattooed with a letter or number sequence (lot id) correlating to the premises and owner from which they originated. Records linking the lot id with the owner and premises of last feeding will already be generated when the packer scans in the number of the premises of last feeding and links it with the owner. The first receiving packer shall keep a record of the tattoo administered to the out swine and the premises from which it originated.

If the swine are sent directly to a second receiving packer, they will be tattooed with the lot ID to correlate with the owner of record at the time the swine is accepted for processing.

If the swine are sent to a collection point, dealer or sorting facility, they will be identified with a tattoo identifying the premises that received the swine. Records of the collection point will be maintained to document the shipper of the swine, previous premises, date of receipt and date of identification required under 9CFR

If the swine are sent to a second collection point, they will be tattooed again to that dealer/collection point and records will be maintained to document the shipper, the date received and last owner from which it was received.
Identification of “Off” Swine

Upon arrival at the first receiving collection point, the swine will be tattooed with a letter or number sequence (lot id) correlating to the premises from which they originated. Records linking the lot id with the owner and premises of last feeding can be generated when the collection point scans in the number of the premises of last feeding and links it with the owner. The first receiving collection point shall keep a record of the tattoo administered to the off swine and the premises from which it originated.

If the swine are sent directly to a second receiving packer, they will be tattooed to correlate with the owner of record at the time the swine is accepted for processing.

If the swine are sent to a second collection point, dealer or sorting facility, they will be identified with a tattoo identifying the premises that received the swine. Records of the collection point will be maintained to document the shipper of the swine, previous premises, date of receipt and date of identification required under 9CFR.

Premises ID

The collection points may choose to use premises ID labels for shipment to the packer. The premises ID number should be both in a visible numeric format and in a barcode format (both on the same “label” to avoid mistakes) and attached to the travel documents. Upon arrival at the packer, this number will be scanned or recorded, linking the packer’s lot tattoo number and the animals’ owner to the premises ID.

Tattooing Program

(Note: Off and out hogs are being tattooed to the collection points 2-3 times. The Working Group members associated with these mar-
LIVESTOCK IDENTIFICATION

Kets felt that this system is currently working well. It was proposed to put together a working group to evaluate this system and be able to report on it back to NAIS.]

Tattooing can only be used if the off and out hogs are destined for a scalding market destination. If the market destination employs skinning, official individual identification must be used to provide for traceback. The use of the AIN is recommended.

Dr. Woods stated that regarding the APHIS-VS ICVI project, I feel we will do our industry a great disservice if we do not give markets a system in which they can participate. I am happy we are moving forward with that system. We will have a way to move and identify group/lot animals and still meet 48 hour traceback requirements. In markets, premise retrieval is a challenge. Relative to NAIS distribution of AIN tags, we need to develop a mechanism to make tags readily available to producers and market operators to enable rapid effective identification of livestock in marketing channels. Based on experiences with animal disease control Uniform Methods and Rules, this document will require frequent review and upgrading as we progress with implementation of the NAIS.

Dr. Hillman – Thank you Dr. Woods for the great amount of work that you and your subcommittee members expended in development of the draft State Standards for Implementation of the National Animal Identification System. We will discuss actions relative to the report in the Business Session of our Committee meeting.

Database Management Relative to Animal Identification System for an Effective Disease Control System

Management of animal identification data remains one of the major points of disagreement among stakeholders and agencies. In order to address the data and database management issue, representatives of several stakeholder groups and USDA were asked to discuss their needs and expectations. These presentations follow:

Report from the IT Working Group – Presented by Robert Fourdraine, Chair.

Seven conference calls were held with 30 committee members.

The purpose of this document is to identify the different benefits between two data repository architectures as applied towards the United States Animal Identification Plan (USAIP).

The September 2003 USAIP proposal indicated that USAIP could be administered as a single, central database, and/or as a decentralized collection of linked databases (page 9). This centralized database concept consists of two components, a Premises database and a National Animal Identification database. This centralized database repository would be the sole storage area for all the USAIP required data.
The data stored in this repository is to be used by the USDA to perform a 48-hour trace-back of animals and premises exposed to an incident of a Foreign Animal Disease. Per the USAIP, the USDA is tasked with administering this centralized database.

Recently, a proposal was submitted by the Beef Information Exchange (BIE) to describe how a decentralized approach could work in harmony with the centralized system. The BIE is a consortium of five independent companies whose mission is to meet the identification/tracking needs of the Beef Industry.

The BIE proposal fleshes out the decentralized approach mentioned in the September 2003 USAIP document and defines a new role in this architecture known as a “Data Trustee.” This “Data Trustee” role allows for decentralized data repositories, to be managed by private companies or by state animal health officials, which will work in conjunction with the USDA centralized database. The Data Trustee approach is viewed as an option to producers and processors, not as a replacement for the single, central USDA database. The main purpose for this proposed change is to address the Beef Industry participants’ concerns regarding data confidentiality and privacy of reported information.

The “Data Trustee” role in the decentralized architecture allows for multiple entities/companies to register with USDA for the privilege of storing USAIP data for their clients in lieu of immediately transmitting full movement data to the centralized USAIP repository. These Data Trustees will transmit at a frequency deemed appropriate by USDA the USAIN of each animal in their database along with the fact that data for these animals is being held by the reporting data trustee. Full data on each animal would be reported to the USAIP central repository only when a Foreign Animal Disease incident (or approved “triggering event”) occurs or USDA launches an animal investigation/surveillance; and then, the data transmitted from the Data Trustee to the USAIP system will be limited to specific animal/premise data associated with the health incident. This process could help ensure information privacy for the production chain participants as the Data Trustees only share data with the central system on a “need to know” basis. It is envisioned that there would be many different data trustees and that producers and processors would contract with the Data Trustee they trust. USDA would need to certify each Data Trustee and could assign the industry trade association for that species or other designee to provide oversight, auditing, and recommendations for re-certification of each Data Trustee. The Data Trustee model is based upon the same high level architecture as is used for the global credit card system.

The proposed Data Trustee approach is intended to work in parallel with a centralized system and be offered to certain species groups and industry groups who have issues with the centralized system. The Data
Trustee approach is not intended to replace the centralized system architecture. In the remainder of this document, an analysis is performed outlining the strengths each of these architectures has over the other.

**Centralized Repository “Strengths”**

The following are the strengths of using a centralized repository design as compared to a de-centralized repository design for the USAIP application.

1. **Simpler/Less Complex Design**

   By the very nature of the centralized repository design, it is less complex than the de-centralized repository design. There are fewer systems and processes involved with the centralized architecture which does make it easier to manage. In the BIE proposed de-centralized architecture, there is a new process defined involving the Data Trustee. The de-centralized design involves the following steps:
   
   - **The “pushing” of data from the IT Service Provider (a data collector) to a Data Trustee (which may in fact be one in the same)**
   - **The “pulling” or requesting of data by the USDA centralized system from each Data Trustee**

   The centralized architecture, by contrast, only involves “pushing” data from the IT Service Provider to the USDA centralized system.

   There are numerous implications to adding this additional layer to the design. One implication is that problems become more difficult to diagnose as the number of components are added to a system. Isolation of issues involves more time and coordination of many different groups in order to resolve the issue. When fix agents from different organizations/entities become involved in resolving problems, you lengthen the mean-time-to-repair (MTTR) especially at the point of interface between systems. At that point many things beyond direct control of the system applications can occur such as network issues, security issues (firewalls), etc. that will exponentially add to the time to fix an issue. In order to address these issues, routine testing of the system using automated testing tools should be utilized to ensure that the networks are up and working.

   A second implication with a more complex system is that any system enhancements can become more challenging to implement. As systems evolve and more features are added, these changes must be deployed throughout the components of the architecture. Changes to the interface (such as added data fields or additional data checks) between system components are especially challenging. This challenge involves more time to communicate changes, plan/coordinate the changes and added risk that the changes may not immediately work on first pass. However, the Data Trustees may actually simplify the process for USDA, as interface changes with USDA must only be imple-
REPORT OF THE COMMITTEE

mented between USDA and the Data Trustee as opposed to between all data collectors and USDA. Since there would be many fewer Data Trustees than data collection companies, this would be less work. The Data Trustee will be responsible for multiple system interfaces with other service providers/customers.

In some situations, a more complex/de-centralized system is the solution needed to meet business requirements. An example of this was one of the supporting “arguments” for the USAIP de-centralized architecture. This supporting argument states that the world’s credit card authorization system is based on a complex, de-centralized system and, even with increased complexity, operates very efficiently. However, the credit card authorization system does not exactly fit the same business model as the USAIP/NAIS but is similar. Chief among these is the fact that the primary data of interest is not located in a single, central database. In the case of the credit card system, the depository information on each cardholder is kept in the cardholder’s bank, not the credit card company’s central database. This is a similar approach the Data Trustee architecture being proposed. Secondly, what does exist in the central credit card database is only a directory of each card number, pointing to the banking database which contains the information needed to complete a credit card transaction. Again, this is similar architecture recommended for the USDA Data Trustee. And, finally, many credit card transactions require information be pulled more than one bank which is the case with most animal health investigations — information will need to be pulled from more than one Data Trustee. The primary difference between the two systems is the type and amount of data (cardholder credit information versus animal location history).

To summarize, in the credit card system, all the account information for a credit card is maintained in one de-centralized database (the bank’s or account issuer’s system). This de-centralized architecture is logical because the validation system simply needs to know what credit card issuer manages the account and can query that system for the account information. In the proposed USAIP de-centralized architecture, the account information is basically the animal data. As designed, it is highly probable that not a single de-centralized database will own all the “movement” information for any one particular animal. In other words, the data for an animal will be spread across multiple repositories as it moves through the food production chain (meaning multiple premises “transferred-to” for that animal in that production chain will likely be entered into multiple Data Trustee systems). Because this spreading of animal “account” information occurs across multiple systems, the analysis of that data becomes a more complicated process versus the less simple centralized design. The data would first be “pulled” into the USDA system, which can occur in a matter of minutes to a few hours depending upon the number of animals whose informa-
LIVESTOCK IDENTIFICATION

tion would need to be pulled. USDA would need to utilize a “cross-reference” directory in which Data Trustees have information for each animal and/or premises involved in the disease outbreak investigation. At the beginning of an analysis, USDA would create a centralized database of all animal movements for all animals and premises in the search. The analysis tools would then only be used on the single USDA database. The search tools would not be intended for use across on data residing at multiple locations. Based on the initial data request and analysis a second round of requests will need to be made by USDA to the appropriate Data Trustees for additional data to accommodate a widening investigation.**

As outlined in the above paragraph, one added complexity of the de-centralized repository will be for the centralized system to contain other data tables that cross-references each electronic animal ID to a Data Trustee holding a movement/transaction for that animal and cross-references each premises to each data trustee. With the additional messaging, processing and logic to manage these cross-referencing tables, the overall design adds another layer of complexity that would not be needed in a centralized design. Experience has shown that maintaining one or two, additional tables does not add materially to the system complexity, but this will need to be tested to be confirmed.

Overall, in a going forward basis, the more complex de-centralized architecture introduces more to manage than that of the simpler, centralized design.

2. Quicker Report Turn-Around (when Disease Incident Occurs)

One advantage of the current USAIP proposed centralized architecture is that, at the most critical time of processing, it is the most time-efficient design.

The most critical time for the overall USAIP system will be when a Foreign Animal Disease incident occurs. Per the USAIP specifications, a 48-hour trace-back is required when an animal health incident occurs. With the centralized database maintaining all the USAIP required data, a query simply needs to be run against the database to extract that information. In order to be effective, the Data Trustee model must only add a few minutes of additional time in the process between query initiation and completion of the query to be effective.

With the proposed de-centralized architecture, the following is the process for executing a trace-back report:

- The USDA centralized system must query the cross-reference table at the national level to determine which Data Trustee systems need to be queried for specific animal movement information. Only those Data Trustees having relevant information would be queried.
REPORT OF THE COMMITTEE

- The USDA centralized system must then query all appropriate Data Trustee systems for the necessary animal movement information.
- The USDA system must wait for a response from each Data Trustee system containing information on the requested animal or premises to confirm all data is received prior to analysis.
- The USDA will then parse the received data to build the history for an animal(s) involved in the health incident. (NOTE: If based on the initial analysis there is “missing” continuous chain of custody data all Data Trustee systems including those not having any data pertaining to the request must respond to the centralized system to confirm a “negative hit”).
- If a “step” in the animal movement is missing or the history data “paints” an incomplete picture, a re-request may have to occur (NOTE: an example of this would be an animal’s history shows that a “to” premise that doesn’t match the next movement’s “from” premise as the audit trail is built). (It should be noted that this is also a possibility in a centralized federal database. This is an area that this committee feels needs further discuss and should to be addressed in the near future.

All the above activities in the de-centralized architecture are occurring when time is of the essence. Further complicating the process in a de-centralized architecture is that any step in the process or any component/system in the above steps experiencing a problem could put the goal of achieving the objective of a 48-hour report turn-around at risk.

Finally, one major advantage the centralized design has over the de-centralized design is in the area of “follow-up” queries. When a health incident occurs with an animal, the initial query will inevitably precede follow-up queries as the USDA officials try to isolate all the possible impacted animals and premises associated with the initially isolated/detected animal. Each of these queries will involve the same set of complex transactions listed above. As a result, the subsequent follow-up queries will inherit all the same breakpoints that could slow down the process. Having the data centrally stored will allow for subsequent queries to be simply executed against the database to retrieve the results.

Overall, the USAIP central repository design will allow for quicker processing when time and accuracy are at its most critical (during the trace-back process).
3. Less Costly Overall

It would be expected that a centralized repository design would be less costly than a de-centralized design. The centralized design, which will be managed by the USDA, will involve a large system capable of processing and storing all the data associated with the USAIP. The centralized design will include configuration for system redundancy to ensure 24x7x365 operation. The centralized system will also require periodic data backups as well as staffing to support an around-the-clock operational system. All of these items will add to the costs to implement the system. One such cost is ensuring data integrity in a centralized and or de-centralized system is resolving inaccuracies in the data. The cost of reconciling inaccurate records is high. Data Trustees, being closer to the data collection point, may be able to provide a higher level of data accuracy, but this needs to be determined.

With an accompanying decentralized architecture, the centralized system will most likely not require that same storage space as it would in a centralized-only architecture. However, the centralized system in a de-centralized architecture will most probably require as much processing power, staffing and other expenses as the same system in centralized-only architecture. In addition, each Data Trustee in a de-centralized architecture will have similar hardware, processing, staffing, etc requirements as the centralized system.

While the overall costs may be larger for a de-centralized architecture, later in this document costs will be addressed from a “private-funded” versus “publicly-funded” aspect. As viewed from a perspective of using less publicly-financed resources, the de-centralized architecture would move cost away from the public sector.

There will need to be a thorough analysis of the Total Cost of Operation (TCO) in the near future of both systems to gain an accurate cost to benefit analysis. Determining the TCO for the public sector and the private sector for each approach will require operating both systems during pilot projects. It is only through empirical analysis that true costs can be identified.

4. Less Governmental Oversight Required

While the main reason for proposing a de-centralized architecture for the USAIP is data privacy, from both the government and others, deploying a de-centralized system for this initiative will require additional government oversight to ensure smooth operation. Oversight of the network will need to be automated in order to keep costs as low as possible.

With the USAIP allowing a de-centralized architecture, an oversight organization will have to be established to ensure specified standards will be met by Data Trustees. Without these standards, serious legal and operational issues could arise. The standards that would
apply to Data Trustees are generally the same standards that would apply to data service providers as described in the USAIP, with the exception of higher levels security, data integrity and 24x7x365 accessibility.

This “standards” certification of Data Trustees will need to include such checks as: establishment and adherence to data privacy policies, security/access rules and operational service level agreements. The service level agreements will be formal documents and address operational issues such as data storage requirements (types of back-up/storage, frequency of back-ups, etc.), system response times, system availability, on-call staff support (including management escalation contact lists), etc.

It is envisioned that an annual review will be required by the agency responsible for certifying Data Trustees to ensure compliance. Plus more frequent reviews of operational metrics (e.g. monthly review of system response times & availability) will be needed to ensure ongoing performance standards are met. USDA could designate an industry trade association group or other group to provide this oversight and audit function and have these services optionally funded by the Data Trustee.

This additional government oversight required to certify Data Trustees is one of the trade-offs for establishing an architecture that may allow additional data privacy while still meeting the objectives of the USAIP.

There will be added costs and time involved with this certification process. This certification process is necessary, however, to ensure the implementation of the USAIP is successful and any legal exposure is minimized.

5. Less Risky

While “risk” was indirectly addressed in earlier sections of this document, it needs to be emphasized that a de-centralized architecture will be more “at risk” of problems than a centralized architecture as applied towards the USAIP. There are several “risk” areas that can be touched on but the two most significant would be data integrity and process-critical operational performance.

In a centralized architecture, the USDA through its system can directly control data stored. Data not meeting standards can be immediately rejected from the IT Service Provider (field data collection). In a de-centralized architecture, the Data Trustees handle the data acceptance role from the IT Service Providers. If invalid data is accepted, problems could arise with performing the trace-back process during an animal health incident. USDA will need to indirectly control most data validity by establishing standards in the Data Trustee SLA, and can test these during “fire drills”. Such “fire drill” exercises will be needed
to test the effectiveness of either a centralized or decentralized system. Still, any variance on how these data checking rules are applied across the Data Trustees could cause issues.

Note that data validity not only addresses confirmation that the data fields have accurate values (e.g. ensuring the right-most digit of the Premises ID is the correct “check digit” OR that the first 3 digits of the Animal ID contains the country code) but also that the data transmitted is accurate in terms of historical information. Data Trustees can easily validate the information in the data fields. However, as animals are moved through the production chain, the centralized system could confirm that the premises “moving out” the animal had previously “received-in” that same animal. With Data Trustees’ recording animal movements, it is very likely that each movement of an individual animal will be stored in separate Data Trustee systems (e.g. a producer using one Data Trustee sells to a feedlot using another Data Trustee who then sells to a packer that uses a different Data Trustee). This means that only when the centralized system receives queries back during a trace-back would a “missing” movement be detected. This type of problem would make the trace-back less effective in quickly finding all the locations the infected animal was processed. This argument assumes that as the data is received USDA will reconcile all animal movements. Some questions for further discussion include:

1. Will USDA do this reconciliation on all animal movements to confirm/audit continuous chain of custody?
2. Should this capability be built into Data Trustees Systems?

The second “at-risk” area with the de-centralized architecture is in the area of functionality during the critical track-back process.

The de-centralized repository architecture involves many more systems and includes inter-system data transfers during the most critical process of the application (track-back). Because of the additional systems and processing, the overall system is more susceptible to problems arising. If any one of these processes or systems break-down, delays will occur in getting the track-back data reported-on. The great advantage to de-centralized systems is that if one component is disabled, other components can still function and provide their service. However, in the de-centralized architecture as applied towards the USAIP, all the components are needed to build the complete animal movement history “snap-shot”. This means that ALL the de-centralized systems in the design MUST be operating to receive the required results.

Overall, including redundancy and other features in the design can minimize these inherent risks with the USAIP de-centralized architecture. However, in this USAIP application, the centralized architecture is less-risky during the most critical process of the USAIP.
De-centralized Repository “Strengths”

The following are the strengths of using a de-centralized repository design as compared to a centralized repository design for the USAIP application.

1. Data Privacy

The main reason the de-centralized architecture was proposed as an enhancement for the USAIP was to provide data security for food production chain participants.

During feedback sessions on the USAIP, concern arose from among all sectors of the production chain regarding use of the data being collected by the USAIP. Data privacy concerns ranged from other governmental uses of the USAIP data (e.g. enforcement of environmental regulations) to the public’s access to the data via the Freedom of Information Act (FOIA) to business competitors gaining insight into another organization’s operations.

To alleviate these concerns, the BIE proposed a de-centralized data architecture that would keep data private except on a “need-to-know” basis for specific animal health incidents. This approach would limit an inquiry to only that data needed to research the animal incident and nothing more.

While more details of how this de-centralized repository design would work are needed, the goal of increasing data privacy may better be met by the BIE proposal. Data Trustees would manage their repositories and would establish “confidentiality agreements” with their clients to best keep this private (while still meeting the USDA SLA of providing the specific data “as needed”).

Note that the Data Trustee’s ability to maintain data privacy is still being debated in terms of FOIA requirements. One opinion from legal counsel has stated that confidentiality issues with respect to FOIA will not be resolved under the decentralized architecture. This opinion further stated that to ensure Data Trustee-held data remains “private”, legislation would be required to address the situation.

A second legal opinion would assert that if Data Trustees are not funded by the government, there is no way information in Data Trustee private hands would be subject to FOIA.

We feel this sub-committee is not in a position to provide an opinion concerning data privacy and FOIA requirements and will defer this issue to the NAIS Subcommittee of the Secretary’s Advisory Committee. A final decision on data privacy will however, impact the cost benefit analysis of the overall system.

2. Less “Public Funds” Needed to Implement

Cost of the two architectures was addressed earlier in this document. In that analysis, it was determined that the de-centralized architecture would likely be more costly to deploy than a centralized archi-
LIVESTOCK IDENTIFICATION

However, as proposed, it is envisioned that the marketplace would “pay” for the greater data privacy that would be available in the de-centralized architecture. Under this business model, many food production chain participants would pay a maintenance fee or transaction fee to the Data Trustees to provide the service of meeting the USAIP reporting requirements YET keeping the data as private as possible. Under this model, private funds would pay for that service thereby lessening the amount of public funds needed to startup and maintain the system. That means private industry would fund all parts of the de-centralized architecture except the centralized system managed by the USDA.

Therefore, it is possible that the overall cost for the government in a Data Trustee environment would be lower than in a centralized-only environment while the overall cost for a de-centralized option will be larger than the centralized-only architecture when private and public costs are combined.

3. Establishes a Repository for Industry-Desired “Value-Added” Data

One of the advantages of using Data Trustees to maintain repositories is the capability of storing additional “value-added” data for the industry.

Value-added data provides food chain participants with additional information to help them better market, evaluate and produce their product. An example of value-added data can include such items as vaccinations or health plan information.

As with any data, this information could be placed in any repository. However, private industry would prefer this information to be stored in an area where they can manage the sharing of this information individually. Private industry would prefer these data be managed without governmental involvement for concern of who might use these data. If this information was stored in a Data Trustee’s or service providers repository, the food chain participant can selectivity choose who and what type of data to be shared (this could be part of the contractual agreements between the Data Trustees or Service Provider and their clients) as described in the USAIP.

Expanding the food-chain data stored for business purposes in addition to the regulatory purposes of the USAIP will create a more efficient and knowledgeable marketplace that would benefit all food chain participants. Establishing a system that supports maintaining these data would be a long-term benefit that will be more effectively employed as its use broadens.

Conclusion

As illustrated in this document, there are trade-offs when analyzing
REPORT OF THE COMMITTEE

the type of architecture to be allowed under the USAIP. Both systems have advantages as well as shortcomings. What the food production industry, government, and especially the members of the USAIP Information Technology subcommittee must determine is the “business” priorities going-forward for this USAIP effort. Once these priorities are determined, the pros and cons of these two architectures can be mapped towards priorities and an analytical decision can be made.

Mr. Fourdraine addressed a number of questions and comments relative to a centralized versus a decentralized data management system.

State Veterinarians Needs and Expectations
Bret Marsh
State Veterinarian, Indiana

Thanks to all of those individuals who have worked so hard over the last few years to develop the template for the National Animal Identification System (NAIS). As a State Veterinarian, I am especially grateful for the leadership provided by Drs. Hillman, Woods and Siroky on this important issue. Without the dedication of many individuals and organizations, the industries we are charged to protect would continue to be vulnerable.

Identification of animals is not new to any of us. Animals have had individual identification by a variety of means for centuries. Our challenge today is to combine an individual identification with a specific premise to accomplish the goal of rapid traceback.

States have collected data on premises and individual animals for decades to support the goals and missions of state animal health agencies. Therefore, all 50 states have served as data trustees throughout the decades, and states have taken very seriously the task of being stewards of the data. Some of these state systems are robust with sophisticated database systems, while others are simply drawers full of documents. Nonetheless, the state systems have supported the needs of state animal health officials for animal health purposes, theft investigations, truck wrecks and for determining herds in areas for circle testing. The database systems under development must recognize the significant resource this data represents to the states for use in efforts in addition to response to a foreign animal disease.

There has been a lot of discussion about the development of a database system that will receive data from all of the states, and yet there is an enormous need to build infrastructure at the state level before we can effectively “push” data anywhere. In building a superstructure for storing, maintaining and retrieving data there must be more discussion about providing support for building the necessary infrastructure at the state level.
LIVESTOCK IDENTIFICATION

Our overarching goal is to protect the agricultural assets of the country, and the development of the database must recognize this fundamental tenet. While there are times for states to act individually, there are also times when we must act as 50 united states, and this is one of them. State veterinarians have traditionally worked very closely together, but this issue will compel us to become even more closely aligned. To support the goal of protecting the nation’s assets we must be unified in our approach.

Although there may be some producers across the country that would choose to participate in a private system, the federal government must continue to aggressively develop a national system. This endeavor must be equipped to support all producers, especially those who choose not to participate in offerings from private companies.

The issue of confidentiality is often the “show-stopper” in nearly every meeting I attend on animal identification. I am concerned that this issue has taken the focus away from the goal. For example, I recently refinanced my home, and I then began to receive letters for various mortgage companies offering me their services. These letters contained my current mortgage balance, the current interest rate and the tax rate on my home. I also can within minutes find a satellite image of my home on the internet simply by entering my mailing address. The information available today to any curious person is remarkable, and I would hope that the need to offer the small number of data elements that are needed to make this identification database successful would not be a road-block to progress.

I would encourage all of us to keep our sights on the goal of protecting the nation’s agricultural assets, because the economic viability of our country depends on it. Considering the United Kingdom destroyed over 10 million head of livestock to eradicate foot and mouth disease, a country the size of the state of Oregon, is it essential that we make immediate progress. This is further supported by the USDA’s tabletop exercise in late 2002 that simulated the intentional introduction of FMD virus. The results of the exercise indicated that within 10 days 35 states could be affected.

There are a lot of people domestically and internationally counting on us to be successful. The stakes are high, likely never higher. I am confident we can find the solution before it is too late.

Livestock Industries Needs and Expectations
Allen Bright
Intioch, NE

I have been called ‘not grass roots’ while talking with producers since being elected President of Nebraska Cattleman’s association. Most producers did not get in business to produce food. After a while,
REPORT OF THE COMMITTEE

most of us develop a passion to produce food and keep business afloat. We are talking about constitutional things when it comes to producer confidentially.

Brucellosis eradication challenges – is an example of problems that can occur with producers acceptance and participation in a government program. The local vet is not always trusted. Producers consider State and Federal Government Veterinarians as “Government” and thus the trust level is affected.

We have an opportunity to do this (NAIS) the best possible- the first time. There is confusion among producers about NAIS. They see that it may be voluntary….and if it is mandatory, unless it puts dollars in their pockets, producers will not participate in a voluntary program. Mandatory - if we are hoping to avoid ID becoming mandatory by achieving a high level of voluntary participation, we have some challenges.

Funding is a challenge. As an example - the funding current funding commitment is approximately $.50 per tag allocated next year (1/2 of the funding - 30,000,000 new calves).

The brucellosis program was never labeled as mandatory – but if you wanted to sell heifers – it was mandatory.

Demand for source verified cattle continues to grow. When I look at the level of funding and the federal and state budget challenges; there is a shortfall. Where is the money going to come from?

I suggest that participation needs to be quite high for this to work. Process and source verified cattle will provide value to an identification system.

I am in favor of a private database system. I may be wrong, but I do not think so. We must assure that discussion occurs openly and we need to make sure we have it right.

Don’t cram a centralized database down producers’ throats. We have around 800,000 beef producers, but professional animal agriculture cattle owner numbers continues to shrink.

Let’s work together.

Livestock Market/Processor Needs and Expectation

Dick Jurgens
Towanda, IL

System must be simple and easily accessible.
System must not have an added COST FACTOR for the markets.
System must have MULTI SPECIES capability.
System must not have an added COST FACTOR for the markets.
System must have the capability to MONITOR and TRACK the movement of Livestock ACROSS DESIGNATED BOUNDARIES.
System must possess strict DATA SECURITY.
System must provide for seamless, QUICK TRACKING.
LIVESTOCK IDENTIFICATION

We must have consistent application among all species. We need to incorporate auction market vet into the process in order to provide data he needs for certification of animal movements. Any transaction that occurs at a market needs to be prepared to be an interstate bound transaction, and reported once.

Incorporate other disease programs, which are already in place, into the ID and reporting system to streamline required data.

We also have data security and accountability issues. An example is queries from banks of cattle sold out of trusts.

USDA Needs and Expectations
John Clifford
Washington, DC

The U.S. Department of Agriculture’s (USDA) Animal and Plant Health Inspection Service (APHIS), in cooperation with State and Tribal animal health authorities, is responsible for the administration of national animal health programs. These would include eradication and surveillance programs for diseases such as bovine tuberculosis, brucellosis, and pseudorabies.

An integral component of the National Animal Health Surveillance System is a national animal identification system (NAIS). By allowing for rapid tracing of infected and exposed animals during an outbreak situation, the NAIS will help limit the scope of such outbreaks and ensure that they are contained and eradicated as quickly as possible.

To ensure that animal health officials have immediate, reliable, and uninterrupted access to essential NAIS information in the event of a disease concern, certain basic data must be maintained at the Federal level. Accordingly, such information needs to be maintained within data repositories managed by APHIS. These information repositories must also be integrated with current information systems already established for animal disease control, monitoring, surveillance, and eradication programs (e.g., the Emergency Management Response System, the Generic Data Base and the National Animal Health Laboratory Network). The NAIS data systems will also need to be well integrated with other systems as they are developed and implemented (e.g., the Interstate Certificate of Veterinary Inspection System).

There are two main NAIS information repositories: the National Premises Information Repository and the National Animal Records Repository. The information maintained in the National Premises Information Repository will incorporate the twelve basic data elements defined in the former U.S. Animal Identification Plan (USAIP):
REPORT OF THE COMMITTEE

<table>
<thead>
<tr>
<th>National Premises Information Repository: Data Elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Premises Identification Number</td>
</tr>
<tr>
<td>Name of Entity</td>
</tr>
<tr>
<td>Owner or Appropriate Contact Person</td>
</tr>
<tr>
<td>Street Address</td>
</tr>
<tr>
<td>City</td>
</tr>
<tr>
<td>State</td>
</tr>
<tr>
<td>Zip/Postal Code</td>
</tr>
<tr>
<td>Contact Phone Number</td>
</tr>
<tr>
<td>Operation Type</td>
</tr>
<tr>
<td>Date Activated</td>
</tr>
<tr>
<td>Date Retired</td>
</tr>
<tr>
<td>Reason Retired</td>
</tr>
</tbody>
</table>

The National Animal Records Repository will have the capability to maintain animal identification and movement data as defined in the USAIP, but will only require essential data elements necessary for animal tracebacks. Specifically, these elements include:

- the animal’s official identification number;
- the premises number of the location where the animal was identified or sighted;
- the date of the sighting;
- the event code that is associated with the reportable sighting.

In addition, when an entity reports information to the repository on behalf of another party, the record reported must include the nonproducer participant number of the entity reporting the data. This will help animal health officials determine whom they may contact to obtain additional information about certain animals or premises, if necessary.

Animal identification and tracking systems maintained by the States or regional alliances will be an integral part of the overall NAIS information infrastructure. These systems will be maintained and operated at the discretion of the States, and essential data will be pushed from them to the national repositories.

Once participating state/regional and third party systems have been evaluated for data compliance, USDA will support the establishment of interfaces between them and the national repositories. The State/regional systems will be able to collect and maintain more information than is required for the NAIS, but only the required data needs to be sent to the national animal records repository.

Old Business

The Committee reviewed Resolution 19, from the 2003 Committee
LIVESTOCK IDENTIFICATION

meeting and determined that the intent of the three points contained in the resolution were either accomplished or progress was being made toward accomplishment. No additional action was necessary.

The Committee reviewed and amended its Mission Statement. The new mission statement is as follows:

The purpose of the Committee on Livestock Identification is to coordinate and evaluate methods of livestock identification and to make recommendations to USAHA for the adoption or rejection of animal identification systems.

The goal of the committee is to meet the expanding needs in livestock identification, both national and international, and be prepared to reach conclusions that are not only reasonable to the livestock industry, but fulfill the purposes for which each livestock identification system is designed.

New Business
1. New Business Item 1 – Resolution
   SUBJECT MATTER: National Animal Identification System
   A resolution, entitled National Animal Identification System, was presented, discussed and approved by the committee. The resolution urges the expeditious development of data management systems that will meet all stakeholders’ needs.

2. New Business Item 2 - Resolution
   SUBJECT MATTER: Web based Interstate Certificate of Veterinary Inspection
   A resolution calling for implementation of the web based ICVI in all states was presented, discussed and approved by the committee.

3. New Business Item 3 - Recommendation
   The committee approved a recommendation that the Committee accept the report of the State Standards for Implementation of the NAIS Subcommittee as a work in progress, to be forwarded to USDA for development into a draft Uniform Methods and Rules with subsequent distribution of the draft UM&R to all stakeholders for review, comment and amendments.

4. New Business Item 4 -
   Dr. Hillman discussed the potential development of a NAIS Oversight Subcommittee under the USAHA Committee on Livestock Identification. This idea was discussed at the ID EXPO in Chicago. This concept was suggested as a means to provide stakeholders the opportunity for input into the development, implementation and management of the NAIS. Early in the development of the USAIP, oversight was an issue of concern. Many persons believed that an Advisory Com-
mittee was needed, while others felt an Advisory Committee alone would not provide sufficient opportunity for stakeholder input.

Subsequent to the Chicago meeting, Secretary Veneman formed the NAIS Advisory Subcommittee under the Foreign Animal and Poultry Diseases Advisory Committee. The Subcommittee has met and one of its actions was to continue the species working groups as a mechanism to provide stakeholder input to the NAIS development, implementation and management. With this mechanism in place the need for an oversight subcommittee as part of the Committee on Livestock Identification is questionable at this time. Therefore, the Chair has not appointed such a subcommittee. The Chair requested input from the Committee relative to this issue. The Committee did not believe that an oversight subcommittee was needed, in that the Committee on Livestock Identification itself provided a venue for stakeholder input.
REPORT OF THE COMMITTEE ON NOMINATIONS AND RESOLUTIONS

Chair: Mr. R. E. Frost, Lincoln, CA

2005 NOMINATIONS

PRESIDENT................................. Richard D. Willer, Phoenix, AZ
PRESIDENT-ELECT ....................... Bret D. Marsh, Indianapolis, IN
FIRST VICE-PRESIDENT............... Lee M. Myers, Atlanta, GA
SECOND VICE-PRESIDENT .......... James W. Leafstedt, Alcester, SD
THIRD VICE-PRESIDENT .......... Donald E. Hoenig, Augusta, ME
TREASURER ................................. Jones W. Bryan, Clemson, SC

REGIONAL DELEGATES

NORTHEAST .......................... Robert J. Eckroade, PA
.............................................. Ernest W. Zirkle, NJ
NORTHCENTRAL ...................... Velmar Green, MI
.............................................. James Lewis, MN
SOUTH ..................................... L. Wayne Godwin, FL
.............................................. A. Greg Rosales, AL
WEST ....................................... Bill Sauble, NM
.............................................. C. W. Lum, HI

2004 RESOLUTIONS

108th Annual Meeting
October 21-27, 2004

RESOLUTION NUMBER: 1 APPROVED

SOURCE: COMMITTEE ON JOHNE'S DISEASE
SUBJECT MATTER: NEW NATIONAL JOHNE'S DISEASE DAIRY HERD PREVALENCE STUDY

BACKGROUND INFORMATION:
The current herd prevalence of Johne’s disease in U.S. dairy herds is unknown. The herd infection rate based upon the National Animal Health Monitoring System (NAHMS) 96 Dairy Study was approximately 22 percent. This figure was based upon ELISA testing of a sub-sample of cows within approximately 1,000 herds, assuming test sensitivity of 50 percent. Based on our knowledge of ELISA sensitivity today, the true prevalence of Johne’s disease in U.S. herds is likely to be much higher. It is critical that a new Johne’s dairy cattle prevalence study be performed to provide an accurate assessment of the prevalence.

It is proposed that a dairy study to determine and evaluate progress in control programs should be conducted in fiscal year 2006. The sur-
REPORT OF THE COMMITTEE

vey will be based on environmental sampling of a statistically valid number of dairy herds, in the 20 states with the largest number of dairy cattle. The protocol for environmental sampling will be used to minimize the number of samples and costs per herd. Each sample will be a pool of sub-samples obtained in the assigned area thereby maximizing sampling efficiency.

RESOLUTION:

The United States Animal Health Association (USAHA) requests the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) conduct a Johne’s prevalence study during 2006 to guide the National Johne’s Disease Control Program. The funding for this survey will be provided by USDA-APHIS-VS.

RESOLUTION NUMBER: 2 APPROVED

SOURCE: COMMITTEE ON LIVESTOCK IDENTIFICATION
SUBJECT MATTER: NATIONAL ANIMAL IDENTIFICATION SYSTEM

BACKGROUND INFORMATION:

As a result of its two years of involvement and leadership in the United States Animal Identification Plan (USAIP) process, the livestock industry believes the National Animal Identification System (NAIS) must be a partnership between animal health officials and private sector entities. The livestock industry recognizes that state animal health officials play the key role in the animal health investigations and surveillance in concert with the United States Department of Agriculture (USDA). For a partnership of industry and animal health officials to effectively implement the NAIS data management component, it must perform several different functions: encourage producer participation at a level that insures integrity of the NAIS and volume of data required; safeguard security and confidentiality; provide a flexible data management architecture responsive to the needs and expectation of producers, livestock marketing system, and animal health officials thereby providing incentives to record, report and/or query information within the system; and utilize significant organizational assets, including media, communications, education, and government affairs resources of established and proven industry experts and advocates.

RESOLUTION:

To expedite the development of a data management system to meet all stakeholders’ needs and expectations, the United States Animal Health Association (USAHA) urges the National Animal Identification System (NAIS) Subcommittee of the Secretary of Agriculture’s Advi-
NOMINATIONS AND RESOLUTIONS

The Advisory Committee on Foreign Animal and Poultry Diseases to request the United States Department of Agriculture (USDA) to facilitate the cooperative development of an appropriate animal traceability database system through the joint leadership of the species and segment working groups, issue-based working groups, and state animal health officials.

RESOLUTION NUMBER: 3 APPROVED
SOURCE: COMMITTEE ON INFECTIOUS DISEASES OF HORSES
SUBJECT MATTER: NEED FOR TIMELY PERTINENT INFORMATION FROM THE UNITED STATES DEPARTMENT OF AGRICULTURE, ANIMAL AND PLANT HEALTH INSPECTION SERVICE, VETERINARY SERVICES ON CURRENT DISEASE SITUATIONS AFFECTING HORSES.

BACKGROUND INFORMATION:
In recent years, the U.S. horse industry has had to deal with the occurrence of a number of important infectious diseases, including West Nile virus (WNV) and, most recently, Vesicular Stomatitis (VS).
Currently, anyone seeking up-to-date information regarding an infectious disease occurrence in horses will find it difficult to obtain. It requires an extensive effort via the internet and/or by phone contact with affected states. The existing United States Department of Agriculture (USDA) website provides little information on any equine disease of concern.

In addition, information on international trade restrictions is virtually impossible to find. While the countries with restrictions on the import of horses because of WNV are few, some, such as Brazil, are important trading partners of the United States. Limitations in available information is even more glaring with regard to the current VS situation in Texas, Colorado and New Mexico. The USDA website includes trade restriction information for only three countries: Korea, Canada and the European Union, and in fact, posted requirements for Korea are out of date. The International Regulation Retrieval System (IRRS) lists the latest update for horses for export to Korea as January 2004. There were no recent updates available through the USDA website. Currently, USDA does not list any state requirements for movement of animals from VS-affected states, although several states have imposed movement restrictions.

In the past, the USDA has played a key role in providing extensive and timely reports to the horse industry and to state animal health officials regarding important disease outbreaks in the United States.
REPORT OF THE COMMITTEE

These reports have always included what information was available on the epidemiological findings in such outbreaks as well as information on domestic and international movement restrictions. The USDA is the appropriate agency to compile this information accurately and to make it readily available.

RESOLUTION:

The United States Animal Health Association (USAHA) urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Services (APHIS), Veterinary Services (VS) to enhance its current program of gathering data on outbreaks of infectious diseases with the cooperation of the states in order to provide up-to-date information on such outbreaks, as well as state and international movement restrictions and other pertinent information to stakeholders and state animal health officials on a regular and timely basis.

RESOLUTION NUMBER 4 APPROVED

SOURCE: COMMITTEE ON INFECTIOUS DISEASES OF HORSES

SUBJECT MATTER: ELECTRONIC EIA FORMS

BACKGROUND INFORMATION:

The United States Animal Health Association’s (USAHA) Committee on Infectious Diseases of Horses has carefully compared the VS Form 10-11 used for submission of blood samples for Equine Infectious Anemia (EIA) testing in approved laboratories to the use of electronic EIA submission forms (eEIA) and find that the eEIA submissions as developed by Global Vet Link (GVL) have the following advantages:

- Provide clients with instant results through online application
- Have direct veterinary practice connectivity – plan for submissions before they are received
- Save administrative time, labor and money with online system
- Able to identify submission errors before tests are run
- Electronically access EIA laboratory test forms and Certificates of Veterinary Inspection that utilize results posted by the laboratory
- Access a web-based animal health regulatory management system 24 / 7
- Access submissions from any computer with an Internet connection
- Secure system ensures that you only do business with accredited veterinarians
- Documents are automatically submitted to the appropriate ani-
NOMINATIONS AND RESOLUTIONS

mal health authorities

- Run real-time, secured reports and historical data queries
- No software to load, no forms to inventory, reorder, stamp, separate or shuffle
- Customer service assists with regulatory authorities, veterinary practice conflicts, and GVL application training and support
- Allow error free identification through digital imaging

The availability of eEIA has been welcomed by practitioners in the states of Florida, Wisconsin, Missouri, Iowa and Texas, the first states to implement eEIA on a test basis. It would be appropriate to install eEIA capabilities at the same time as Interstate Certificate of Veterinary Inspection (ICVI) installation and to those states that already have ICVI as soon as possible after requests are received.

RESOLUTION:
The United States Animal Health Association (USAHA) requests that the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), in consultation with USAHA, provide laboratory connectivity to all states that wish to utilize or develop the electronic Equine Infectious Anemia (eEIA) application with digital identification. Through this system, states and other entities may either use the Equine Infectious Anemia (EIA) application alone or in conjunction with Interstate Certificate of Veterinary Inspection (ICVI) developed by GlobalVetLink under contract with USDA-APHIS-VS.

RESOLUTION NUMBER: 5 – 32 Combined APPROVED

SOURCE: COMMITTEE ON SALMONELLA
COMMITTEE ON TRANSMISSIBLE
DISEASES OF POULTRY AND OTHER
AVIAN SPECIES

SUBJECT MATTER: SALMONELLA PERFORMANCE
STANDARDS

BACKGROUND INFORMATION:
The United States Department of Agriculture (USDA), Food Safety and Inspection Service (FSIS) issued the Pathogen reduction: Hazard Analysis and Critical Control Point (PR/HACCP) Systems final rule on July 25, 1996. To verify that industry PR/HACCP systems are effective in controlling the contamination of raw meat and poultry products with disease-causing bacteria, the PR/HACCP rule sets Salmonella performance standards (SPS) that slaughter establishments and establishments that produce raw ground products should meet.

The SPS have been in effect for large establishments since January 26, 1998, and the results of this testing were published in the
Progress Report on Salmonella testing of Raw Meat and Poultry Products, 1998-2003. The data reported for 2003 showed that Salmonella prevalence in all product categories, for all sizes of establishments combined, was lower than agency baseline studies and surveys conducted before PR/HACCP implementation. In addition, most categories showed marked improvements over the six-year period in both the percentage of samples testing positive and the percentage of sample sets meeting the performance standard criteria.

The Centers for Disease Control and Prevention (CDC) published Preliminary FoodNet Data on the Incidence of Infection with Pathogens Transmitted Commonly Through Food — Selected Sites, United States, 2003 on April 30, 2004. This report detailed the surveillance results for nine FoodNet sites representing approximately 41.5 million persons. Salmonella cases represented 38.6 percent of laboratory-diagnosed cases of foodborne illness. Among the 5,455 Salmonella isolates serotyped, five serotypes accounted for 59 percent of infections: 20 percent Typhimurium, 14 percent Enteriditis, 12 percent Newport, 6 percent Heidelberg, and 6 percent Javiana.

During 1996—2003, the estimated incidence of several infections declined significantly. The estimated incidence of Salmonella decreased 17 percent (95 percent CI = 26 percent to 7 percent decrease); incidence of S. typhimurium, typically associated with meat and poultry, decreased 38 percent (95 percent CI = 47 percent to 27 percent decrease). The decline in human Salmonella infections during 1996—2003 accompanies a decline in the isolation of Salmonella from meat and poultry by FSIS.

RESOLUTION:

The United States Animal Health Association (USAHA) recommends that the United States Department of Agriculture (USDA), Food Safety and Inspection Service (FSIS) and The United States Department of Health and Human Services (DHHS), Food and Drug Administration (FDA) continue efforts to improve the safety of U.S. meat, poultry, and egg products and protect public health.

These efforts should be based on rigorous science-based initiatives that are proven effective in reducing pathogen contamination and should include adequate funding for research and development of new and innovative control strategies.

The USAHA also recommends that USDA-FSIS establish informal performance standards, rather than regulatory standards, using these as “benchmarks” to determine whether establishments are appropriately controlling pathogens in their operations. In addition, the establishment of any new performance standards or changes to existing performance standards should be tied to scientifically supportable measures of human health outcome directly related to that standard.
NOMINATIONS AND RESOLUTIONS

Finally, the USAHA recommends that government and industry strive to work cooperatively toward the common goal of improving food safety related to meat, poultry, and egg products. The establishment of a confidential third-party data repository intended to collect and store government, industry, academic, and other pertinent food safety data that would be accessible to all affected parties should be pursued. Communication between industry and government should be improved with additional opportunities for combined training developed.

RESOLUTION NUMBER: 6 APPROVED
SOURCE: COMMITTEE ON PUBLIC HEALTH AND RABIES
SUBJECT MATTER: A NATIONAL PLAN FOR RABIES CONTROL IN WILDLIFE
BACKGROUND INFORMATION:

The epizootic of raccoon rabies continues to spread into uninfected areas of North America. The natural barriers that previously restricted the raccoon rabies variant to the Atlantic coast states have been compromised. Barriers have been breached in Ohio and Cape Cod, Massachusetts with a first time occurrence of raccoon rabies on Long Island, New York. Translocation of raccoons with incubating rabies infection may have contributed in these instances. This creates the potential for a large portion of the nation to be affected by raccoon rabies.

The cost of living with raccoon rabies cannot accurately be determined, but is substantial according to numerous local, state, and federal studies. This epidemic has reached national proportions and control efforts require coordination at the national level.

Rabies vaccine, licensed for use in raccoons and coyotes by the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) is available for delivery to wildlife through bait distribution. The use of oral raccoon rabies vaccination has been successful in the control of raccoon rabies in urban and rural environments, limiting the spread of raccoon rabies to uninfected areas, and dramatically controlling and eliminating rabies in coyotes in south Texas. Large-scale control efforts must continue to be developed and implemented over large areas of the epizootic front to prevent the spread of raccoons throughout the continent. The USDA-APHIS Wildlife Services (WS), has provided substantial leadership, funding and program support to assist states with oral rabies vaccination programs which include raccoon, coyote, gray fox and skunk rabies. The USDA-APHIS-WS has also facilitated numerous meetings involving federal, state and provincial agencies to address the potential for coordinated, regional rabies control efforts, with the goal of developing a national rabies control program that would complement raccoons control programs in Canada and Mexico. The Na-
REPORT OF THE COMMITTEE

tional Working Group on Rabies Prevention, coordinated by the Centers for Disease Control and Prevention, and the National Association of State Public Health Veterinarians, the Council of State and Territorial Epidemiologists and the American Veterinary Medical Association have developed recommendations for enhancing rabies control including wildlife vaccination.

RESOLUTION:
The United States Animal Health Association (USAHA) urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS) to continue to seek additional funding for terrestrial wildlife rabies control programs. The USAHA further encourages state and local governments and regional alliances to support this activity through appropriate funding channels. The USAHA also strongly encourages the USDA-APHIS-WS, the United States Public Health Service (USPHS) and the Centers for Disease Control and Prevention (CDC) to allocate appropriated funding and resources to assist states and local agencies in the development, maintenance and expansion of coordinated regional wildlife rabies control and vaccination programs.

RESOLUTION NUMBER: 7 – 8 – 23 Combined APPROVED
SOURCE: COMMITTEE ON LABORATORY AND VETERINARY WORK FORCE INITIATIVES
COMMITTEE ON FOREIGN AND EMERGING DISEASES
USAHA/AAVLD COMMITTEE ON ANIMAL HEALTH INFORMATION SYSTEMS

SUBJECT MATTER: FEDERAL FUNDING FOR THE NATIONAL ANIMAL HEALTH LABORATORY NETWORK

BACKGROUND INFORMATION:
The National Animal Health Laboratory Network (NAHLN) is part of a national strategy to coordinate and network Federal laboratory capacity with the capacity and extensive infrastructure (facilities, professional expertise, support) of State and University laboratories to better respond to animal health emergencies, including bioterrorist events, newly emerging diseases and foreign animal disease (FAD) agents that threaten the Nation’s food supply and public health.

In fiscal year 2002, 12 State and University diagnostic laboratories were selected by the Cooperative State Research, Education and Extension Service and the Animal and Plant Health Inspection Service to enter into Cooperative Agreements funded by Homeland Security appropriations to formally initiate the network. In order to ensure that the NAHLN provides optimum geographic coverage and the capacity to
be fully capable of responding to any animal health emergency, funding will be required for facilities, training and equipment. It is also essential that annual allocations be provided for maintaining the high level of preparedness that is required for the network laboratories to be capable of responding in a crisis situation.

RESOLUTION:
The United State Animal Health Association (USAHA) requests the House Agriculture Committee, the Senate Agriculture Nutrition and Forestry Committee, the Senate Agriculture, Rural Development and Related Agencies Appropriations Subcommittee and the House Agriculture Rural Development, Food and Drug Administration and Related Agencies Appropriations Subcommittee to immediately provide $85 million to fully fund the establishment and enhancement of the National Animal Health Laboratory Network (NAHLN).

Furthermore, the USAHA urges the Secretary of Agriculture to request annual recurring line item funding in the United States Department of Agriculture budget in the amount of $30 million for ongoing support of the NAHLN.

RESOLUTION NUMBER:  8 - Combined with 7
SOURCE: COMMITTEE ON FOREIGN AND EMERGING DISEASES
SUBJECT MATTER: FEDERAL FUNDING FOR THE NATIONAL ANIMAL HEALTH LABORATORY NETWORK

RESOLUTION NUMBER:  9 APPROVED
SOURCE: COMMITTEE ON FOOD SAFETY
SUBJECT MATTER: COLLABORATION IN ANIMAL HEALTH, FOOD SAFETY AND EPIDEMIOLOGY (CAHFSE)

BACKGROUND INFORMATION:
The Collaboration In Animal Health, Food Safety And Epidemiology (CAHFSE) is a stakeholder-driven, United States Department of Agriculture (USDA) multi-agency Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), Agricultural Research Service (ARS), and Food Safety and Inspection Service (FSIS) collaboration to address issues that may affect animal health and food safety. It has been under development for three years with input and support from multiple industries, key stakeholders, and by all three relevant USDA undersecretaries.

The CAHFSE is based on longitudinal sample and data collection on farms and at commodity processing facilities over time. The CAHFSE will provide a flexible platform to evaluate management factors that
REPORT OF THE COMMITTEE

may be related to animal health, production practices and food safety outcomes, including antimicrobial resistance issues.

USDA will maintain confidentiality of data in a similar manner to the National Animal Health Monitoring Systems (NAHMS), which has proven to be excellent over many years. The CAHFSE will complement the NAHMS by conducting quarterly sampling and collection of production practices over time. Currently, data and samples are being collected on swine farms and will soon be collected in swine slaughter/processing plants.

RESOLUTION:

The United States Animal Health Association (USAHA) endorses the continued Collaboration in Animal Health, Food Safety and Epidemiology (CAHFSE) and recommends that the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), Agricultural Research Service (ARS), and Food Safety and Inspection Service (FSIS) reprioritize funding in order to implement the program with all commodities that support the program and volunteer to participate.

RESOLUTION NUMBER: 10 APPROVED

SOURCE: UNITED STATES ANIMAL HEALTH ASSOCIATION BOARD OF DIRECTORS

SUBJECT MATTER: FEDERAL FUNDING FOR THE NATIONAL VETERINARY MEDICAL SERVICE ACT (PUBLIC LAW 108-161)

BACKGROUND INFORMATION:

The United States is experiencing a shortage of veterinarians in rural agricultural and inner-city areas, in certain population groups, and in various veterinary disciplines, such as public health, epidemiology and food safety. Veterinarians are the nation’s first line of defense against disease outbreaks. Veterinarians are critically needed by federal and state governments to preserve our nation’s biosecurity and food safety.

Mean educational debt for 2003 graduates was $76,558, an increase of 5.3 percent over 2002 graduates. Mean starting salary, across all types of practice, was $41,602 (JAVMA January 15, 2004). Loan repayment consumes almost one-third of the income of recent graduates; by comparison, a greater percentage than for other health professions. This disparity between salary and debt precludes recent veterinary graduates from accepting lower-paying positions in rural agricultural, inner-city and governmental areas, where they are needed most.

The National Veterinary Medical Service Act was signed into law in December 2003, but has not received any funding appropriations. It authorizes the Secretary of Agriculture to enter into agreements with
veterinarians who provide services in veterinary shortage situations in exchange for veterinary education loan repayment. If funded, it will also provide veterinarians with additional loan repayments in exchange for service in federal emergency situations. $60 million in federal appropriations, over three years ($20 million per annum), would permit 400 veterinarians to participate in the program over that period of time.

RESOLUTION:
That the United States Animal Health Association (USAHA) requests the House Agriculture Committee, the Senate Agriculture Nutrition and Forestry Committee, the Senate Agriculture, Rural Development and Related Agencies Appropriations Subcommittee and the House Agriculture Rural Development, Food and Drug Administration and Related Agencies Appropriations Subcommittee to immediately provide $20 million per annum to fund the National Veterinary Medical Service Act, P.L. 108-161.

Furthermore, the USAHA urges the Secretary of Agriculture to request line item funding for the National Veterinary Medical Service Act beginning in the FY06 executive budget.

RESOLUTION NUMBER: 11 APPROVED
SOURCE: COMMITTEE ON FOOD SAFETY
SUBJECT MATTER: CONTINUED SUPPORT FOR FOOD ANIMAL RESIDUE AVOIDANCE DATABANK (FARAD) AND THE NATIONAL ANTIMICROBIAL RESISTANCE MONITORING SYSTEM (NARMS)

BACKGROUND INFORMATION:
Antimicrobial compounds play an essential role in ensuring the health and well being of livestock. Protecting the health of livestock is also an important contributor to providing consumers an abundant supply of safe, wholesome and affordable food. In order to maintain the human safety, animal safety and continued efficacy of these important products animal health professionals need prompt access to data relating to prudent use, including complex pharmacokinetic data. This data is an important contributor to prudent use decisions as well as to aid in preventing violative residues in animal products. Since its inception in 1982 the Food Animal Residue Avoidance Databank (FARAD) has developed and maintained a unique and valuable pharmacokinetic food safety database for veterinarians, livestock producers, state and federal regulatory agencies and extension specialists. In addition, the Food and Drug Administration (FDA) has established the Guidance for Industry #152 framework for evaluating the safety of antibiotics relative to their potential to contribute to the development of antimicrobial resistance. It is important that such resistance patterns, if
REPORT OF THE COMMITTEE

present, are addressed so as not to jeopardize public health as a poten-
tial indirect consequence of antibiotic use in livestock. The United
States Department of Agriculture (USDA), FDA and Centers for Dis-
eease Control and Prevention (CDC) have jointly funded the National
Antimicrobial Resistance Monitoring System (NARMS) for many years.
The NARMS program is the post approval monitoring system for new
and existing antibiotics and the data are a central element in the deci-
sion-making process employed by the FDA Veterinary Medicine Advi-
sory Committee as they implement the Guidance for Industry #152
evaluation process.

RESOLUTION:
The United States Animal Health Association (USAHA) supports
the continued funding of the Food Animal Residue Avoidance Databank
(FARAD) and full funding of the National Antimicrobial Resistance
Monitoring System (NARMS) by the Food and Drug Administration
(FDA), United States Department of Agriculture (USDA) and Centers
for Disease Control and Prevention (CDC) to support these important
programs.

RESOLUTION NUMBER: 12 APPROVED

SOURCE: COMMITTEE ON AQUACULTURE
SUBJECT MATTER: ADEQUATE LONG-TERM FINANCIAL
SUPPORT FOR THE STATE-FEDERAL
INFECTIONOUS SALMON ANEMIA
PROGRAM AND INDEMNIFICATION IN
THE NORTHEASTERN UNITED STATES

BACKGROUND INFORMATION:
Salmon aquaculture is a multi-million dollar agricultural industry in
the United States. An October 2004 study[1] indicated that the farm
gate value of Maine salmon aquaculture was about $50 million. The
Maine industry is rebuilding after an economically-devastating outbreak
of Infectious Salmon Anemia (ISA), a disease caused by Infectious
Salmon Anemia Virus (ISAV), in 2001-2002. In 2000, the reported
farm gate value of Maine salmon farms was $100 million annually. The
current epizootic has caused losses totaling millions of dollars. ISA is
recognized as a foreign animal disease and has been diagnosed on
Maine salmonid fish farms again recently.

The United States Animal Health Association’s (USAHA) 2001 Reso-
lution No. 04, called upon the United States Department of Agriculture
(USDA), Animal Plant Health Inspection Service (APHIS) Veterinary

[1] Economic Impact of Aquaculture in Maine, Planning Decisions Res-
search & Planning (www.planningdecisions.com), October 14, 2004, O’Hara,
Lawton and York
Services (VS), to, among other things, develop a USDA-APHIS-VS, ISA program which supports an ISA surveillance and monitoring plan component and an indemnity plan component. The final USDA-APHIS-VS, ISA program draft was approved on April 30, 2002. In December 2002, following the USDA’s determination that Federal assistance was necessary to effectively control this disease, which posed a threat to animal health and the U.S. economy, $8.3 million was released from the Commodity Credit Corporation (CCC) to be used for indemnity payments, program activities such as: depopulation and disposal; clean up and disinfection; establishment of surveillance programs; epidemiology and diagnostic support; and training for producers and veterinarians.

The USDA-APHIS-VS, ISA protocol has been universally implemented on Maine salmonids farms, and until recently, no significant outbreak of ISA has occurred in U.S. waters although the pathogen was detected at several sites in the Cobscook Bay area in 2003 and early 2004. Among the likely reasons that ISAV loads in the marine environment have increased are disparities between U.S. and Canadian disease management protocols. While standardization of approach is being actively pursued on both sides of the international border, the situation in recent months has resulted in limited depopulation and disposal of pre-market fish from several Maine farms. An outbreak of ISA again appears imminent in Cobscook Bay.

Although some amount of indemnification is anticipated from the USDA for the most recent losses of young fish at Maine salmonids farms, the CCC funds are nearly exhausted. ISA is neither a simple nor transient phenomenon. The administrative and surveillance components of the ISA program have been funded by USDA for the near term but continuity of indemnity funding is also needed for the important purpose of encouraging farmers to swiftly eliminate infected stock before the appearance of clinical disease occurs and dramatically increases losses. USDA-APHIS must therefore act quickly to provide long-term financial support for surveillance, monitoring and indemnification to assist Maine salmonid growers in effectively implementing the ISA program standards.

RESOLUTION:

The United States Animal Health Association (USAHA) requests the United States Department of Agriculture (USDA), Animal Plant Health Inspection Service (APHIS) Veterinary Services (VS), to begin work immediately to establish sufficient, annual funding for the long-term maintenance of the USDA-APHIS-VS Infectious Salmon Anemia (ISA) program including indemnification for losses incurred by U.S. salmonid growers in the implementation of the program.
REPORT OF THE COMMITTEE

RESOLUTION NUMBER: 13 – 40 Combined APPROVED

SOURCE: COMMITTEE ON IMPORT EXPORT
COMMITTEE ON BIOLOGICS AND
BIOTECHNOLOGY

SUBJECT MATTER: IMPORTATION OF FETAL BOVINE SERUM

BACKGROUND INFORMATION:

The United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) has the responsibility of ensuring that fetal bovine serum (FBS) imported from other countries is free of pathogens which do not exist in the United States and pose a risk to the U.S. livestock population.

Since Bovine Spongiform Encephalopathy (BSE) has become the main disease limiting the trade of live cattle, meats and bovine products throughout the world, the limited supply of USDA approved FBS has not been able to keep up with the demand, resulting in price differences that make USDA approved FBS as much as 10 times higher than non USDA approved FBS. This price difference rewards smuggling and misrepresentation of FBS between origins, thus putting at risk the traceability and safety of “USDA approved FBS”, throughout the world.

Gamma irradiation has been used by USDA-APHIS-VS for several decades, as a method to inactivate potential pathogens in ruminant serum imported from countries known to have livestock diseases that do not occur in the United States. Importations of ruminant serum have been authorized by USDA-APHIS-VS in limited quantities for developmental research and diagnostic purposes by both governmental and private institutions.

Gamma irradiation is currently being used as an approved treatment to eliminate potential pathogens in medical products used for both human and animal medical applications. Gamma irradiation is also authorized by USDA for the treatment of many food products of animal and plant origin.

Many research laboratories and biologics manufacturers can use gamma irradiated serum from BSE free countries, especially in those applications where the absence of BSE is most critical.

RESOLUTION:

The United States Animal Health Association (USAHA) urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) to re-propose the concept and feasibility of authorizing the use of gamma irradiation for the importation of commercial shipments of Fetal Bovine Serum (FBS) from countries and/or regions that are free of Bovine Spongiform Encephalopathy (BSE), but have restrictions because of
other pathogens that can be eliminated by gamma irradiation, thus helping assure a reliable, affordable, safe and continuous supply of pathogen-free FBS to research laboratories and biologics manufacturers.

RESOLUTION NUMBER: 14 APPROVED
SOURCE: COMMITTEE ON AQUACULTURE
SUBJECT MATTER: RISK ASSESSMENT IN AQUATIC ANIMAL HEALTH
BACKGROUND INFORMATION:
The life-cycles and survival parameters of exotic finfish viruses are not well understood. This makes the application of risk assessment to even the most studied models difficult. Risk analysis is a tool to help decision makers. There will always be a need for supportive actions to help solve the problems generated by the process of risk analysis. There have been reports of difficulties in carrying out existing risk analysis methods.

The stability of infectious agents in different media and under different physical and chemical environments has been extensively studied for some viruses and virtually ignored for others. Gaps in the knowledge are due in part to difficulties in reproducing life cycles and determining whether the agent is inactive or otherwise unable to cause significant fish health problems. Isolation of the agent under certain conditions can present significant challenges. Studies on the susceptibility of viruses to different physical or chemical parameters have often been conducted under artificial conditions and quantitative data on the rate of inactivation are lacking for many agents. To assess the potential risk for the introduction and establishment of an exotic finfish virus in an aquatic ecosystem, several factors associated with the agent must be determined. These factors include the liability of the agent to pH, cooling, freezing, heating, and the ability of the agent to survive freely in the environment.

RESOLUTION:
The United States Animal Health Association (USAHA) requests that the United States Department Agriculture (USDA), Animal Plant Health Inspection Service (APHIS), Veterinary Services (VS) determine if these data needed to perform credible risk assessments exist and identify information gaps. Appropriate steps should be taken to fill in these gaps for the prevention of the introduction and the potential establishment of finfish viruses of economic significance into the U.S. commercial farmed fish industry.
REPORT OF THE COMMITTEE

RESOLUTION NUMBER: 15 APPROVED
SOURCE: COMMITTEE ON SHEEP AND GOATS
SUBJECT MATTER: BRUCELLA OVIS TESTING STANDARDIZATION

BACKGROUND INFORMATION:
Laboratories that are conducting Brucella ovis ELISA testing report that there are problems with both control sera and antigens produced and provided by National Veterinary Services Laboratory (NVSL). There have been many false-positive test results due to inconsistent quality of the control sera and antigens. While NVSL has been made aware of the problem regarding the quality of the reagents, staff has not communicated consistently with all of the laboratories that are affected. The false-positive test results have resulted in a lack of consumer confidence in testing which is a critical part of control programs. These testing problems pose risks to many major sheep-producing states that rely on valid test results for interstate movement.

RESOLUTION:
The United States Animal Health Association (USAHA) recommends that the United States Department of Agriculture (USDA), Animal Plant and Health Inspection Service (APHIS), Veterinary Services (VS), and the National Veterinary Services Laboratory (NVSL) provide a standardized Brucella ovis ELISA test. NVSL should also provide laboratory testing for this process.

RESOLUTION NUMBER: 16 APPROVED
SOURCE: COMMITTEE ON INFECTIOUS DISEASES OF HORSES
SUBJECT MATTER: EQUINE INFECTIOUS ANEMIA CONTROL PROGRAM

BACKGROUND INFORMATION:
The United States Animal Health Association (USAHA) Committee on Infectious Diseases of Horses has studied, developed and now proposes a National State-Federal Cooperative Equine Infectious Anemia (EIA) Control Program. The goals of this program are to, without the burden of additional regulations, (a) reduce the overall national prevalence of EIA and (b) reduce the imposition of required EIA testing. Under this plan, EIA test requirements for equine movement will be standardized, simplified and, in some cases, eliminated; allowing greater freedom of movement while reducing the risk of being exposed to equidae of unknown EIA status. These proposed changes will reduce the overall cost of EIA control.

The Program proposal calls for a three-phase implementation with an open time frame. Phase One establishes EIA Risk Zones within the U.S. based on incidence levels derived from historical EIA testing.
NOMINATIONS AND RESOLUTIONS

records; Phase Two refines the Risk Zones and risk management as improved equine census and disease prevalence information becomes available; and Phase Three further develops the program, and its utility to the industry, through the development of a voluntary EIA Certification Program partially supported by Federal funding. This Program will reward equine owners who test and have historically tested their animals with reduced costs, increased ease of movement, and protection from punishment for the untested and non-commingled EIA reservoir equidae in their region.

RESOLUTION:
The United States Animal Health Association (USAHA) requests that the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), in collaboration with the USAHA, develop and annually update a National State-Federal Cooperative Program for the Control of Equine Infectious Anemia. It is further requested that USDA-APHIS-VS and states begin implementation of this control program as soon as possible.

RESOLUTION NUMBER: 17 – 33 Combined APPROVED

SOURCE: COMMITTEE ON PSEUDORABIES
       COMMITTEE ON BRUCELLOSIS

SUBJECT MATTER: BRUCELLOSIS AND PSEUDORABIES IN FERAL SWINE

BACKGROUND INFORMATION:
Feral swine continue to pose an increasing threat of acquiring, harboring and transmitting diseases with significant animal and human health importance and trade impact. There continues to be a crucial need for additional research and field studies that address threats related to feral swine.

RESOLUTION:
The United States Animal Health Association (USAHA) thanks the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS) and Veterinary Services (VS), Agricultural Research Service (ARS) and Cooperative State Research, Extension and Education Service (CSREES) for recognizing the feral swine threat as a high priority and encourages them to continue to provide long-range funding for research, program support and field studies.
In particular, funding is necessary to:
1. Provide continuing support for conducting population studies that support the development of disease risk management strategies.
2. Pursue the goal of developing Brucella strain VTRS-1 for use
REPORT OF THE COMMITTEE

as a dual vaccine and conduct field trials to demonstrate its efficacy.

3. Conduct further field trials and studies of swine brucellosis and pseudorabies infection in feral swine the methods of their transmission to domestic swine.

RESOLUTION NUMBER: 18 WITHDRAWN BY COMMITTEE
SOURCE: COMMITTEE ON SALMONELLA
SUBJECT MATTER: FUNDING TO EXPAND MOLECULAR CHARACTERIZATION OF GROUP D SALMONELLA FIELD ISOLATES RELATED TO THE NATIONAL POULTRY IMPROVEMENT PLAN
BACKGROUND INFORMATION:

The determination of the source of field salmonella outbreaks in poultry can be an arduous task and field epidemiology many times can lead to a dead end. Molecular characterization of salmonella isolates can be a very valuable tool in field epidemiology when other means of identifying the source are not available.

RESOLUTION:

The United States Animal Health Association (USAHA) recommends that the United States Department of Agriculture (USDA), Animal Plant and Health Inspection Service (APHIS), Veterinary Services (VS), National Veterinary Services Laboratories (NVSL) continue to provide molecular characterization of group D salmonella field isolates for samples related to the National Poultry Improvement Plan (NPIP) and to seek the necessary funds to expand this service.

RESOLUTION NUMBER: 19–26–36–43 Combined APPROVED
SOURCE: COMMITTEE ON PUBLIC HEALTH AND RABIES, COMMITTEE ON FOREIGN AND EMERGING DISEASES, COMMITTEE ON WILDLIFE DISEASES, COMMITTEE ON CAPTIVE WILDLIFE AND ALTERNATIVE LIVESTOCK
SUBJECT MATTER: HOMELAND SECURITY PRESIDENTIAL DIRECTIVE 9
BACKGROUND INFORMATION:

Homeland Security Presidential Directive 9 (HSPD 9) of January 2004 establishes a national policy to defend agriculture and the food system from attack, major disasters, and other emergencies. In HSPD 9, the Secretaries of the Interior, Agriculture, Health and Human Services, the Administrator of the Environmental Protection Agency, and other appropriate federal departments and agencies were directed to
expand current programs to develop comprehensive and fully coordinated surveillance and monitoring systems for animal disease, plant disease, wildlife disease, food, and public health. The Food and Agriculture Sector Government Coordinating Council recently was chartered to provide effective coordination of agriculture and food security strategies, policy, and communication across government and between the government and the sector to support the nation’s homeland security mission.

State fish and wildlife management agencies have the primary authority and responsibility to manage and conserve the wildlife resources of the United States and are represented on a national basis by the International Association of Fish and Wildlife Agencies (IAFWA); however, the state fish and wildlife management agencies have not been actively engaged to date by the federal agencies directed to implement the policy established in HSPD 9. The United States Animal Health Association (USAHA) recognizes the potential role of wildlife in the epidemiology of human and domestic animal diseases, the susceptibility of wildlife species to a large number of foreign animal disease agents and other instruments of bioterrorism, and the importance of state wildlife agency involvement in preventing, detecting, monitoring, and responding to animal disease outbreaks.

RESOLUTION:
The United States Animal Health Association (USAHA) requests that the Departments of Homeland Security, Agriculture, Interior, Health and Human Services, and the Environmental Protection Agency involve the state fish and wildlife management agencies, via the International Association of Fish and Wildlife Agencies (IAFWA), in the activities described in Homeland Security Presidential Directive 9 (HSPD 9). Furthermore, the USAHA requests membership and representation of the IAFWA on the Food and Agriculture Sector Government Coordinating Council. Finally, the USAHA requests that funding and other resources be provided to the state wildlife management agencies to assist them in fulfilling their responsibility for conserving U.S. fish and wildlife resources consistent with the goals of HSPD 9.

RESOLUTION NUMBER: 20 – 39 Combined APPROVED
SOURCE: COMMITTEE ON BIOLOGICS AND BIOTECHNOLOGY
COMMITTEE ON FOOD SAFETY
SUBJECT MATTER: USDA JURISDICTION FOR ANIMAL DISEASE VACCINES THAT ALSO HAVE A PUBLIC HEALTH BENEFIT
BACKGROUND INFORMATION:
There are various emerging biological products that immunize and...
treat animals to reduce infection, shedding, colonization and/or bioburden in the intended animal. For example it is well documented that E. coli O157:H7 in improperly cooked ground beef or cross contamination of other food items is a significant public health threat. The United States Department of Agriculture (USDA) declared E. coli O157:H7 an adulterant in ground beef in 1994 and in 1996 developed the Hazard Analysis and Critical Control Points (HACCP) regulatory framework that establishes a science and risk-based approach to reducing food safety risks. Since the implementation of HACCP and the development and adoption of in-plant interventions that improve the microbiological profiles of meat products, the Centers for Disease Control and Prevention (CDC) has documented very significant declines in the rates of food borne illness in the United States. Despite the recognition that reducing food borne illness requires interventions at each step from the farm to the table and after over 12 years since E. coli O157:H7 was declared an adulterant, no viable or effective preharvest interventions have been developed and approved to reduce the risk of E. coli O157:H7. One reason for this is the existence of uncertain regulatory approval procedures, processes and authorities. Recent research indicates that there is an opportunity to develop safe and efficacious vaccines to reduce the risk of E. coli O157:H7 shedding in cattle. However, the regulatory process necessary for review and potential licensing of a safe and efficacious vaccine is uncertain and an impediment to reducing the risk of E. coli O157:H7 at the preharvest level and subsequently reducing food safety risks.

RESOLUTION:
The United States Animal Health Association (USAHA) supports and encourages the United States Department of Agriculture (USDA) to work closely with the United States Department of Health and Human Services (USDHHS), Food and Drug Administration (FDA) to allow USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), Center for Veterinary Biologics (CVB) to assume the review, approval and licensing process for vaccines used in animals that have a benefit in reducing food safety risks. The USDA has extensive expertise, experience, the test facilities, inspection unit, and existing framework to regulate vaccines of this type. In addition, USDA has the authority to regulate vaccines for use in animals pursuant to the Virus Serum Toxin Act, in Title 9 Code of Federal Regulations (CFR) and an existing Memorandum of Understanding with the FDA dated June 18, 1982, which indicates that the agreements to play this role have long been in place. The USAHA urges the USDA to work with FDA to quickly establish the clear regulatory path at the USDA for these important contributors to food safety.
NOMINATIONS AND RESOLUTIONS

RESOLUTION NUMBER: 21 APPROVED
SOURCE: COMMITTEE ON JOHNE’S DISEASE
SUBJECT MATTER: UPDATED NATIONAL JOHNE’S DISEASE CONTROL PROGRAM STRATEGIC PLAN

BACKGROUND INFORMATION:
During the 107th Annual Meeting of the United States Animal Health Association (USAHA) in San Diego, California, October 9 – 16, 2003 a recommendation was approved by the Committee on Johne’s Disease requesting the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) to host a meeting of the Strategic Planning Subcommittee of the Committee on Johne’s Disease. This subcommittee met June 15-17, 2004 in Riverdale, Maryland. The charge of this subcommittee was to update the National Johne’s Disease Control Program Strategic Plan. The subcommittee presented their report to the Committee on Johne’s Disease at the 2004 annual meeting and it was approved by the committee.

RESOLUTION:
The United States Animal Health Association (USAHA) submits the National Johne’s Disease Control Program Strategic Plan dated July 2004 (attached) to the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), and recommends that it be used to guide the National Johne’s Disease Control Program.

RESOLUTION NUMBER: 22 APPROVED
SOURCE: COMMITTEE ON FOREIGN AND EMERGING DISEASES
SUBJECT MATTER: TRAINING OPPORTUNITIES FOR VETERINARY STUDENTS

BACKGROUND INFORMATION:
The American Association of Veterinary Medical Colleges (AAVMC) Public Practice white paper identified a developing shortage of future veterinarians with interests and expertise needed to meet existing societal needs in population medicine, public practice and public health. Many colleges and schools of veterinary medicine are making efforts to increase the professional student pool interested in research, population medicine, and food animal medicine, to help meet societal needs in the future. The educational experiences of veterinary students participating in United States Department of Agriculture (USDA) externships in the past have proven very successful in introducing and motivating students to continue their pursuit of professional opportunities in the area of diagnostics, prevention, control and eradication of animal and zoonotic diseases. Veterinary students participating in USDA externship
REPORT OF THE COMMITTEE

programs have further stimulated interest in public practice among their classmates. The United States Animal Health Association (USAHA), Committee on Foreign and Emerging Diseases (FED) proposes that USDA and USAHA (Committee on FED) work together to contribute to future veterinary staffing needs in public health by facilitating the efforts of veterinary faculty and expanding the USDA externship program.

RESOLUTION:
The United States Animal Health Association (USAHA) urges:
1. The United States Department of Agriculture (USDA), Animal Plant and Health Inspection Service (APHIS), Veterinary Services (VS) to increase the externship opportunities for veterinary students.
2. The USDA-APHIS-VS to develop externship application information to facilitate finding externship opportunities, facilitate liaison contact, wherever possible, with members of the USAHA's Committee on Foreign and Emerging Diseases and college deans.
3. The USDA-APHIS-VS recruit a pool of applicants for externship and obtain funding. Opportunities need to be identified by December 15 and acceptance notified by February 15 of each year; thereby students can consider these opportunities when planning for summer jobs.

RESOLUTION NUMBER: 23 Combined with 7
SOURCE: AAVLD/USAHA COMMITTEE ON ANIMAL HEALTH INFORMATION SYSTEMS
SUBJECT MATTER: FEDERAL FUNDING FOR THE NATIONAL ANIMAL HEALTH LABORATORY NETWORK (NAHLN)

RESOLUTION NUMBER: 24 APPROVED AS AMENDED
SOURCE: COMMITTEE ON TUBERCULOSIS
SUBJECT MATTER: STRATEGIC PLAN FOR THE ERADICATION OF BOVINE TUBERCULOSIS

BACKGROUND INFORMATION:
1) In 2000 all states were tuberculosis free except Michigan; however, Texas lost its free status in 2002 and California and New Mexico lost their free status in 2003.
2) The tuberculosis situation in Michigan seems to be holding as status quo.
3) Tuberculosis cases are being discovered that trace to large dairy calf development units.

448
NOMINATIONS AND RESOLUTIONS

4) A previously infected elk herd in Kansas was found to be infected.
5) Nineteen of the top 40 adult cattle slaughter plants are not submitting granuloma samples at an acceptable rate.
6) Individual states are initiating entry test requirements for dairy cattle.
7) The goal of tuberculosis eradication by 2003 was not achieved.
8) Mexican origin feeder cattle with tuberculosis continue to be discovered in U.S. slaughter plants.

RESOLUTION:
The United States Animal Health Association (USAHA) strongly urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) to adopt the 2004 Strategic Plan for the Eradication of Bovine Tuberculosis and incorporate the recommendations contained in the Strategic Plan into the national Bovine Tuberculosis eradication plan (see attachment).

The USAHA requests the House Agriculture Committee, the Senate Agriculture, Nutrition and Forestry Committee and the Rural Development and Related Agencies Appropriations Subcommittee immediately provide $35.84 million per annum to fund the recommendations of the Strategic Plan for the eradication of Bovine Tuberculosis. Furthermore, the USAHA urges the Secretary of Agriculture to request line item funding of $35.84 million in the USDA budget for fiscal year 2007 for the ongoing support of the recommendations in the Strategic Plan for the Eradication of Bovine Tuberculosis.

The USAHA urges the livestock industry organizations, state animal health agencies and state wildlife agencies to support the USDA funding requests for the national tuberculosis eradication program, so that the recommendations of the strategic plan can be fully implemented.

RESOLUTION NUMBER: 25 APPROVED

SOURCE: COMMITTEE ON TRANSMISSIBLE DISEASES OF SWINE

SUBJECT MATTER: EMERGING SWINE DISEASE RESPONSE MECHANISM

BACKGROUND INFORMATION:
The need for a coordinated, comprehensive and real-time surveillance system for domestic and emerging swine diseases in the United States has been recognized for some time. The Swine Futures Project (SFP), a multi-year government-industry partnership, developed recommendations for the United States Department of Agriculture (USDA) that would meet the needs of the pork industry. The final report, issued
in 1999, provided key recommendations to develop and implement a comprehensive surveillance plan for the prevention and control of diseases affecting the U.S. pork industry and to establish a system to rapidly detect and respond to emerging animal diseases.

Today there is no defined, coordinated response mechanism for assisting industry with emerging disease investigations. Emerging diseases may go undiagnosed due to the lack of epidemiological resources as well as financial resources to further the investigation beyond a certain battery of tests reported only to the attending veterinarian and producer. The only current mechanism for coordinated assistance is to initiate a foreign animal disease (FAD) investigation, which evokes an emergency response.

Veterinary Services’ Centers for Epidemiology and Animal Health (CEAH)/Center for Emerging Issues has taken the lead in developing an Emerging Animal Health Issues System which provided guidelines for handling emerging diseases within Veterinary Services (VS). Recently, VS has created the National Center for Animal Health Surveillance at CEAH to coordinate surveillance activities and develop a national surveillance system.

RESOLUTION:

The United States Animal Health Association (USAHA) recommends that the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) through the efforts of the National Center for Animal Health Surveillance (NCAHS) and the Center for Emerging Issues (CEI), work with industry and state animal health officials to develop a defined mechanism to detect, investigate, evaluate and respond to emerging diseases in swine and provide the necessary resources (monetary and non-monetary) to support these activities.

RESOLUTION NUMBER: 26 - Combined with 19
SOURCE: COMMITTEE ON FOREIGN AND EMERGING DISEASES
SUBJECT MATTER: HOMELAND SECURITY PRESIDENTIAL DIRECTIVE 9

RESOLUTION NUMBER: 27 APPROVED
SOURCE: COMMITTEE ON TRANSMISSIBLE DISEASES OF SWINE
SUBJECT MATTER: CONFIDENTIALITY OF COLLECTED DATA
BACKGROUND INFORMATION:

There are significant numbers of scientific databases containing information regarding characterization of microbial isolates that are held by industry, government and academia that are inaccessible to each
other. This inaccessibility is attributed to concerns that the information is subject to the Freedom of Information Act which, may result in punitive consequences, disrupting the scientific and economic integrity of the scientific community.

RESOLUTION:

The United States Animal Health Association (USAHA) requests that the United States Department of Agriculture (USDA) take steps to protect the confidentiality of scientific data in order to foster collaborative research efforts and exchange of information between USDA agencies, industry, and academia.

RESOLUTION NUMBER: 28 APPROVED
SOURCE: COMMITTEE ON LIVESTOCK IDENTIFICATION
SUBJECT MATTER: WEB BASED INTERSTATE CERTIFICATE OF VETERINARY INSPECTION

BACKGROUND INFORMATION:
Electronic Interstate Certificates of Veterinary Inspection (ICVI) have been developed as requested in the 2001 United States Animal Health Association’s Resolution 12. This resolution requested that the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) provide a web based electronic certificate of veterinary inspection that utilizes a USDA web-based computer database to document intrastate, interstate and international movement of livestock and poultry.

An electronic ICVI would comply with the Government Paper Elimination Act (GPEA) 2003 initiative focused on federal forms.

The USAHA resolution was also supported by the National Institute of Animal Agriculture (NIAA) Resolution 25, Animal Health - Int’l Trade, 2002.

Since its inception in 2003, the ICVI has proven to be a successful application and provides a substantial role in safeguarding animal health as a major component to the National Animal Identification System related to premises identification, animal identification and disease risk management.

RESOLUTION:

The United States Animal Health Association (USAHA) recommends that the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) commit to bring all 50 states onto electronic Interstate Certificates of Veterinary Inspection (ICVI) and provides the necessary support within the next 18-24 months. In addition, ICVI should be referenced through the Code of Federal Regulations (CFR).
REPORT OF THE COMMITTEE

RESOLUTION NUMBER: 29 APPROVED
SOURCE: COMMITTEE ON IMPORT EXPORT
SUBJECT MATTER: PRIORITY PASSAGE FOR LIVE ANIMAL CARGO AT BORDER CROSSING

BACKGROUND INFORMATION:
The use of x-ray technology to screen cargo at border crossings, the waiting time has increased significantly.

There is inconsistency in the priority given to live animal cargo between ports of entry. Some allow more rapid passage for live animal transports, while at others the wait is for hours with all other cargo conveyances. In cases of weather extremes, the resultant long wait times can prove to be cruel and/or fatal to the animals.

The Department of Homeland Security (DHS) does not have a consistent protocol for live animal cargo. A process to allow vehicles with live animal cargo to move ahead of inanimate cargo should be developed to avoid suffering of animals.

RESOLUTION:
The United States Animal Health Association (USAHA) urges the United States Department of Agriculture (USDA) communicate to the Department of Homeland Security (DHS) the need to develop a process to allow vehicles with live animals on board to advance ahead of other vehicles in line that are carrying inanimate cargo to enhance the well being of the animals and avoid suffering.

RESOLUTION NUMBER: 30 APPROVED
SOURCE: COMMITTEE ON BRUCELLOSIS
SUBJECT MATTER: REDUCTION AND ELIMINATION OF BRUCELLOSIS IN WILDLIFE IN THE GREATER YELLOWSTONE AREA

BACKGROUND INFORMATION:
The Greater Yellowstone Area (GYA) in Wyoming, Montana, and Idaho is one of the last reservoirs of Brucella abortus infection in the United States.

Government and the livestock industry have spent several billions of dollars on the eradication of brucellosis.

The latest infections of cattle in the state of Wyoming have a great impact on the state’s communities and livestock producers. The cost to the federal government will be several millions of dollars.

RESOLUTION:
The United States Animal Health Association (USAHA) request that all appropriate agencies of the United States Department of Agriculture (USDA) and the United States Department of Interior (USDI), working in close collaboration with the state fish and wildlife management
agencies, the state veterinarians, the state departments of agriculture, and the state livestock agencies, immediately initiate an aggressive program to reduce and eventually eliminate brucellosis from wildlife in the Greater Yellowstone Area (GYA) of Wyoming, Montana, and Idaho. In this effort, all available, scientifically credible technologies and multidisciplinary management practices should be employed.

RESOLUTION NUMBER: 31 APPROVED
SOURCE: COMMITTEE ON BRUCELLOSIS
SUBJECT MATTER: DEVELOPMENT OF PROTOCOLS TO ALLOW CONDUCT OF CRITICAL RESEARCH RELATED TO BRUCELLA SPECIES

BACKGROUND INFORMATION:
The state and federal governments and the livestock industry have spent billions of dollars since 1935 to eradicate Brucella abortus infection in cattle. These efforts are leading to a national herd that is nearly free of the disease. The only significant reservoir of field strains of Brucella abortus is in free ranging elk and bison within the Greater Yellowstone Area, an area that includes portions of the states of Wyoming, Montana, and Idaho and consists largely of federally managed lands. Significant research is essential to manage and eventually eliminate Brucella abortus infection in the Greater Yellowstone Area.

Brucella abortus has been listed by the United States government as a select agent because of its potential to be used as a weapon of mass destruction. The listing of Brucella abortus as a select agent has halted essential research on the disease and agent.

RESOLUTION:
The United States Animal Health Association (USAHA) requests that the United States Departments of Agriculture (USDA), Agricultural Research Service (ARS) and Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) and the United States Department of Health and Human Services (USDHHS), Center for Disease Control and Prevention (CDC) impanel a working group to develop a protocol that addresses biosafety and security concerns related to outdoor research with the Brucella species affecting livestock and wildlife as quickly as possible. The protocol should address all facets to be considered in a decision to permit outdoor research to be conducted by qualified researchers.
REPORT OF THE COMMITTEE

RESOLUTION NUMBER: 32 - Combined with 5
SOURCE: COMMITTEE ON TRANSMISSIBLE DISEASES OF POULTRY
SUBJECT MATTER: SALMONELLA PERFORMANCE STANDARDS

RESOLUTION NUMBER: 33 - Combined with 17
SOURCE: COMMITTEE ON BRUCELLOSIS
SUBJECT MATTER: BRUCELLOSIS AND PSEUDORABIES IN FERAL SWINE

RESOLUTION NUMBER: 34 APPROVED
SOURCE: COMMITTEE ON IMPORT/EXPORT
SUBJECT MATTER: AGRICULTURE AS A PRIORITY OF THE UNITED STATES DEPARTMENT OF HOMELAND SECURITY

BACKGROUND INFORMATION:

Congress created the Department of Homeland Security (DHS) to take the lead on coordinating border security and law enforcement efforts to guard against future terrorist events. During preliminary discussions on the creation of the new department, The National Association of State Departments of Agriculture (NASDA) expressed concerns to the President and Congress regarding the proposed transfer of portions of the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS) to the newly created agency. State departments of agriculture work closely with and rely greatly on USDA-APHIS and its Agricultural Quarantine Inspection (AQI) program to insure that cargo and passengers entering this country through legal access routes are screened for harmful animal pests and diseases. They have also long relied on USDA-APHIS state-federal cooperative programs to provide the resources needed to protect plant and animal health.

Agricultural Quarantine Inspection (AQI) is now a part of the Customs and Border Protection (CBP) Directorate of the DHS that serves as the front line of defense at U.S. ports against agricultural products without the required phytosanitary documentation. The new “One Face at the Border” will create Customs and Border Protection (CBP) Officers (GS-11) with the primary mission of preventing terrorists and their weapons from entering the United States and with a secondary mission of performing traditional inspections of customs, immigration and agriculture. Furthermore, CBP Agriculture Specialists (GS-11) are to be stationed only at ports with large volumes of cargo and only to support the CBP Officers. Legacy agriculture inspectors, who have a minimum of two years formal education in science, may “apply and compete” for the CBP Agriculture Specialists positions.
NOMINATIONS AND RESOLUTIONS

Documents discovered in Afghanistan have identified food and agricul-
ture as potential targets for terrorist attacks.

RESOLUTION:
The United States Animal Health Association (USAHA) recognizes
that the Department of Homeland Security (DHS) is charged with the
responsibility of protecting the security of our nation’s food and agricul-
ture by preventing the entrance of plant and animal pests and dis-
eases.

The USAHA recommends that DHS Customs and Border Protec-
tion (CBP) recognize that prevention of animal and plant diseases
through purposeful or accidental introduction of disease agents must
be considered a critical priority of the agency.

The USAHA urges the DHS-CBP to reconsider the de-emphasis of
agriculture inspections at medium and large ports of entry and the
elimination of agriculture inspections at small ports of entry.

The USAHA requests that legacy agriculture inspectors, with the
proven education, skills and experience in cargo and baggage agricul-
ture inspection, be immediately reassigned as CBP Agriculture Spe-
cialists and that CBP Officers positions be open to all legacy customs,
immigration and agriculture inspectors.

RESOLUTION NUMBER: 35 APPROVED
SOURCE: COMMITTEE ON ANIMAL WELFARE
SUBJECT MATTER: DEVELOPMENT OF CONSENSUS ON
ANIMAL CARE GUIDELINES

BACKGROUND INFORMATION:
In recent years the issues of animal welfare, animal well-being and
animal rights have generated significant discussions, actions on the
part of livestock producers, legislative and regulatory debates and, in
some cases, prohibitions of certain livestock production practices in
specific states. These issues have also generated concern and re-
quests for action within the food processing, marketing, and service
sectors. While not part of the existing World Trade Organization frame-
work for trade, the World Organization for Animal Health (OIE) had
convened working groups to develop general animal care guidelines
relating to land and sea transport and humane slaughter. Recent sur-
veys indicate that consumers in the United States continue to strongly
support the notion that raising livestock for food production is appropri-
ate so long as the animals are treated humanely. The vast majority of
consumers currently hold the opinion that livestock producers are treat-
ing animals humanely. However, it is clear that livestock producers
need to continue to take responsibility to ensure the animals they man-
age are treated humanely or consumers may see the need to support
legislative or other action to assure that such practices are in place. In
REPORT OF THE COMMITTEE

response to this reality and consistent with requests from the food processing, marketing and service sectors, virtually all livestock production systems have or will soon have developed and implemented science-based animal care guidelines.

RESOLUTION:

The United States Animal Health Association (USAHA) supports and encourages the animal agriculture sector in the United States to continue their efforts to develop and implement science-based animal care guidelines that will help ensure the humane treatment of animals. The USAHA Committee on Animal Welfare will continue to provide a forum to enhance the dialogue regarding guidelines development and implementation and will encourage and facilitate efforts to reach consensus regarding controversial animal welfare issues. In addition to encouraging the consensus building process, USAHA discourages attempts to resolve these controversial issues through legislative and regulatory mandates. This position is consistent with policy resolutions developed by the National Council of State Governments and other organizations.

RESOLUTION NUMBER: 36 - Combined with 19
SOURCE: COMMITTEE ON WILDLIFE DISEASES
SUBJECT MATTER: HOMELAND SECURITY PRESIDENTIAL DIRECTIVE 9

RESOLUTION NUMBER: 37 APPROVED
SOURCE: COMMITTEE ON PARASITIC DISEASES
SUBJECT MATTER: TROPICAL BONT TICK ERADICATION PROGRAMS IN THE CARIBBEAN

BACKGROUND INFORMATION:

The Tropical Bont Tick (TBT), *Amblyomma variegatum*, and the associated disease heartwater were first introduced into the Caribbean region in 1828 when infested cattle were imported from Senegal into Guadeloupe. The tick remained confined to only a few Caribbean islands until the mid-1970s when it began to rapidly spread to other islands in the Caribbean, reaching Puerto Rico to the north and St. Vincent to the south. This rapid spread appears to have been coincident with the expansion of the range of cattle egrets in the Caribbean.

In affected countries, TBT and its associated diseases heartwater and dermatophilosis limit the potential for increased livestock production. In TBT-infested countries, control activities continue to be a drain on limited financial and human resources. Furthermore, there is a high risk of introduction of TBT and its associated diseases into the Americas and subsequent spread in the region due to the presence of wildlife and domestic animal hosts for the tick and its associated diseases,
NOMINATIONS AND RESOLUTIONS

and native tick species capable of serving as vectors for heartwater. Spread of TBT and its associated diseases in the southern United States, Mexico, Central America, the Greater Antilles, and South America could result in $655 thousand to $3 billion potential annual losses.

Animal industry groups, state animal health officials, and federal officials have been concerned about the spread of TBT and its associated diseases to the United States since the mid-1980s. The United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) and International Services (IS) have actively supported our involvement in a program to eradicate TBT from the Caribbean since the mid-1990s. USDA, APHIS support has been by means of financial contributions and technical assistance to a multi-national program known as the Caribbean Amblyomma Program (CAP) since 1994. Under the auspices of the Food and Agriculture Organization (FAO), CAP operates in nine English or Dutch-speaking islands in the Lesser Antilles.

The CAP also liaises with complimentary programs in the French West Indies administered by the Government of France, as well as a USDA, APHIS, VS program on St. Croix, US Virgin Islands, where TBT was discovered in the year 2000. Over the past decade, CAP has developed a proven methodology to eradicate TBT from the Caribbean. As a result, by February 2003, six of the nine CAP islands had achieved the status of “Provisional Freedom from TBT;” however, two of these have experienced significant re-infestations of TBT in the past year. Additional funds are urgently needed to not only address the presence of TBT on Antigua and St. Croix, but also to continue TBT eradication and surveillance throughout the CAP islands until the entire Caribbean region is declared TBT free.

RESOLUTION:

The United States Animal Health Association (USAHA) requests continued and increased funding from United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), International Services (IS) for the Caribbean Amblyomma Program (CAP), administered under the Food and Agriculture Organization (FAO), as well as funding for the USDA, APHIS, Veterinary Services (VS) program on St. Croix, to eradicate the Tropical Bont Tick (TBT) and its associated diseases of heartwater and dermatophilosis. USAHA also requests USDA, APHIS, IS and VS, by means of their membership in the World Organization for Animal Health (OIE), to encourage their French counterparts to place greater emphasis on eradication of TBT from the French West Indies. We further request this funding be sought and allocated as soon as possible to mitigate the risk of spread of TBT to Puerto Rico and the United States mainland and to continue on-going surveillance efforts in the region against
REPORT OF THE COMMITTEE

TBT until the Caribbean as a whole is free from TBT and its associated diseases.

RESOLUTION NUMBER:  38  APPROVED AS AMENDED
SOURCE: COMMITTEE ON PARASITIC DISEASES
SUBJECT MATTER: REPLACEMENT OF THE UNITED STATES DEPARTMENT OF AGRICULTURE, AGRICULTURAL RESEARCH SERVICE KNIPLING BUSHLAND UNITED STATES LIVESTOCK INSECTS RESEARCH LABORATORY

BACKGROUND INFORMATION:
The continuing pressures of Rhipicephalus (Boophilus) sp. ticks along the Texas-Mexican border is a real and measurable threat to the health of United States cattle. Practical scientific investigations have been completed by the United States Department of Agriculture (USDA), Agricultural Research Service (ARS) Knipling-Bushland United States Livestock Insects Research Laboratory in Kerrville, Texas to assist in the control and eradication of Texas Fever ticks in the United States.

RESOLUTION:
The United States Animal Health Association (USAHA) urges the Secretary of Agriculture to request adequate funds to construct a replacement United States Department of Agriculture (USDA), Agricultural Research Service (ARS) laboratory in the area of Kerrville, Texas.

RESOLUTION NUMBER:  39 - Combined with 20
SOURCE: COMMITTEE ON BIOLOGICS AND BIOTECHNOLOGY
SUBJECT MATTER: USDA JURISDICTION FOR ANIMAL DISEASE VACCINES THAT ALSO HAVE A PUBLIC HEALTH BENEFIT

RESOLUTION NUMBER:  40 - Combined with 13
SOURCE: COMMITTEE ON BIOTECHNOLOGY AND BIOLOGICS
SUBJECT MATTER: IMPORTATION OF FETAL BOVINE SERUM

RESOLUTION NUMBER:  41 APPROVED
SOURCE: COMMITTEE ON SCRAPIE
SUBJECT MATTER: SCRAPIE FLOCK CERTIFICATION PROGRAM

BACKGROUND INFORMATION:
There have been significant changes in the scrapie program since
implementation of the accelerated scrapie eradication program.

RESOLUTION:
The United States Animal Health Association (USAHA) recommends that the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) to thoroughly review the Scrapie Flock Certification Program (SFCP) and determine the best method to bring the SFCP into consistent status with current World Organization for Animal Health (OIE) standards. The changes proposed should be subjected to public review prior to implementation.

RESOLUTION NUMBER:  42  APPROVED
SOURCE:  COMMITTEE ON SCRAPIE
SUBJECT MATTER:  CONSISTENT STATE COMPLIANCE
BACKGROUND INFORMATION:
The codified deadline for states to be in compliance as a “consistent state” was August 21, 2003, two years after the regulation became effective.

RESOLUTION:
The United States Animal Health Association (USAHA) urges State Animal Health Officials to submit their Consistent State status pre-review checklist immediately and the states take appropriate measures to be in full compliance. USAHA further urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) and State Animal Health Officials to take action immediately to enforce compliance with the interstate movement and consistent state regulations.

RESOLUTION NUMBER:  43 - Combined with 19
SOURCE:  COMMITTEE ON CAPTIVE WILDLIFE AND ALTERNATIVE LIVESTOCK
SUBJECT MATTER:  HOMELAND SECURITY PRESIDENTIAL DIRECTIVE 9
The Committee met on Wednesday, October 27, 2004. In attendance at the meeting were at least 39 people, including 13 members of the Committee. Reports were provided on a number of parasitic disease issues of interest.

John George, Diane Kammlah, and Mat Pound, United States Department of Agriculture (USDA), Agriculture Research Service (ARS), Kerrville, Texas, and Edwin Bowers, USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), Laredo, Texas discussed “Recent Developments in the Occurrence of Cattle Fever Tick Outbreaks and Results of Research to Develop Improved Technology for Tick Eradication.”

Historically, there are annual incursions of cattle fever ticks, *Boophilus annulatus* and *B. microplus*, into south Texas when errant tick-infested livestock and free-ranging white-tailed deer from Mexico cross the Rio Grande into Texas. Each year a variable number of such incursions result in populations of cattle fever ticks that infest cattle in Texas pastures that are usually close to the river. During the first nine months of calendar year 2004, 77 premises were quarantined after cattle fever tick-infested cattle were identified on them by personnel of the USDA-APHIS-VS Cattle Fever Tick Eradication Program (CFTEP). The number of infestations discovered thus far this year is 2.9 times greater than the number of tick outbreaks reported from January through September in 2003 and seven times greater than the total number for all of 2002. It is noteworthy that 21 (27%) of the tick-infested premises were located in the so-called “Tick Free Area” outside the Quarantined Zone (Systematic Area). In 2004, 65% of the infested premises have been in Zapata County, a county that is located in the lower one-third of the
800 km-long Systematic Area and which is separated from Mexico along most of its border by Falcon Lake, a large lake formed by a dam across the Rio Grande. Past attempts to relate the prevalence of tick outbreaks to climate have generated inconclusive results. Even so, a series of warmer than average winters and above average precipitation in southern Texas and northeastern Mexico would favor growth of *Boophilus* populations and seem likely to be important variables in the epidemiology of recent cattle fever tick problems.

The use of a Global Information System (GIS)-based approach by USDA-ARS, Kerrville, Texas to geo-reference and map historical and current locations of *Boophilus* infestations in the Systematic and Tick Free areas promises to be useful in the identification of factors related to the occurrence and distribution of infestations of *B. annulatus* and *B. microplus*. Maps pinpointing new infestations are being used currently by the CFTEP to delimit 3-mile buffer zones around an infested premise as part of the quarantine and tick eradication process.

Ticks collected from a *B. microplus* population discovered on a ranch in Starr County, and tested with standard bioassay methods and an experimental biochemical diagnostic method were found to be resistant to the organophosphate acaricide coumaphos. The high concentration of coumaphos used routinely by the eradication program to treat cattle on a tick-infested premise was used in a systematic series of four acaricide applications that prevented re-infestation of the cattle by coumaphos-resistant ticks and resulted in tick-free cattle that could then be moved from the infested premise.

Mat Pound, Allen Miller, John George and Diane M. Kammlah, USDA-ARS Kerrville, Texas, and Edwin Bowers, USDA-APHIS-VS, Laredo, Texas, reported on technologies developed by USDA-ARS to aid the USDA-APHIS-VS CFTEP through passive acaricidal treatment of ticks feeding on white-tailed deer and other wild ungulates.

Although the cattle tick, *Boophilus annulatus*, and the southern cattle tick, *B. microplus* were declared eradicated from 14 southeastern states in the United States as far back as 1943, frequent re-infestations from Mexico into Texas along the Rio Grande continue to be found and regulatory re-eradication measures implemented by USDA-APHIS-VS CFTEP personnel. The majority of these incursions are cattle-related, resulting either from native or Mexican exposures, however, there are increasing instances in which wild ungulates such as white-tailed deer and elk are implicated in the establishment and spread of infestations and also in helping to maintain tick populations on infested premises where cattle have been vacated in accordance with regulatory provisions. Because of the influence of increasing populations of both native and exotic wild ungulates within and near the tick quarantine zone in compromising tick eradication efforts, the USDA-ARS began research and development of technologies to control ticks.
feeding on these animals in 1989. As a result of these efforts, several technologies have been developed and field-tested that include use of both systemically and topically active acaricides.

The first technology involved systemically active macrocyclic lactones including ivermectin and doramectin that were coated onto re-cleaned whole kernel corn and fed to white-tailed deer. It was discovered that, in the presence of abundant forage, deer will consume only about 1% body weight of corn per day; therefore, corn is a self-limiting diet for deer that makes it an ideal dosing medium. In the early and mid-1990’s, field trials of ivermectin-medicated corn were implemented to control cattle ticks on elk and white-tailed deer on the Apache and Catarina ranches, respectively, that are located adjacent to each other within the tick quarantine zone along the Texas-Mexico border. The selective treatment of elk on the Apache Ranch led to the successful eradication of ticks from the ranch for the time since the mid 1950’s, and treatment of white-tailed deer on the Catarina resulted in eradication of ticks for the first time since records were begun in the mid 1930’s.

Because consumption of macrocyclic lactones by humans is not legal in the United States, the systemic tick control technology may not be used in ungulate game animals during or within 90 days before hunting season. To circumvent this restriction, a passive topical treatment device for white-tailed deer was developed and named the ‘4-Poster’ because of the 2 vertical application rollers located on each end. The ‘4-Poster’ Deer Treatment Bait Station consists of a single centrally located bin to hold whole kernel corn used as bait and 2 feeding/treatment stations each located on either side of the corn bin. The feeding/treatment stations are designed to force the side of the head, neck, and ears of the deer to come in contact with acaricide impregnated application rollers as the deer feeds on corn that slowly flows via gravity down a slope leading from the corn bin. Whole body counts of the lone star tick, *Amblyomma americanum*, on deer anesthetized during field trials in Texas of ‘4-Posters’ charged with an oily formulation of amitraz showed 97% control of ticks on deer from the Treatment Pasture as compared with those in a similar Control Pasture. After 3 years of treatment during periods of major tick activity, greater than 90% control of free-living adult and nymphal ticks was observed in the Treatment vs. Control pastures. Subsequently, extensive field trials in Maryland, New Jersey, New York, Connecticut, and Rhode Island demonstrated significant control of free-living populations of lone star and/or blacklegged ticks, *Ixodes scapularis*, through passive application of oily formulations of amitraz and permethrin. During 2003, a 10% oily formulation of permethrin was approved by the United States Environmental Protection Agency for use on white-tailed deer when applied by the ‘4-Poster’ Deer Treatment Bait Station. Both the ‘4-Posters’ and permethrin acaricide are now commercially available in most regions.
PARASITIC DISEASES

of the United States, and experimental field trials are underway at the ARS tick quarantine facility at the Cattle Fever Tick Research Laboratory, Moore Field, Texas to quantify efficacy against Boophilus sp. feeding on white-tailed deer and other wild ungulates.

USDA-ARS scientists also have developed and patented a device that passively applies acaricidal or other neckbands on white-tailed deer and a portable capture and handling facility consisting of a rotunda, working boxes, and patented lift-chute for white-tailed deer that causes minimal stress and therefore minimizes development of trap-shyness in captured deer. A field trial with deer that were captured with the facility then manually fitted with amitraz impregnated neckbands showed similar efficacy against free-living populations of lone star ticks as was obtained in similar studies using either the ivermectin medicated bait or ‘4-Poster’ technologies. In addition, ARS scientists have developed slow-release injectable macrocyclic lactone impregnated microspheres that, through slow degradation within the animal, provide doses of acaricide that extend efficacy for several months.

Miguel A. Borri-Diaz, USDA-APHIS-VS, Puerto Rico and United States Virgin Islands (USVI), gave an update on the effort to eradicate the Tropical Bont Tick (TBT) from St. Croix, USVI. The following was his report:

BACKGROUND:

The TBT, Amblyomma variegatum, was first observed in St. Croix, USVI, in 1967 when Dr. Duke Deller, State Veterinarian, USVI Department of Agriculture, collected the tick from cattle during a routine visit. At that time in history, six adjoining farms on the western end of St. Croix were infested by the TBT. By March 1968 the number of TBT infested farms had increased to 11. The appearance of the TBT in St. Croix was associated with the increase in the abundance and range of the cattle egret in the Caribbean region. The USVI Department of Agriculture began an aggressive eradication effort and in 1972 St. Croix was declared free of A. variegatum.

In 1987, after being free of the TBT for 15 years, Dr. Duke Deller, on a routine sick call to Sion Farms, collected tick samples from a dead bull. These ticks were identified at the University of the Virgin Islands as a male and female of A. variegatum. Due to a lack of funds to establish an aggressive eradication program as was done in 1967, the affected farm was quarantined and the animals involved were routinely sprayed with an acaricide. By September 2003 the number of TBT infested farms had increased to eight.

The TBT is associated with acute dermatophilosis, and is an important vector of Cowdria ruminantium, which causes heartwater disease in ruminants. Livestock producers in the Continental United States,
REPORT OF THE COMMITTEE

Caribbean and South America have developed an interest in the St. Croix Senepol breed of cattle. The presence of the TBT in St. Croix limits the possibility of exportation of the Senepol to Continental United States and other interested countries.

In an attempt to encourage importation of the Senepol into the Continental United States and other interested countries, USDA-APHIS-VS entered into a Cooperative Agreement with USVI Department of Agriculture to establish a TBT eradication program on St. Croix. The expected increase in exportation of the Senepol cattle will greatly aid and increase the economy of St. Croix.

PROGRAM COMMENCEMENT AND PROGRESS:

USDA-APHIS-VS has been operating much of their TBT related activities in St. Croix during the past years using APHIS Administrator’s Contingency Funds which were not assured each year and were very limited. During November 2002, VS and USVI Department of Agriculture representatives met in Miami, Florida to discuss and identify action items and issues that had to be addressed in an effort to request the total funding needed to attain TBT eradication in St. Croix during the next two years. During October 2003 VS and USVI Department of Agriculture representatives met again in St. Croix to discuss actions taken on the issues identified at the Miami meeting. It was determined that the USVI Department of Agriculture and USDA-APHIS-VS personnel in St. Croix had accomplished and resolved all action items. For FY04, $500,000 in funds was allocated for a TBT eradication program in St. Croix. The program will cover eradication efforts from September 2004 through September 2005. TBT funding for a second year will depend on progress attained in the eradication effort during the first year of the implemented program.

CURRENT STATUS:

The St. Croix TBT eradication program has entered the eradication stage. Two scratch teams are in the process of performing a 100% premise scratch in the eastern end of St. Croix. The purpose is to establish a dividing line between the quarantine and non-quarantine zones. At this time St. Croix has eight TBT infected premises. All of these premises are located at the western end of the island. These premises will be treated in accordance with the approved work plan by spraying with coumaphos every two weeks. The program is designed to attain eradication in 24 months. There will be an 18-month treatment period and a six-month surveillance period.

CONCLUSIONS:

In the Caribbean region, the presence of the TBT and its associated diseases dermatophilosis and heartwater disease has caused
major losses in productivity and international trade. In St. Croix, even though free of heartwater disease, the presence of the TBT has affected the exportation of its Senepol cattle to the Continental United States as well to interested South American and Caribbean countries. The eradication of *A. variegatum* will offer St. Croix the opportunity to strengthen its weak economy by increasing revenue through exportation of its highly regarded beef cattle. The reintroduction of *A. variegatum* into St. Croix in 1987 after 15 years of being free suggests that total eradication cannot be reached unless the entire Caribbean region is free of the TBT.

Richard E. Pacer (USDA) and Rupert G. Pegram, Food and Agriculture Organization, gave a progress report on the Caribbean Amblyomma Program.

**BACKGROUND:**

The TBT, *Amblyomma variegatum*, was first introduced into the Caribbean region in 1828 when infested cattle were imported from Senegal into Guadeloupe. During the past 25 years, it became established on several islands in the Lesser Antilles.

The TBT is associated with acute cases of dermatophilosis, and is an important vector of *Cowdria ruminantium*, which causes heartwater. The tick and its associated diseases cause high morbidity and mortality in domestic ruminants and wildlife, leading to considerable losses in production.

In 1994 the Caribbean Amblyomma Program (CAP) commenced in 8 English-speaking islands, namely Anguilla, Antigua, Barbados, Dominica, Montserrat, St. Kitts, Nevis, and St. Lucia, with the goal to eradicate TBT from these islands; in 1999 the Dutch-speaking island of St. Maarten was also included. The FAO provides the lead technical role for the eradication activities of CAP.

As of September 2004, external donors have invested about US $12 million in the program with over half of these funds contributed by USDA. Collectively, these funds have made a major positive impact and at this time, six of the nine CAP islands have been certified as provisionally free from TBT: St. Kitts and St. Lucia (November 2001), Anguilla and Montserrat (February 2002); and Barbados and Dominica (February 2003).

CAP also coordinates TBT surveillance activities on other Caribbean islands and was very instrumental in assisting St. Vincent in 2000 when that island became infested for the first time. Following emergency intervention, St. Vincent is now believed to be provisionally free from TBT since 2002-2003.
PROGRESS AND CHALLENGES DURING THE PAST YEAR:

During the past year, the CAP Regional Coordination Unit (RCU) and key technical personnel were relocated from Barbados to Antigua where it provides training and support to the national programs and overall coordination. Its strategic geographical position and proximity are facilitating more cost-effective support to Nevis and St. Maarten, as well as Antigua. The move has also fostered and allows for greater collaboration and liaison between CAP and French program officials in Guadeloupe.

During the past year, CAP has focused primarily on TBT eradication efforts on Antigua, Nevis, and St. Maarten. Major activities and outputs of the RCU during the year include regional workshops, production of a public awareness CD/video program and accompanying brochure in English, French and Spanish, other training manuals, etc., and coordination of production of quarterly, annual, consultants and other reports.

CAP has continued good collaboration and relationships with the French International Agricultural Research & Development Center (CIRAD) in Guadeloupe. The RCU, together with CIRAD, continued further development and supervision of the CAP database TickINFO 4 with a GIS module to monitor TBT surveillance data. The former CAP website was incorporated into the CIRAD website, CARIBvet, in 2002, and during 2004 CIRAD implemented major system upgrades.

Despite the above successes, a lack of adequate funds in 2004 required program officials to scale back eradication efforts on Antigua until additional funds can be secured. Although national governments continue to provide both financial and material resources to the program, presently, the USDA is the sole external donor to CAP.

Furthermore, a lack of sufficient funds for surveillance and emergency response during the past 2 years has not allowed for adequate follow-up and surveillance efforts on the islands provisionally free from TBT. This is of great concern and urgency at this time because two islands, St. Kitts and St. Lucia, have identified serious re-infestations and spread of TBT during 2004 from the former much smaller residual hot-spots that were identified during 2002 - 2003.

CURRENT STATUS AND NEXT STEPS:

In early 2004 USDA-APHIS officials in consultation with CAP, university and industry officials wrote a comprehensive 5-year “Strategic Plan to Eradicate TBT from the Caribbean.” That document identifies needed financial and material resources and establishes target dates and milestones to achieve eradication of TBT and declare all CAP islands “provisionally free from TBT” by 2009. USDA-APHIS-VS also continues TBT control and eradication efforts on St. Croix, which became re-infested in 2000.
PARASITIC DISEASES

Following completion of TBT eradication on St. Croix and the CAP islands, funds will still be needed to assist Caribbean islands with disease surveillance activities to detect the introduction of TBT, as well as other exotic animal diseases until TBT is eradicated from the French West Indies. A 3-year proposal for an Animal Disease Surveillance network was developed and submitted to the International Fund for Agricultural Development (IFAD), but was not approved by their board. Consequently, the critical overall funding deficit for effective implementation of both eradication and surveillance program activities for 2005 has not yet been resolved.

CONCLUSIONS:

In the Caribbean region, the presence of TBT, and its associated disease dermatophilosis, has caused major losses in productivity in cattle, sheep, and goats. Similar losses in productivity of livestock and wildlife could be expected if TBT were to spread beyond the Caribbean to neighboring countries.

As stated previously at the 2003 USAHA Meeting, at the continental, regional level, area-wide eradication of the TBT from the Caribbean is essential to eliminate the foremost, original risk of spread to the mainland Americas of TBT.

Joseph L. Corn and Britta Hanson, Southeastern Cooperative Wildlife Disease Study (SCWDS), College of Veterinary Medicine, University of Georgia, Athens, Georgia, discussed "Surveillance for Exotic Ticks on Wildlife in the Southeastern United States and Puerto Rico." SCWDS is conducting surveillance for exotic ticks on wildlife in the southeastern United States and Puerto Rico in cooperation with USDA-APHIS-VS. Early detection of exotic ticks in these areas will increase the potential for eradication or control where exotic tick populations become established. One tick of great concern is the TBT, Amblyomma variegatum. This tick was introduced from Africa into the Caribbean in the 1800s, is a vector of heartwater and other diseases, and is a threat to wildlife and livestock in the Americas. Surveillance currently is being concentrated in Florida and Puerto Rico. Surveillance activities include examination of free-ranging wildlife captured at selected survey sites, environmental sampling using tick drags, examination of animals at wildlife rehabilitation facilities, examination of hunter-killed wildlife, and collection of specimens from wildlife examined during other collaborative projects involving live-captures and mortality investigations. All ectoparasites are submitted to the USDA-APHIS-VS National Veterinary Services Laboratories (NVSL) in Ames, Iowa.

The climate and abundance of wildlife in Florida are conducive to survival of introduced exotic ticks, and surveillance thus far has been concentrated in southern Florida. Active surveillance, including trap-
ping of free-ranging wildlife, began in Florida in August 2003. Free-ranging wild animals were captured at 71 sites, and over 1400 animals were examined from August 2003 – October 2004. Ectoparasites were collected from 511 animals, and identifications have been completed for 186 of these submissions. Environmental sampling using tick drags and/or tick traps was conducted at 24 sites, but ticks were only collected at three sites using these methods. Surveillance of wildlife at wildlife rehabilitation centers was conducted 11 times during August 2003-October 2004, and over 270 animals were examined. Ectoparasites were collected from at least 75 of these animals, and identifications have been compiled for 25 of the submissions. Surveillance of hunter-killed white-tailed deer and feral hogs was conducted at three sites; ectoparasites were recovered from 113/136 animals examined. Road-killed wildlife surveillance was conducted on survey routes that totaled 2,292 miles. Of 115 animals found during road-kill surveys, most were not suitable for examination.

Several areas in Puerto Rico have been targeted for surveillance due to the presence of feral animals. Active surveillance was conducted on Mona Island in Puerto Rico during February 2004. On Mona Island, a total of 82 animals including one native species; the Mona Island iguana, and three feral species; feral swine, goats, and cats, were examined. The island of Vieques, Puerto Rico is of special concern because of its proximity to St. Croix, U. S. Virgin Islands, an island where the TBT is present. Also, large areas of Vieques are in a natural state, and potential hosts for the TBT such as feral cattle, horses, and goats are present. Over 200 mongooses have been examined on Vieques, and ticks were recovered from about 30% of the mongooses examined. All ticks from Puerto Rico currently are being processed.

Although ectoparasite identification has been completed for only about 35% of the nearly 1000 submissions, several exotic lice and mites with origins in the Old World, South America, and the Caribbean have been identified. Intensive surveillance will continue at sites selected in Florida and Puerto Rico based on environmental factors, wildlife host abundance, and risk associated with pathways for introduction of ectoparasites. Surveillance will be conducted mostly by active trapping of free-ranging wildlife at selected sites as this method has been by far the most productive in terms of collection of ectoparasites.

Jack Schlater, USDA-APHIS-VS-NVSL, Ames, Iowa, reported on parasitology activities at USDA-APHIS-VS-NVSL. The purpose of the Parasitology Unit is to identify animal parasites of interest to USDA-APHIS-VS. To that end, most of the Unit’s routine work revolves around ticks, screwworm suspects, and mange mites. At times other parasites, such as intestinal helminthes, Cryptosporidium, and Giardia, have been identified for large-scale surveys conducted by Veterinary
PARASITIC DISEASES

Services. In addition, the Unit has been able to participate in a number of cooperative activities that include identifying parasites from wildlife for the SCWDS, identifying bird lice and feather mites for the book *Parasites and Diseases of Wild Birds in Florida*, identifying lice associated with hair loss syndrome in black-tailed deer, and supplying data for the National Tick Survey website. Behind-the-scenes activities include moving into new facilities and improving disaster recovery capabilities. The Unit is in the process of hiring additional personnel to improve the timeliness of identifications and in anticipation of additional tick submissions from enhanced surveillance in Florida.

Angela James, Jerome Freier, Suzanne Joy, Andrew Fox, and Kenneth Geter, USDA-APHIS-VS Center for Epidemiology and Animal Health (CEAH), Fort Collins, Colorado discussed “Reducing the Threat of Exotic Ticks by Geospatial Countermeasures.” The introduction and possible establishment of foreign animal diseases in the United States is a growing concern based on recent reports describing the detection of exotic ticks on reptiles, birds, and mammals imported into the United States (Keirans and Durden, 2001). Of the diseases that may be carried by imported tick species, heartwater has the most serious implications on the U.S. livestock industry. Heartwater fever, caused by *Ehrlichia ruminantium*, occurs in sub-Saharan Africa and the eastern Caribbean and is transmitted by ticks belonging to the genus, *Amblyomma* (Uilenberg et al., 1984, Norval et al., 1992). The TBT, *Amblyomma variegatum* and the Bont tick, *A. hebraeum* are competent vectors of heartwater and these tick species have been found on imported wildlife species (Burridge et al., 2003). Resident *Amblyomma* species experimentally shown to transmit heartwater are *Amblyomma dissimile*, *A. maculatum*, and *A. cajennense*. *Amblyomma marmoratum* and *A. sparsum* are currently found in Africa and Central and South America, respectively; however, recently both species have been collected from captive reptile breeding facilities in Florida and both are competent experimental vectors of heartwater (Allan et al., 1998, Burridge et al., 2000).

CEAH is using geospatial methods to determine the distribution of arthropod vectors and vector-borne diseases affecting humans and livestock. Because, ticks are important vectors of pathogens, knowledge of their geographic distribution is important in developing targeted surveillance and control strategies. Therefore, our objective was to develop a model to describe the distribution of two African heartwater vectors, *A. hebraeum* and *A. variegatum* based on climatic, ecological, and topographic features and then apply this information as a predictive model to find locations in the U.S. with environmental conditions similar to those found in the normal habitat range.

Spatially-referenced data layers for the Bont and TBT were obtained
from an African Species Distribution Database housed at the University of Oxford (Cumming, 2000). Ecological and climate factors used in model development included: soil texture, soil type, elevation, minimum and maximum temperatures, precipitation, vegetation, sand and clay, slope, aspect, and landform. We randomly selected 10% of the Bont tick observations and 20% of the TBT observations for later use to cross-validate each model. The remaining tick observations were used to generate a model for each tick species and an equal number of random points were also selected throughout Africa. Attribute tables were populated with the same environmental variables for each set of tick observations and random points.

Likely presence or absence of the Bont tick and the TBT were modeled using logistic regression methods. Logistic regression models consider multiple, interactive, and curvilinear relationships among one or more predictive variables. In developing the TBT model, a principal component analysis, was used to reduce data redundancy and autocorrelation effects. In addition, we developed climatic zones using monthly minimum temperatures and monthly precipitation for Africa and North America to take into account seasonality differences on each continent. Our final logistic regression model for each tick species was selected by backwards elimination, based on the model with the lowest AUC (Area Under Curve). The predictive performance of the final models for Africa was evaluated using 10-fold cross validation and by predicatively comparing the results with those observations withheld from the model’s development to the models’ predictions.

The logistic regression model for A. hebraeum used 13 variables and A. variegatum model used 11 variables with a probability threshold of 0.5 for each model. The regression model for A. hebraeum included the independent variables elevation, minimum temperature in August and May, maximum temperature in November, and precipitation in April. The logistic model predicted Bont tick presence in Africa with high accuracy (94% and 100% for independent accuracy assessment, respectively and 94% cross validation accuracy). In contrast, the logistic regression model for the TBT included the independent variables vegetation index in August and September, maximum and minimum temperatures in January and February. The logistic model predicted the TBT presence in Africa had a 78% and 85% for independent accuracy assessment, respectively and 85% cross validation accuracy. The logistic regression model predicted that the Bont tick would survive in 29 states dominated by the Pacific Northwest including parts of the southern and eastern coastlines. The logistic regression model for the TBT in the U.S. is currently under development.

The distribution of A. hebraeum in Africa was predicted to present in 30 different countries covering an area of 2,959,827 km² in the southern region of Africa, however, A. variegatum’s distribution was predicted to present in 44 different countries covering an area of 7,221,203 km² with two large areas covering parts of the eastern and western half of Africa.
PARASITIC DISEASES

The potential distribution of *A. hebraeum* in the U.S. appears to reflect its likelihood of becoming established in areas with a high-level of precipitation during the winter months with moderate temperatures, about 40-70 degrees Fahrenheit. Although, the climatic factors associated with the distribution of *A. hebraeum* in Africa only appear to be similar along the coastline of California, Oregon, and Washington as well as areas along the mid-Atlantic coast, it is likely that *A. maculatum* has the capability of playing a major role in the establishment and spread of the disease in livestock and wildlife within the inner regions of the United States.

This work is ongoing and refinements to these models are being made that incorporate additional predictive variables, such as heating degree-days and soil temperatures. Identifying environmental factors that determine the preferred habitat of heartwater vectors is essential in developing spatially targeted surveillance measures for protecting animal agriculture in the United States.

References for James et al, CEAH, presentation on “Reducing the Threat of Exotic Ticks by Geospatial Countermeasures”:


REPORT OF THE COMMITTEE

James Novy, International Advisor/Director, International Atomic Energy Agency, National Screwworm Eradication Programme, Veterinary Services Division, Ministry of Agriculture, Kingston, Jamaica discussed screwworm eradication in Jamaica. The New World Screwworm has been successfully eradicated from the United States, Mexico, Puerto Rico, the United States and British Virgin Islands, all of Central America and Panama. The screwworm continues to exist in the Caribbean in Cuba, Dominican Republic, Haiti, Jamaica and Trinidad and Tobago, as well as in most of the South American countries.

The Government of Jamaica (GOJ) organized a National Screwworm Eradication Programme in 1998 in partnership with the International Atomic Energy Agency. A three year program was planned. The GOJ had the commitment of $8 million from the U.S. PL480 funds (PL 480 - an “Emergency and Private Assistance” program to provide agricultural commodities to foreign countries on behalf of the people of the United States to: address famine or other urgent or extraordinary relief requirements; combat malnutrition, especially in children and mothers; carry out activities that attempt to alleviate the causes of hunger, mortality or morbidity; promote economic and community development; promote sound environmental practices; and carry out feeding programs) for the project and a commitment of $1 million from the International Atomic Energy Agency, including a Technical Advisor. An agreement was made with the Mexico-U.S. Commission for the Eradication of Screwworm whereby the GOJ would purchase the sterile screwworm flies for the project at cost. There was also an agreement with USDA-APHIS whereby the GOJ would reimburse the USDA-APHIS for the cost of airplanes used to transport the sterile insects from the production plant in Tuxtla Gutierrez, Mexico to Jamaica and to disperse the sterile flies over the island of Jamaica. Also, USDA-APHIS agreed to post an Animal Health Technician as a field advisor to the project in Jamaica.

By mid-1999, the infrastructure for the program was established and the first sterile screwworm flies were received in August 1999. Some reduction in the number of animal infestations was noted during 2000, but eradication was not achieved. In December 2000 there was a three-week interruption in the supply of sterile flies due to a labor problem at the plant in Mexico. Again at the end of June 2001 there was a five-week interruption in the supply of sterile flies due to a labor problem at the plant in Mexico. During this time the strain of sterile flies being produced was changed from the Costa Rica 92 strain to the Panama 95 strain. The number of infested animals has continued to be approximately the same each month since the inception of the program with about 3,000 cases reported each year. About 45% of the reported cases are from canine and about 2.5% from humans. The swine, bovine and caprine account for the majority of the remainder of cases reported.

Problems encountered and some of the reasons that the screwworm has not been eradicated from Jamaica:
PARASITIC DISEASES

1) Lack of importance given to the Programme by the livestock and animal owners;
2) Jamaica is a paradise for the screwworm: ideal climate and a very high density of hosts;
3) The level of the screwworm population was underestimated;
4) Nearly 70% of the animals are not attended to on regular basis. There are thousands of dogs, cattle and goats that roam freely over the island;
5) Funding and cash flow has been a problem. The GOJ has had difficulty allocating sufficient funds for the program. After the PL480 funds were expended at the end of 2001 the GOJ has had to fund 95% of the program. The IAEA has funded the remaining 5%;
6) There were interruptions in the supply of sterile screwworm flies and the distribution of sterile screwworm flies in the field. In addition to the labour problems at the plant in Mexico in 2000 and 2001 there were interruptions due to weather in May of 2002, in September 2002, and again in September 2004. There was a mechanical failure of one of the irradiators at the plant in Mexico in January 2003 that resulted in some of the screwworm flies to not be sterilized. In August 2003 the chill fly unit used to emerge and collect the sterile flies in Jamaica failed and was down for five weeks. Without consistent distribution of quality sterile flies eradication can not be achieved;
7) There were insufficient numbers of field inspectors during the first three years of the Programme. During 2003 and 2004 the U.S. Embassy to the IAEA in Vienna, Austria (as a result of the expressed need made by the USDA-APHIS) agreed to contribute US $400,000 to the IAEA, Division of Technical Cooperation for the screwworm program in Jamaica provided that the IAEA would match this amount. This money was to be used to employ temporary field inspectors and supplies, and to pay for the salary and subsistence of the IAEA Technical Advisor; and
8) The management of the program has been part-time in that the Director of the Veterinary Services Division is also the Director of the National Screwworm Eradication Programme. Most of the time is spent on dealing with Import/Export Issues. Field supervision has also been insufficient for the same reason.

The GOJ has agreed to fund the National Screwworm Eradication Programme through March 2005, the end of the current GOJ fiscal year. The IAEA is only committed to fund the program until December 31, 2004. If there is no significant progress shown toward eradication of the screwworm by December 2004 it is very likely that the GOJ will not continue to fund the program beyond March 2005.

From March to July 2004 a portion of the island of Jamaica was treated with the Jamaica 03 strain of sterile flies, but no difference in
REPORT OF THE COMMITTEE

cases occurred in that region compared to the part of the island treated with the Panama 95 strain. In July 2004, the entire island once again has been treated with the Panama 95 strain. In June 2004, the contracted the services of a retired USDA-APHIS Entomologist who has been working to improve the quality of the sterile flies being produced and dispersed in Jamaica. The dispersal of sterile flies has been consistent with the exception of two weeks in September 2004 as a result of the passage of hurricane IVAN. Improving the quality of the sterile flies and getting consistent dispersal in the field over the next three months is probably the last effort to take this program to a successful completion.

The screwworm has been successfully eradicated from every country where the sterile flies have been used. Not only will this be a disaster for Jamaica, but a political problem as well since the GOJ has spent more than US $12 million on this program. It will also impact on future screwworm eradication efforts. The Dominican Republic is very interested in the eradication of the screwworm, but securing the necessary funding will be difficult if the program in Jamaica fails. Funding the project has been a major difficulty in Jamaica and will be in the other Caribbean countries. The programs in Mexico and Central America were funded at least 80% by the U.S. because there was the risk of re-infestation to the U.S. if the screwworm was not eliminated from those countries. Currently, the funding of the sterile fly barrier in Panama is being funded by more than 80% U.S. because it is an insurance that the screwworm will not migrate back north to the U.S. Unfortunately, the presence of the screwworm in the Caribbean islands is apparently not seen as a threat to re-infestation of the U.S. and these countries must look elsewhere for assistance.

Efforts to provide some influence to get the U.S. to help with the eradication of the screwworm from Jamaica, and also from the other Caribbean islands would be very beneficial. With the tourist traffic between the Caribbean islands and the U.S. there is some risk of re-introduction of the screwworm into the United States.

The Committee approved two (2) resolutions which were forwarded to the Committee on Nominations and Resolutions for approval by the general membership. The resolutions addressed:

1. Continued and increased funding for the Caribbean Amblyommnia Program (CAP) and the TBT eradication program; and requesting USDA-APHIS-VS to encourage the French to place greater emphasis on eradication of TBT from the French West Indies; and

2. Funding for replacement of the USDA-ARS laboratory in Kerrville, Texas.
REPORT OF THE COMMITTEE ON
PHARMACEUTICALS

Chair: Dr. Joe S. Gloyd, Wilmington, DE
Vice Chair: Dr. Thomas J. Burkgren, Perry, IA

Dr. Eric J. Bush, CO; Dr. William H. Fales, MO; Dr. Paula J. Fedorka-Cray, GA; Dr. Richard E. Hill, IA; Dr. John P. Honstead, CO; Dr. G. Dean Lindsey, IN; Dr. Patrick L. McDonough, NY; Dr. David J. S. Miller, England; Mr. Mark J. Owens, IA; Ms. Valerie H. Patten, NY; Ms. Tracy A. Rae, IA; Mr. Steven Roach, IA; Dr. Jane F. Robens, MD; Dr. A. David Scarfe, IL; Dr. Roy A. Schultz, IA; Dr. Paul L. Sundberg, IA; Dr. R. Flint Taylor, NM; Dr. Deepanker Tewari, PA; Dr. Jon C. Van Berkom, ND; Dr. Lyle P. Vogel, IL; Dr. Elizabeth K. Wagstrom, IA.

The Committee met on October 27, 2004 from 8:00 am–12:00 pm. Approximately 10 committee members and 5 visitors were recorded on the roll. The Chair welcomed the Committee members and gave all in attendance the opportunity to introduce themselves.

Dr. Paula Fedorka-Cray, United States Department of Agriculture (USDA), Research, Education and Economics (REE), Agriculture Research Service (ARS) Research Leader, gave an update on the National Antimicrobial Resistance Monitoring System (NARMS). Bacterial isolates come from veterinary diagnostic laboratories, sentinel farms and packinghouses. Resistance testing is done on campylobacter, E. coli, enterococci, and salmonella. The most common resistance among isolates is to tetracyclines but there is wide variation between species as well as serotypes. Salmonella serotypes vary over time and vary by species and source.

Dr. Lyle Vogel, American Veterinary Medical Association (AVMA), provided the AVMA perspective on several issues. The AVMA is moving forward with legislative efforts to secure adequate funding for the animal arm of NARMS. Vogel participated in an external review of the Centers for Disease Control and Prevention (CDC) activities within NARMS. This review concluded that this is valuable service to public health; however, the program needs improvement in campylobacter sampling. It also concluded that CDC was not timely in publishing its data. The review also recommended that an oversight committee be appointed for CDC NARMS. The AVMA judicious use guidelines are currently under review. The AVMA is also working to put together lists of antimicrobials important to veterinary medicine. Vogel reported that the Minor Use/Minor Species (MUMS) Act passed in 2004. He also reported that the AVMA is addressing the issue of compounding animal drugs through education of veterinarians.

Dr. Liz Wagstrom briefed the Committee on the development of the
National Pork Board’s Responsible Use Program. This communication effort will target producers with information on appropriate use of antimicrobials. The goal is to raise awareness and educate on the issue. The program will debut in early 2005. At some point in the future there may be a transition to a certification program.

Dr. Dan McChesney presented information from the Food and Drug Administration (FDA)-Center for Veterinary Medicine (CVM) on several topics of interest to the Committee. He explained the issue of compounding of animal drugs. There is controversy over the legal requirements of compounding and the difference between compounding and manufacturing. The current Compliance Policy Guide on compounding is under revision. McChesney reported that the importation of U.S.-approved drugs from Canada is a non-issue. There is more concern over the sale of drugs over the Internet. FDA-CVM does approve the import of some companion animal drugs that are not available in the United States. McChesney reported that the FDA’s Adverse Event Reporting System has improved over the last few years. Currently over 25,000 adverse drug events are reported per year.

Dr. Eric Dubbin, FDA-CVM Ruminant Drugs Team Leader, gave a presentation on a number of topics concerning the FDA-CVM. A number of new drugs have been recently approved: Excede, Navigator, Vetsuin, Surpass, and Optaflexx. The MUMS Act is being implemented within FDA-CVM to increase the number of drug approvals for these uses and species. So far, 22 requests for designation have been submitted but the law has only been in effect since August 2004. Dubbin also updated the Committee on the progress made under the Animal Drug User Fee Act (ADUFA). Under ADUFA sponsors pay fees. In return, FDA-CVM must improve their performance in approving new animal drugs. This should expedite and improve the FDA-CVM review of applications for new animal drugs. Lastly, he informed the Committee on the most recent meeting of the FDA-CVM Veterinary Medical Advisory Committee (VMAC). VMAC met in October 2004 to review a new approval for tulathromycin for use in swine and cattle.

The Committee discussed the need for a new Chair and Vice Chair. Drs. Liz Wagstrom and Larry Hawkins were recommended respectively, and this information will be forwarded to the USAHA President for consideration.

While the Committee did not approve a specific resolution, the Committee discussed their support for a resolution approved by the Committee on Food Safety concerning adequate funding for NARMS and the Food Animal Residue Avoidance Database.
REPORT OF THE 
PROGRAM COMMITTEE

Chair: Dr. Richard D. Willer, Phoenix, AZ
Vice Chair: Dr. Bret D. Marsh, Indianapolis, IN

Dr. Bruce L. Akey, NY; Dr. J. Lee Alley, AL; Dr. Paul L. Anderson, MN; Dr. Joan M. Arnoldi, WI; Dr. Thomas Baldwin, UT; Dr. Corrie C. Brown, GA; Dr. Jones W. Bryan, SC; Dr. Thomas J. Burkgren, IA; Dr. David M. Castellan, CA; Dr. Robert A. Cook, NY; Dr. Joseph L. Corn, GA; Dr. Francois C. Elvinger, VA; Dr. James J. England, ID; Dr. Malcomb G. Fearnehough, TX; Dr. John R. Fischer, GA; Mr. Bob Frost, CA; Dr. R. David Glauer, OH; Dr. Joe S. Gloyd, DE; Dr. Steven L. Halstead, MI; Dr. William L. Hartmann, MN; Dr. Sam D. Holland, SD; Dr. G. Reed Holyoak, OK; Dr. Scott E. LaPatra, ID; Mr. James W. Leafstedt, SD; Dr. Donald H. Lein, NY; Dr. Jim Logan, WY; Dr. Charles E. Massengill, MO; Dr. Gavin Meerdink, IL; Dr. Lee M. Myers, GA; Dr. James E. Pearson, IA; Dr. John A. Smith, GA; Dr. Peter J. Timoney, KY; Mr. Robert W. Tully, KS; Dr. Cindy B. Wolf, MN; Mr. John F. Wortman, Jr., NM.

The Committee met on Saturday, October 23, 2004. The Chair called the meeting to order at 6:00 pm. There were 27 members present, as well as six additional United States Animal Health Association (USAHA) members. The Chair welcomed everyone to the Committee discussions and thanked the Committee Chairs for their willingness to serve. He expressed the importance of the Committees to the overall success of USAHA. Each person introduced himself to the entire Committee, and it was noted that there were 15 new Chairs this year, as well as a new Committee on Scrapie, Chaired by Dr. Jim Logan.

The Chair reviewed last year's meeting and summarized the outcomes of last year's feedback. He established a Committee Chair update via email to keep the Chairs informed of current activities and Chair expectations. This was done in response to comments at last year's meeting regarding the need for improved communication with the Chairs throughout the year. Willer received very positive feedback on this communication initiative and the Committee encouraged the next year's Chair, Bret Marsh, to continue this effort. In an effort to further engage the Chairs, invitations were send to each Committee Chair to attend the February 2004 USAHA Government Relations Committee meeting in Washington, DC. Eight Committee Chairs attended the meeting.

USAHA President Don Lein addressed the Committee and thanked everyone for their efforts on behalf of USAHA. He reviewed some of the issues that would be discussed in this year's Committee sessions.
REPORT OF THE PROGRAM COMMITTEE

The Chair reported on changes that have taken place in the overall schedule for the Annual Meeting. The 2004 meeting has been shortened by a half day by eliminating the Wednesday morning USAHA Scientific Session. Papers that had previously been given during this session were submitted for presentation during one of the American Association of Veterinary Laboratory Diagnosticians (AAVLD) Scientific Sessions. This is the first time for the change and eight papers will be given in this new format. Willer discussed the difference between a paper given during the AAVLD Scientific Session, which requires an abstract be submitted in May, and a time specific paper that is given during a Committee session. Both types of paper presentations will result in the papers being printed in their entirety in the USAHA Proceedings.

The Chair reviewed several procedural matters with the Committee including the requirement for name badges to enter a Committee meeting, completing the Chair Survey Form as soon as possible following the Committee meeting, reviewing of the Committee membership list, using sign-up sheets in each meeting, determining how to add or remove members from the Committee, using the Operating Procedures Manual, applying the protocol for videotaping or recording a Committee session, using Robert’s Rules of Order in Committee activities, and reviewing the mission statements for each respective Committee.

Immediate Past President Bob Frost spoke to the Committee regarding resolutions and recommendations. He encouraged everyone to use clarity when developing these documents and to make certain the documents are directed to a specific entity. He reviewed the protocol that requires a recommendation be included in the Committee report as opposed to a resolution that does not appear in the Committee report. Instead, a short reference can be made in the Committee report that the Committee approved a certain resolution. Resolutions are submitted to the Committee on Nominations and Resolutions for review and submission to the membership for approval. Recommendations and cover letters prepared by the Committee Chair are sent to the USAHA President for signature and forwarding on to the entity to whom the recommendation is directed.

USAHA Secretary Dr. J Lee Alley spoke to the Committee and encouraged the Chairs to have their reports turned in before leaving the Annual Meeting. Each Committee report requires approval by the Board of Directors. A handout was reviewed that provided style manual suggestions to make the reports as consistent as possible.

Vice Chair Bret Marsh spoke to the Committee regarding the sunsetting of Committees. He reported on the continuing action by the Executive Committee to review the number of Committees in an attempt to keep the most topical issues addressed by USAHA. Over the last several years there have been notable deletions, additions and
mergers of committees. Attendance counts will be conducted throughout the Annual Meeting to determine the level of interest in the committee topics.

Mr. Larry Mark encouraged the Chairs to see him following their Committee meeting to provide him with topics that may be of interest to the media.

The Chair then reviewed some of the current member services that are available. He reported on the News Alert Summaries and News Flashes that are produced each day and distributed to the Board of Directors and chairs. The original recipients distribute the information domestically and internationally. A newly redesigned website was recently launched and the Chairs were encouraged to review the site and provide feedback. In addition, a new membership brochure has been produced to provide a convenient information tool for distribution to prospective members.
REPORT OF THE COMMITTEE ON PSEUDORABIES

Chair: Dr. Paul L. Anderson, St Paul, MN
Vice Chair: Mr. James W. Leafstedt, Alcester, SD

Dr. John K. Atwell, NC; Dr. C. Carter Black, GA; Mr. Philip E. Bradshaw, IL; Dr. William L. Brown, KS; Dr. Max E. Coats, Jr., TX; Dr. Paul R. DuBois, KS; Dr. Gene A. Erickson, NC; Dr. Thomas W. Freas, IN; Dr. Michael J. Gilsdorf, MD; Dr. Larry M. Granger, MD; Dr. Thomas J. Hagerty, MN; Dr. Edwin C. Hahn, IL; Dr. Robert M. Harbison, AR; Dr. Howard T. Hill, IA; Dr. Sam D. Holland, SD; Dr. Richard D. Hull, IL; Dr. John A. Johnston, IN; Dr. Charles F. Kirkland, NC; Dr. John P. Kluge, IA; Dr. John A. Korslund, MD; Mr. John H. Lang, WI; Dr. Bret D. Marsh, IN; Dr. David T. Marshall, NC; Dr. Charles E. Massengill, MO; Dr. James D. Mckean, IA; Dr. John J. Schiltz, IA; Mr. Jeff Schnell, IA; Mr. James E. Stocker, NC; Dr. Paul L. Sundberg, IA; Dr. Paul O. Ugstad, CA; Dr. Larry L. Williams, NE.

The Committee met on Tuesday, October 26, 2004, from 8:00 am-12:00 pm. There were 29 in attendance. Chair Paul Anderson presided assisted by Vice Chair Jim Leafstedt. The Chair welcomed those in attendance and all were given the opportunity to introduce themselves.

Dr. Max Coats, Chair of the Feral Swine Subcommittee, delivered his subcommittee report, which was approved by the full Committee. His report was:

The Subcommittee met on October 24, 2004, from 1:00 pm until 4:30 pm. There were 36 in attendance. Dr. Phil Elzer reported on his work with vaccines for *Brucella abortus* strain RB51 and *B. suis* strain VTRS1. The VTRS1 vaccine is a rough strain of *B. suis* and like *B. abortus* strain RB51, there is no O-chain polysaccaride. VTRS1 adequately colonizes pigs and protects sows better than RB 51 when challenged. VTRS1 vaccine appears to be superior to RB51 vaccine in swine.

Dr. Lowell Miller presented information on his work, sponsored by the United States Department of Agriculture (USDA), that deals with Immuno-contraception in Domestic and Feral Swine. The USDA, Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS), Wildlife Research Center (WRC) is working on a vaccine to stimulate antibodies to Gonadotrophic Releasing Hormone (GnRH). GnRH is a small peptide hormone which, when injected into females, will stop estrus. The WRC is investigating an oral vaccine application.

Ned Hahn provided an update on his ongoing effort to Finger Print Feral Pig pseudorabies virus (PRV) isolates. The goal is to: fingerprint
PRV DNA from recent out breaks, to improve the database and to develop a method to determine the source of infection. The main work is with glycoprotein C. There appears to be several strains of PRV virus circulating between and among feral and domestic populations.

Joe Corn, Southeastern Cooperative Wildlife Disease Study (SCWDS), presented an outstanding paper on their work in describing the distribution of feral swine in the U.S. and the distribution of PRV and brucellosis in feral swine. SCWDS has developed a map of feral swine populations and domestic swine populations in the U.S. By overlaying the two maps the area of risk for feral and domestic swine interface may be assessed and may facilitate the development of strategies for preventing commingling developed. These areas may be considered as rational targets for disease surveillance.

Seth Swafford spoke on the mission of USDA-APHIS-WS and their feral swine activities. Feral swine damage includes preventing negative impact on endangered species, property damage, damage to livestock, crop damage and negative effects on domestic swine. From WS contacts, most of the public concerns relate to disease transmission. A new focus for WS is cooperative regulatory disease management.

Dr. John Korslund, USDA-APHIS-Veterinary Services (VS) gave the report for VS. Dr. Korslund reported that all states are at Stage III for swine brucellosis except for Texas. There were two infected transitional herds last year, one in California and one in Hawaii. Dr. Korslund suggested that it may be time to update the swine brucellosis Uniform Methods and Rules (UM&R). Further, only three states had yet to achieve stage 5 in the PRV eradication program.

Dr. Carter Black spoke to the issue of changes to the swine brucellosis UM&R necessary to harmonize it with the PRV Eradication Program Standards. After some discussion, the approved changes were included in a Committee recommendation. In addition, there was consensus that the appointed Harmonization Working Group should continue their assessment of the need to make additional changes to both UM&R’s, if necessary, to complete the harmonization of the two swine program documents and provide their recommendations at the next meeting of the Committee.

Dr. Phil Bradshaw delivered the Report of the National Pseudorabies Control Board. The Board met on October 25, 2004, from 1:30 pm-6:00 pm There were 26 in attendance. Mr. Bradshaw made the announcement that all 50 states have now been granted Stage V (Free) status. He talked about the history of the eradication program and about the many people that have been an important part of the program’s success. He also voiced his concerns about the feral/transitional swine issues that face us now that all states have achieved free status. The following state reports were considered and approved:
<table>
<thead>
<tr>
<th>State</th>
<th>Advance/Renew</th>
<th>Stage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alabama</td>
<td>renewal</td>
<td>Stage V</td>
</tr>
<tr>
<td>California</td>
<td>renewal</td>
<td>Stage V</td>
</tr>
<tr>
<td>Connecticut</td>
<td>renewal</td>
<td>Stage V</td>
</tr>
<tr>
<td>Delaware</td>
<td>renewal</td>
<td>Stage V</td>
</tr>
<tr>
<td><strong>Florida</strong></td>
<td><strong>Advancement</strong></td>
<td><strong>Stage V</strong></td>
</tr>
<tr>
<td>Georgia</td>
<td>renewal</td>
<td>Stage V</td>
</tr>
<tr>
<td>Hawaii</td>
<td>renewal</td>
<td>Stage V</td>
</tr>
<tr>
<td>Idaho</td>
<td>renewal</td>
<td>Stage V</td>
</tr>
<tr>
<td>Indiana</td>
<td>renewal</td>
<td>Stage V</td>
</tr>
<tr>
<td>Kentucky</td>
<td>renewal</td>
<td>Stage V</td>
</tr>
<tr>
<td>Maine</td>
<td>renewal</td>
<td>Stage V</td>
</tr>
<tr>
<td>Massachusetts</td>
<td>renewal</td>
<td>Stage V</td>
</tr>
<tr>
<td>Michigan</td>
<td>renewal</td>
<td>Stage V</td>
</tr>
<tr>
<td>Minnesota</td>
<td>renewal</td>
<td>Stage V</td>
</tr>
<tr>
<td>Mississippi</td>
<td>renewal</td>
<td>Stage V</td>
</tr>
<tr>
<td>Missouri</td>
<td>renewal</td>
<td>Stage V</td>
</tr>
<tr>
<td>Nebraska</td>
<td>renewal</td>
<td>Stage V</td>
</tr>
<tr>
<td>Nevada</td>
<td>renewal</td>
<td>Stage V</td>
</tr>
<tr>
<td>New Jersey</td>
<td>renewal</td>
<td>Stage V</td>
</tr>
<tr>
<td>North Dakota</td>
<td>renewal</td>
<td>Stage V</td>
</tr>
<tr>
<td>Ohio</td>
<td>renewal</td>
<td>Stage V</td>
</tr>
<tr>
<td>Oregon</td>
<td>renewal</td>
<td>Stage V</td>
</tr>
<tr>
<td><strong>Pennsylvania</strong></td>
<td><strong>Advancement</strong></td>
<td><strong>Stage V</strong></td>
</tr>
<tr>
<td>Puerto Rico</td>
<td>renewal</td>
<td>Stage V</td>
</tr>
<tr>
<td>Rhode Island</td>
<td>renewal</td>
<td>Stage V</td>
</tr>
<tr>
<td>South Carolina</td>
<td>renewal</td>
<td>Stage V</td>
</tr>
<tr>
<td>South Dakota</td>
<td>renewal</td>
<td>Stage V</td>
</tr>
<tr>
<td><strong>Texas</strong></td>
<td><strong>Advancement</strong></td>
<td><strong>Stage V</strong></td>
</tr>
<tr>
<td>Virgin Islands</td>
<td>renewal</td>
<td>Stage V</td>
</tr>
<tr>
<td>West Virginia</td>
<td>renewal</td>
<td>Stage V</td>
</tr>
<tr>
<td>Wisconsin</td>
<td>renewal</td>
<td>Stage V</td>
</tr>
</tbody>
</table>
Dr. John Korslund delivered the USDA-APHIS report to the Committee. He talked about the rapid progress made in the eradication program over the last seven years. The following chart lists the year in which each state reached Stage V status. In addition to those states listed, Florida, Texas and Pennsylvania were granted Stage V status on October 25, 2004.

Dr. Korslund then talked about the states that no longer have to meet a surveillance requirement to maintain Stage V status. Program Standards state that: “Once all States have achieved Stage IV or V status, surveillance will no longer be required to maintain Stage V status in states that have maintained Stage V status for five consecutive years, have had no confirmed cases of pseudorabies during the same period and have demonstrated that no feral swine exist in the state.” The following states currently meet these criteria: Connecticut, Delaware, Idaho, Maine, Maryland, Massachusetts, Montana, New Mexico, North Dakota, Vermont, and Wyoming.

Korslund then discussed the issues surrounding feral and transitional swine. Over the last twelve months, there have been seven cases of pseudorabies in feral or transitional swine. The cases occurred in Arkansas (2), South Carolina, Texas (2), Ohio, and Illinois. No cases occurred in commercial swine operations.

In addition, he discussed the first feral swine program site review conducted by USDA-APHIS-VS. The review was in North Carolina in early October, 2004. The review team reported that North Carolina is

<table>
<thead>
<tr>
<th>State</th>
<th>Stage V Achieved</th>
<th>State</th>
<th>Stage V Achieved</th>
<th>State</th>
<th>Stage V Achieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Montana</td>
<td>1994</td>
<td>West Virginia</td>
<td>1996</td>
<td>Rhode Island</td>
<td>2000</td>
</tr>
<tr>
<td>New Mexico</td>
<td>1994</td>
<td>Alabama</td>
<td>1997</td>
<td>Wisconsin</td>
<td>2000</td>
</tr>
<tr>
<td>Delaware</td>
<td>1995</td>
<td>Puerto Rico</td>
<td>1997</td>
<td>Indiana</td>
<td>2002</td>
</tr>
<tr>
<td>Vermont</td>
<td>1995</td>
<td>Georgia</td>
<td>1999</td>
<td>Nebraska</td>
<td>2003</td>
</tr>
<tr>
<td>Iowa</td>
<td>2004</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
doing a good job. Their swine industry is proactive and extremely vigilant. Feral populations in North Carolina are not widespread or highly infected at this point. Better mapping and reporting is planned. Transitional pigs are well monitored both publicly and privately. Finally, the team recommended that future reviews should include field visits.

Finally, Korslund gave the Committee an update on how he thought the definition for “transitional swine” was working after a year of practical experience. He voiced concern that there are insufficient state/federal regulations to prevent the interstate movement of non-slaughter transitional swine. The term “transitional swine” is not addressed anywhere except in the Pseudorabies Program Standards. Testing protocols have not been defined. The question of whether to use Accelerated Pseudorabies Elimination Plan (APEP) funding to depopulate transitional swine has not been fully resolved. Separation of transitional swine in all class markets may also occur and create higher than acceptable risk of pseudorabies spread. He used cases in Texas, Hawaii, West Virginia and Ohio to illustrate some of the challenges that have been presented in the last twelve months.

The Committee discussed two very important question regarding transitional swine; (1) Whose job is it to identify and classify swine herds as commercial or transitional?; and (2) How should the movement of these pigs be regulated? The Committee then decided to evaluate language in the Pseudorabies Program Standards to see if a solution could be found.

Dr. Korslund reminded the Committee that feral/transitional swine represent a small percentage of the total U.S. swine inventory and that spread from feral/transitional swine to commercial swine has been rare. However, he stated that these types of pigs are not going to go away and we must maintain good biosecurity and control measures to ensure the safety of our commercial swine industry.

Dr. Korslund talked about funding for pseudorabies. Currently, there is $8,000,000 left in the APEP fund. There is $4,000,000 in the annual pseudorabies program budget and another $4,000,000 in the annual animal health monitoring system budget.

In closing, he talked about a possibility of USDA-APHIS declaring the U.S. free of pseudorabies by October 2006.

Drs. John Korslund and Brian McCluskey reported on current surveillance programs for pseudorabies. Dr. Korslund reviewed the recommendations on pseudorabies surveillance that were presented by Neal Black in 1998. The following recommendations were extracted from the minutes of the 1998 USAHA Committee on Pseudorabies, National Swine Disease Surveillance Task Force.

Section I - Long Range Surveillance:

1. When all states are at least in PRV Stage IV or validated swine brucellosis free, surveillance will be concentrated in high-risk
PSEUDORABIES

areas.

2. These surveillance efforts will use methods based on conditions in each of these classes of areas, considering the following:

a. The PRV program standards and swine brucellosis sub-committees of USAHA consider reductions of surveillance levels in PRV Stage V and validated swine brucellosis free states;

b. When confidence is high that all infection for both pseudorabies and swine brucellosis has been eliminated in domestic swine, post-eradication surveillance will be limited to high-risk areas (Mexican border, Florida and other feral pig areas) and in the rest of the country at levels sufficient to demonstrate absence of disease consistent with international trade requirements;

c. Surveillance mechanisms such as those identified by the Swine Futures Project shall remain in place or be developed to respond to future disease problems.

In regards to Market Swine Testing (MST), the testing cull sows and boars for pseudorabies at major slaughter facilities, Dr. Korslund reported that USDA-APHIS-VS plans to continue this program for at least three years after the last case of pseudorabies is found in commercial production swine. At this time, the last case on record was in Pennsylvania in early 2003. Although no definite plan to end this slaughter surveillance system have been announced, it is possible that it could be discontinued as early as 2006. He commented that cases of pseudorabies in transitional swine have not been detected in the past few years using slaughter surveillance of sows and boars at major slaughter facilities. Further, tracing false positive samples is expensive and over the last two years has not led to identification of infected commercial herds.

Dr. Korslund commented that reactor rates in tested cull sows and boars are extremely low in programs for pseudorabies and swine brucellosis. In recent years, traces from reactor samples have not led to disclosure of infected herds.

Dr. Korslund then talked about the following challenges that need to be addressed in regard to pseudorabies surveillance:

1. Lack of sow identification
2. Over-sampling known negative populations - lack of targeting surveillance
3. Data management (Generic Database) - Error handling/data transmission problems, cryptic reports and timeliness

Dr. McCluskey discussed comprehensive disease surveillance from
the perspective of the National Surveillance Unit. He then talked specifically about targeted surveillance for pseudorabies. He said that understanding the probabilities of disease introduction, whether into the country or into an individual herd, facilitates targeted surveillance, targeting geographically and targeting specific populations. He explained that modeling, pathways analysis and risk analysis are key to this effort.

He suggested to the committee that USDA-APHIS-VS needs to conduct a robust, comprehensive evaluation of pseudorabies and swine brucellosis surveillance programs using standardized evaluation criteria. Quality attributes and effectiveness for these programs should include: simplicity, acceptability, flexibility, sensitivity, predictive value positive, representativeness, timeliness and usefulness. The evaluation should include investigating surveillance points for integration, cost-benefit analysis, and valuing information collected over previous time periods.

In closing, he agreed with Dr. Korslund that there are no immediate plans to discontinue slaughter surveillance for pseudorabies and swine brucellosis as currently applied. He emphasized that we depend on these systems to meet international requirements for establishing then maintaining disease freedom and to leverage existing surveillance infrastructure and systems.

The Committee approved three recommendations. They were:
Recommendation 1 - Proposed changes to Pseudorabies Program Standards. The Committee recommends that the following changes to the Pseudorabies Program Standards be forwarded...
PSEUDORABIES

to USDA-APHIS-VS: (changes indicated by underline and strikethrough)

Stage IV - Surveillance
E. Swine import requirements shall be as follows:
1. Slaughter swine
   a. Infected, exposed or feral/transitional swine may be shipped through or into a Stage IV State/Area with prior written approval from the State Veterinarian and must move directly to a recognized slaughter establishment. Such swine must be accompanied by a shipping permit (VS Form 1-27), be conveyed in sealed vehicles, and be unloaded under the supervision of State or Federal officials to ensure that biosecurity measures are observed.
   b. Imports of slaughter swine from States or Areas with a Program status up to and including Stage III are permitted to a recognized slaughter establishment or an approved slaughter market only.
2. Commercial breeding swine
   a. Direct shipment from a Stage IV or V State/Area, or
   b. Direct shipment from a qualified pseudorabies-negative herd in any State/Area, or
   c. Negative official pseudorabies serologic test within 30 days prior to shipment with quarantine, isolation, and retest at destination in 30-60 days following importation.
3. Commercial feeder pigs
   a. Direct shipment from a farm of origin or a market in a Stage IV or V State/Area, or
   b. Direct shipment from a farm of origin in a Stage III State/Area, or
   c. Direct shipment from a qualified pseudorabies-negative herd or qualified negative gene-altered vaccinated herd, or
   d. Entry is allowed into Stage IV States/Areas from feeder-pig-monitored herds in Stage II States or from approved feeder-pig markets under the following conditions:
      (1) That the swine enter on permit directly to a designated feedlot;
      (2) That the swine be restricted to the designated feedlot until they are sent to slaughter.
4. Feral/transitional swine
   Negative official pseudorabies serologic test within 30 days prior to shipment. Pigs that move other than directly to slaughter must be quarantined, isolated and retested at the destination in 30 to 60 days following importation.

Recommendation 2 - Proposed changes to Swine Brucellosis Uni-
form Methods and Rules (UM&R). The Committee recommends that
the following changes to the Swine Brucellosis UM&R and that they be
forwarded to USDA-APHIS-VS:

Background - There are differences in the definitions between the
Pseudorabies Program Standards and the Swine Brucellosis UM&R.
There are also differences in the testing schedules for Pseudorabies
Qualified Herds and Swine Brucellosis Validated Free Herds. Advance-
ment of state status in the Swine Brucellosis Program should be based
on the commercial production operations and not be affected by feral
and/or transitional herds. The definitions of feral, transitional and com-
mercial swine herds, as used in the Pseudorabies Program Stan-
dards needs to be included in the Swine Brucellosis UM&R.

Part I  Definitions
Feral or wild swine - Swine that have lived all (wild) or any part
(feral) of their lives as free-roaming animals. Those swine that are free-
roaming.

Commercial production swine - Those swine that are continuously
managed and have adequate facilities and practices to prevent expo-
sure to either transitional or feral swine.

Transitional production swine - Those feral swine that are captive
or swine that have reasonable opportunities to be exposed to feral
swine.

Part V  Validated Swine Brucellosis – Free Herds
A. Initial Validation or Revalidation
   4. Swine growout premises on which no adult breeding swine
      are maintained may be validated or revalidated as Swine
      Brucellosis free if all samples are tested by the same sched-
      ule described for establishing a pseudorabies Qualified
      Negative growout premises on which no adult breeding
      swine are maintained.

Part VII  Program Stages
Stage II
   2. During the 2-year period prior to the request for Stage II sta-
      tus, the State’s commercial breeding swine population
      ............... 

   3. States must develop and adopt a management plan that ade-
      quately separates and addresses control of the interface of
      feral and transitional production swine with commercial swine.
      The plan is to be reviewed by the National Center for Animal
      Health Programs staff.

Stage III (Free)
A. Establishment of status
PSEUDORABIES

2. During the 2-year qualification period, no more than one SB-infected commercial breeding swine herd was identified; ..................

4. States must develop and adopt a management plan that adequately separates and addresses control of the interface of feral and transitional production swine with commercial swine. The plan is to be reviewed by the National Center for Animal Health Programs staff.

C.

4. Infection is disclosed in a commercial swine herd with evidence of spread to other commercial swine herds.

Recommendation 3 - Surveillance for Pseudorabies and Swine Brucellosis. The Committee recommends that USDA-APHIS-VS immediately take the following actions concerning surveillance for pseudorabies and swine brucellosis:

(1) Evaluate and redesign surveillance programs for pseudorabies and swine brucellosis, including current slaughter surveillance programs.

(2) Assign a staff position to be responsible for program analysis and implementation.

(3) Coordinate work between the National Surveillance Unit and Animal Health Programs staff.

(4) Consider randomized on-farm testing in high risk areas.

(5) Provide funding to implement these ongoing surveillance efforts.

The Committee approved a resolution and forwarded it to the Committee on Nominations and Resolutions. The resolution encouraged federal agencies to continue long-range funding for research, program support and field studies in feral swine, in particular, to support research for: (1) Conducting population studies that support the development of disease risk management strategies; (2) development of Brucella strain VTRS-1 for use as a dual vaccine; and (3) conducting further field trials and studies in relation to swine brucellosis and pseudorabies infection in feral swine and the methods of their transmission to domestic swine.

**Recommended changes to USAHA Pseudorabies Committee mission statement** - The Committee on Pseudorabies agreed to change its mission statement as follows:

“The purpose of the Committee on Pseudorabies is to provide information to assist in the control and eradication of PRV from the commercial swine herds in the United States. The program is designed to effect changes to make progress toward our goal of the eradication of PRV.”
REPORT OF THE COMMITTEE ON PUBLIC HEALTH AND RABIES

Chair: Dr. Malcomb G. Fearneyhough, Dripping Springs, TX
Vice Chair: Dr. John P. Sanders, Jr., Kearneysville, WV

Dr. Helen M. Acland, PA; Dr. Dale D. Boyle, VA; Mr. William H. Clay, DC; Dr. Leroy M. Coffman, FL; Dr. Joseph L. Corn, GA; Dr. Donald S. Davis, TX; Dr. Thomas J. DeLiberto, CO; Dr. James M. Foppoli, HI; Dr. Wyatt Frampton, UT; Dr. Nancy A. Frank, MI; Dr. Eric C. Gonder, NC; Dr. Keith N. Haffer, SD; Dr. Cathleen Hanlon, GA; Dr. Richard E. Hill, IA; Dr. Donald E. Hoenig, ME; Dr. Kristin G. Holt, GA; Dr. John P. Honstead, CO; Dr. Patrice N. Klein, MD; Dr. Spangler Kloppe, DE; Dr. Donald H. Lein, NY; Dr. Martha A. Littlefield, LA; Dr. Jorge W. Lopez, Brazil; Dr. Robert G. McLean, CO; Dr. David L. Meeker, VA; Dr. Robert B. Miller, VA; Dr. Lee M. Myers, GA; Dr. Sandra K. Norman, IN; Dr. Leon H. Russell, Jr., TX; Dr. Robert H. Singer, CA; Dr. Paul L. Sundberg, IA; Dr. H. Leon Thacker, IN; Dr. Lewis P. Thomas, NV; Dr. Lyle P. Vogel, IL; Dr. Susan E. Wade, NY.

The Committee met on October 26, 2004 from 8:00 am-12:00pm. There were 45 in attendance. Chair Malcomb Fearneyhough presided assisted by Vice Chair John Sanders. The Chair welcomed everyone to the meeting and all were given the opportunity to introduce themselves.

Dr. Rodney Rohde, Assistant Professor, Texas State University, made a presentation entitled, “Bat rabies, Texas, 1996-2000.” He reported that bats submitted to the Texas Department of Health (1996-2000) were speciated and tested for rabies virus (RABV) antigen by direct immunofluorescence microscopy. Antigenic analysis of rabies virus (RABV)-positive specimens was performed with monoclonal antibodies (Mab’s) against the nucleoprotein of the virus; atypical or unexpected results were confirmed by genetic analysis of nucleoprotein sequence. For those laboratories without genetic typing capability, antigenic analysis with Mab’s offers a pared, simple, and inexpensive means of typing RABV for epidemiological surveys. Their study suggested that MAb typing can be useful for large-scale surveys in which hundreds to thousands of virus samples originate from only one or two bat species and the question is simply “Do we find in these species the RABV variants that we expect to find?” All but 5 of 407 samples from T. brasiliensis, L. borealis, L. cinereus, L. intermedius, and E. fuscus tested in this study displayed the MAb patterns expected for the species. However, MAB typing by fluorescence microscopy lacks precision. Surveys that rely solely on antigenic typing underestimate the true diversity of RABV in bat populations and may oversimplify rabies.

Dr. Charles Trimarchi, New York State Rabies Laboratory, gave a presentation entitled, “National Standard Rabies Diagnostic Protocol: A Minimum Standard for Rabies Diagnosis in the United States.” The results of the postmortem examination of animals for evidence of rabies infections are used by the physician as the basis for the decision to provide or withhold treatment for the bite of a rabies suspect animal. It is this function that dictates the uniquely high standards of sensitivity and specificity required in the performance of these tests. Among the findings of the National Working Group on Rabies Prevention and Control, convened more than ten years ago, was the need for a minimum national standard for the laboratory diagnosis of rabies. In response to this recommendation, a committee of reference diagnosticists was established with the goal of improvement of the overall quality of rabies testing through the formulation of guidelines and standards for equipment, reagents, training, laboratory protocols, quality assurance, and laboratory policy for rabies diagnosis. As a first step to attaining this outcome, the committee prepared a standardized protocol for the analytical phase of rabies testing using the direct fluorescent antibody (DFA) test and evaluated the protocol by comparison testing of 435 samples submitted to public health laboratories of rabies diagnosis. The standard protocol for DFA has been made available to each rabies testing laboratory by postal or electronic mail and has been the course of recent training at the National Laboratory Training Network sponsored courses “Laboratory Methods for Detecting Rabies virus.” In addition, the protocol and other documents appear on the rabies web site (www.cdc.gov/ncidod/dvrd/rabies) maintained by the Centers for Disease Control and Preventive (CDC). The protocol addresses all aspects of the rabies DFA, with particular attention to handling of the diagnostic reagents, microscopy and proper sampling of the central nervous system. Because the consequences of flawed examinations include human mortality and extraordinarily costly misdirection of rabies control resources, the implementation of the Standard Protocol is essential to the protection of animal and public health. This, it is critical that the resources be provided to upgrade each laboratory performing these examinations to ensure the capacity to implement the protocol in its entirety.

Dr. Tom Sidwa, Texas Department of Health gave a report on rabies transmission through organ transplantation. The Texas Department of Health (TDH) became involved in a challenging disease investigation as a result of the first reported cases of rabies transmission through
solid organ transplantation. CDC confirmed the cases and served as lead agency due to the multi-state nature of the scenario.

Dr. John Dunn, CDC, reported on CDC’s Foodborne Disease Active Surveillance Network (FoodNet) Attribution Studies. In the United States, an estimated 76 million people contract foodborne and other acute diarrheal illnesses each year. FoodNet collects data on disease caused by enteric pathogens transmitted commonly through food in ten United States sites. FoodNet’s objectives are to determine burden of foodborne diseases, determine the change in the burden of foodborne diseases over time, and to determine the proportion of domestically-acquired human infections attributed to different food sources (attribution). FoodNet meets these objectives by conducting active surveillance for laboratory-diagnosed illness. To prevent foodborne and other acute diarrheal illnesses, the Foodborne and Diarrheal Diseases Branch and FoodNet perform surveillance and special studies that attribute enteric infections to food sources and non-food sources such as direct animal contact.

FoodNet’s main contribution to point of consumption attribution has been case-control studies of sporadic foodborne disease. To date, 17 case-control studies have been completed, including investigations of infection with Campylobacter species, E. coli O157:H7, and several Salmonella serotypes. Case-control studies of Salmonella enteritidis, Salmonella newport, Listeria monocytogenes, and Salmonella and Campylobacter in infants have been conducted and analyses are ongoing.

In addition to food attribution, CDC’s Foodborne and Diarrheal Diseases Branch has recently performed numerous outbreak investigations enteric infections to direct animal contact. Recently, in consultation with CDC, the National Association of State Public Health Veteri-
narians published a compendium of recommendations for use by Public Health Officials, veterinarians, animal exhibitors, and other concerned with disease control and injury prevention, with the intent of minimizing risks associated with animals in public settings.

CDC’s Foodborne and Diarrheal Disease Branch and FoodNet conduct surveillance and perform special studies for enteric infections transmitted through food and by other routes of transmission such as direct animal contact. FoodNet attribution studies are determining the proportion of foodborne disease attributable to specific foods. Special studies and outbreak investigations have been successful in attributing enteric infections to direct animal contact. Food Attribution studies and other studies describing non-food sources of enteric pathogen transmission are ongoing with the goal of preventing disease among persons in the United States.

Dr. Stephanie Kordick, United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), discussed the USDA-APHIS Bovine Spongiform Encephalopathy (BSE) Surveillance Program that is currently underway. The goal of the program is to test as many cattle with in the targeted population as possible over a 12 to 18 month period in order to determine if BSE is present in the U.S. cattle population. A description of the target population, sample collection procedures, data collection processes, testing methodology and interpretation, outreach activities, and cost recovery issues were discussed.

Dr. John Fisher, University of Georgia, discussed a proposed resolution concerning Homeland Security Presidential Directive – 9 and inclusion of state wildlife agencies in the planning process for the directive.

Dr. Tracey Lynn, USDA-APHIS-Veterinary Services (VS) presented a paper entitled, “Linking Human and Animal Health in the United States: Achievements and Challenges.” She reported that recent events affecting public health, including Severe Acute Respiratory Syndrome (SARS), Monkeypox, and Avian Influenza, have highlighted the potential adverse health effects of human interaction with animals. Outbreaks of zoonotic diseases are occurring with increasing frequency, from all corners of the world. It is difficult to predict when and where the next event will occur. It is apparent, however, that the public health and agriculture sectors must seek new partnerships and new ways to detect these microbial threats.

Both national and internationally, there has been an increasing recognition of a general need to develop these partnerships. The 2002 Public Health Security and Bioterrorism Act and Homeland Security Presidential Directives 5-10 call for an integration of agriculture, public health, and food safety surveillance to increase the Nation’s biopreparedness. In addition, the publication of the World Health Or-

To improve surveillance for emerging infections, the Institute of Medicine has recommended enhanced reporting by Human and Animal health partners. In 2000, the rapid spread of West Nile Virus (WNV) throughout the United States resulted in the national WNV reporting systems called ArboNet. During 2002, an interagency working group was tasked with addressing coordination of human and animal disease surveillance. Currently, USDA’s National Surveillance Unit is working to develop a National Animal Health Surveillance System. There are many challenges, both in public health and agriculture, including multiple, poorly coordinated surveillance systems, confidentiality issues, and funding disparities. In addition to data there has not been an overall evaluation of the effectiveness and efficiencies of the various systems, leading to duplication of efforts and inefficient use of limited resources. There is little linking of veterinary and human data, and not all zoonotic organisms are well addressed by existing surveillance systems. Surveillance for emerging infections in wildlife is especially problematic. Few diseases are notifiable, and measures for the detection of human and livestock infections are inadequate for the identification of similar diseases in wildlife. In addition, there is no action plan for what will trigger a response, and no definition of roles and responsibilities of the different agencies and stakeholders. The mission of the Working Group will be to fully identify obstacles and possible solutions, and implement the most effective methods to incorporate non-traditional partners into a coordinated system of surveillance for detection of zoonotic diseases. Strategic plan can be found at www.aphis.usda.gov/vs.ceah/ncahs/nsu.

Dr. Dennis Slate, USDA-APHIS-Wildlife Services provided updates on the National Oral Rabies Vaccination (ORV) Program including accomplishments and future directions. The ORV Program is collaborative program between the federal, state, and local governments. ORV strategic components include enhanced rabies surveillance, natural barriers, contingency action planning and more effective baits. Three events were discussed: one in Massachusetts, one Ohio and one in New York. An Environmental Impact Study being conducted will bring a North American Rabies Control Plan between Canada, United States and Mexico.

The Committee mission statement was discussed. A subcommittee to address the mission statement was reactivated and a revised statement will be discussed next year.

The Chair discussed last year’s resolution.

The Committee discussed three proposed resolutions, approved
PUBLIC HEALTH AND RABIES

two of them and forwarded them to the Committee on Nominations and Resolutions for approval by the general membership. The resolutions addressed:

1. Additional funding for terrestrial wildlife rabies control programs and development, maintenance and expansion of coordinated regional wildlife rabies control and vaccination programs.

2. Involvement of state fish and wildlife management agencies, via the International Association of Fish and Wildlife Agencies, in the planning activities described in Homeland Security Presidential Directive – 9 and the inclusion of them on the Food and Agriculture Sector Government Coordinating Council.

A third proposed resolution that would request stopping or controlling the translocation of wildlife was tabled until next year’s meeting.
The goals of oral rabies vaccination (ORV) programs in the U.S. are to contain specific terrestrial variants of the rabies virus, followed by evaluation and implementation of tactics to eliminate these strains. ORV successes in Europe provide operational models for ORV programs, but effectively treating isolated rabies foci and developed areas that support high population densities of red foxes are among the most important challenges that remain before complete elimination of rabies in foxes can be achieved.

Similarly, coordinated ORV campaigns have resulted in the near elimination of rabies in the red fox in Ontario, but isolated rabies foci linked to maintenance of the arctic fox variant of the virus in skunks has yet to be effectively addressed. Elimination of canine rabies in coyotes from Texas, and therefore the conterminous U.S., provides another recent case history that supports application of ORV for rabies control, but the potential for reinfection from Mexico underscores the need for internationally effective, cooperative programs with mutually common goals.

ORV has expanded from individual state or county programs in 1997, to coordinated ORV involving 15 eastern states and Texas. Several other states participate in enhanced rabies surveillance and placebo bait testing. Since 2001 in Texas, a maintenance ORV zone continues to be treated once annually to prevent reinfection from Mexico. This zone has been challenged near Laredo in 2001, and again in 2004, emphasizing its importance in preventing reinfection until enhanced rabies surveillance, complemented with ORV emerges as an integrated control option to be implemented along the Texas border in northern Mexico.

In west-central Texas, ORV continues in a doughnut–shaped ORV zone encircling an area infected with a unique strain of rabies in the gray fox. In the eastern US, ORV zones have been created in: eastern Maine; northern New Hampshire through northern Vermont and New York; on the Niagara frontier and along the Lake Erie plain to northeastern Ohio; and then from northeastern Ohio south to northeastern Alabama. These zones are designed to try to contain raccoon rabies.
SLATE, RUPPRECHT, LEIN

Other smaller projects occur in Massachusetts, Florida, Maryland and New Jersey.

During 2004, breaches just beyond the ORV zone in northeastern Ohio near Lake Erie and the Cape Cod Canal ORV zone have been treated through contingency actions plans that call for enhanced surveillance, trap-vaccinate-release (TVR) and ORV (at higher bait densities). These contingency actions are being monitored and will continue to be adapted to the local environmental conditions. Nationally, research and development continues toward new oral vaccines that can effectively immunize all terrestrial rabies reservoir species.

Development of improved baits to deliver these vaccines remains as a research focus, as well. While progress has been made in ORV in the US from 1997 to the present, long-term successes will hinge, minimally on: access more effective, inexpensive vaccines and baits; continuation of an effective, multi-disciplined coalition of scientists and managers dedicated to ORV; and adequate, sustained state and federal support to continue to refine and adapt programs to meet national/international goals.
The Committee convened on Wednesday, October 27, 2004. The Chair welcomed all in attendance.

The Committee reviewed the revised United States Animal Health Association (USAHA) website that was launched one week prior to the meeting. The following are suggestions that were offered for improvement:

1. “Home” page needs introductory information about USAHA and a link to how to join; home page needs photos and improved graphics to spark interest; tabs should be lower case;
2. A page should be provided on “How To Join USAHA”; a membership application should be available to download and print for submission;
3. A photo library should be added; should request members to submit photos that could be downloaded for individual purposes (pamphlets, presentations, brochures, etc.); add links to other photo libraries (i.e. USDA ARS);
4. “About USAHA” page should include printable version of new USAHA brochure;
5. “Members” page should include complete membership directory; the general membership directory was a popular site (approximately 7,000 hits) on the previous USAHA website; should have a space between each listing; should have a link to member websites; consider larger font;
6. “Meetings” page should have current annual meeting information, including final agendas for entire meeting and committees; links to future annual meetings should have location and housing information well in advance; should post informal committee meetings held outside the Annual Meeting;
7. “Committees” page should archive previous meeting reports and allow posting of information or meetings held outside the Annual Meeting;
8. “News” page should archive press releases and newsletters;
9. “Reference Links” page needs minor editing and addition of sites; consider removing the separate listing of links to industry (industry members should have webpage link in members
directory) or charging a fee for posting; should include links to academic institutions involved in USAHA and human health websites (medpub, promed, etc);

10. Should restore “History” page; the previous history page received a total of approximately 2,668 visits in 2003; should archive proceedings;

11. Should restore link to Greater Yellowstone Interagency Brucellosis Committee; and

12. Should consider “Job Opportunities” page.

Larry Mark provided a summary of the USAHA 2004 Annual Meeting evaluation forms submitted thus far. The Committee encouraged the continued use of meeting evaluations and suggested more emphasis on collecting responses (forms on colored paper, hand out forms during plenary session and Board of Directors Meeting). Responses for years attending the meeting included: 13 percent were attending their first year; 22 percent had attended two to four years; 16 percent had attended 5 – 8 years; and 40 percent had attended 9 or more years. The vast majority (88 percent) believed that shortening the meeting by one half day was a good idea. The overall rating of the meeting was great (31 percent); good (57 percent); and average (12 percent). A sampling of comments included:

1. Need to minimize overlapping of committee meetings;
2. Publish committee meeting agendas well before the meeting;
3. Meeting evaluation form was a good idea;
4. Allow less active committees to meet biannually;
5. Committee should focus more on policy;
6. Encourage more joint committee meetings of USAHA/AAVLD;

The Committee commends the USAHA Executive Committee for the revised brochure and had no significant recommendations.

The Committee discussed its mission and long range plan. The Committee recommends a more structured environment similar to other USAHA Committees (i.e. Committee Chair and Vice Chair selected by the USAHA President for 5 year term). In light of the increasing reliance upon information technology and sharing of electronic data, the Committee suggested a proactive appeal for enthusiastic members to effectively guide the public relations and information technology direction of the organization.
REPORT OF THE COMMITTEE ON SALMONELLA

Chair: Dr. David M. Castellan, Sacramento, CA
Vice Chair: Dr. Patrick L. McDonough, Ithaca, NY

Dr. Robin C. Anderson, TX; Dr. Joan M. Arnoldi, WI; Ms. Deanna L. Baldwin, MD; Dr. Marilyn F. Balmer, MD; Dr. Charles W. Beard, GA; Dr. Johnny E. Braddy, MD; Dr. Richard E. Breitmeyer, CA; Dr. Max Brugh, GA; Dr. Jones W. Bryan, SC; Dr. Karen E. Burns, GA; Dr. John A. Caver, SC; Dr. Hector M. Cervantes, GA; Mr. Kevin G. Custer, GA; Dr. Sherrill Davison -Yeakel, PA; Dr. Richard L. Dutton, NE; Dr. Robert J. Eckroade, PA; Mr. Kevin M. Elfering, MN; Dr. John I. Enck, Jr., PA; Dr. Paula J. Fedorka-Cray, GA; Ms. Kathleen E. Ferris, IA; Dr. James M. Foppoli, HI; MS. Rose Foster, MO; Dr. Don A. Franco, FL; Dr. Tony G. Frazier, AL; Dr. John C. Galland, CA; Dr. Richard K. Gast, GA; Dr. G. Yan Ghazikhanian, CA; Dr. Hashim M. Ghori, AR; Dr. Eric N. Gingerich, PA; Dr. R. David Glauer, OH; Dr. Robert D. Glock, AZ; Dr. Eric C. Gonder, NC; Mr. Robert R. Green, DC; Dr. Jean Guard-Bouldin, GA; Dr. Carl J. Heeder, MN; Dr. Rudolf G. Hein, DE; Dr. Michael Hellwig, KY; Dr. William W. Hewat, NC; Dr. G. Thomas Holder, MD; Dr. Keith A. Honegger, IN; Dr. Carolyn Inch, CAN; Dr. Hailu Kinde, CA; Mr. Ken Klippen, DC; Dr. Glenn E. Kolb, WI; Dr. David C. Kradel, PA; Dr. Kenton S. Kreager, IA; Dr. Dale C. Lauer, MN; Dr. Elizabeth A. Lautner, NY; Dr. Jerry D. Maiers, NC; Dr. John Mason, NY; Dr. David L. Meeker, VA; Dr. Ricardo A. Munoz, ME; Mr. Donald S. Munro, PA; Dr. Thomas J. Myers, DC; Dr. Kakambi V. Nagaraja, MN; Mr. Steven H. Olson, MN; Dr. Robert L. Owen, NC; Mr. Andrew R. Rhorer, GA; Dr. Kurt E. Richardson, GA; Mr. Steven Roach, IA; Dr. John P. Sanders, Jr., WV; Mr. James L. Scroggs, GA; Dr. H. L. Shivapasasad, CA; Dr. Martin A. Smeltzer, NC; Dr. Jill A. Snowdon, MD; Dr. Bruce N. Stewart-Brown, MD; Dr. David E. Swayne, GA; Dr. H. Fred Troutt, IL; Dr. Elizabeth K. Wagstrom, IA; Dr. W. Douglas Waltman, GA; Dr. Gary L. Waters, MT; Dr. Scott J. Wells, MN; Dr. David H. Willoughby, CA; Dr. Nora E. Wineland, CO; Dr. Helen S. Wojcinski, MI; Dr. Richard R. Wood, IL; Dr. Ching-Ching Wu, IN.

The Committee met from 12:30 pm-6:10 pm October 24, 2004, with 63 members and guests in attendance. Chair Dr. David M. Castellan presided assisted by Vice Chair Dr. Patrick L. McDonough. Two subcommittees were appointed at the end of the meeting - one to study and to write comments for the newly proposed Food and Drug Administration (FDA) Salmonella enteritidis program, and the second to monitor Salmonella Performance Standards during the coming year. Two resolutions were proposed at the end of the meeting.

500
SALMONELLA

Dr. Andy Rhorer, United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), Senior Coordinator, presented information on the National Poultry Improvement Plan (NPIP) for the calendar year 2003. He also gave a Pullo-rom case report. In 2003, there were eight isolations/outbreaks of Salmonella pullorum (both standard and intermediate types) reported to NPIP. There were 42 isolations/outbreaks from 27 flocks of Salmonella pullorum reported from January 1 to October 1, 2004. There have been no isolations of Salmonella gallinarum since 1988 in any type poultry.

Dr. Kathy Ferris, USDA-APHIS-VS National Veterinary Services Laboratories (NVSL), Ames, Iowa, presented the NVSL Salmonella serotyping report for 11,493 animal, avian and epidemiologically related sources for the time period July 1, 2003 – June 30, 2004. The most frequently identified serotypes were Salmonella typhimurium, S. newport, S. heidelberg, S. kentucky, and S. senftenberg.

The Salmonella are isolated from cases of clinical disease and from herd and flock monitoring and are submitted by animal disease diagnostic laboratories throughout the USA. Data are included on Salmonella isolated by the Food Safety and Inspection Service (FSIS) as a result of HAACP (Hazard Analysis and Critical Control Point) testing. Data generated from the serotyping of research isolates are not included in this report.

A total of 228 serotypes were identified from isolates recovered from animals, their environment, or feed in 37 states and the District of Columbia. The 10 most common serotypes accounted for 66% of the total isolates reported. Salmonella typhimurium, S. newport, S. derby, S. heidelberg, S. kentucky, S. senftenberg, and S. muenster are among the 10 most common serotypes from both monitor and clinical cases.

Although the total number of S. typhimurium isolates is less, the percent of total isolates identified as S. typhimurium increased from 15% in 2003 to 20% this year. Twenty-five percent of clinical isolates were S. typhimurium compared to 21% last year, and 15% of monitor isolates were S. typhimurium. S. typhimurium is one of the most common serotypes isolated from cattle, chickens, swine, and horses again this year, but there were only 20 isolates of turkey origin identified as S. typhimurium. Of the total isolates identified as S. typhimurium, 58% were S. typhimurium var. copenhagen and 42% were S. typhimurium.

Again this year, 8% of all isolates were identified as S. newport. It was the second most common serotype for the first time, and was the most common serotype isolated from cattle in cases of clinical disease and the second most common from horses with clinical disease. The majority of S. newport (66%) was of cattle origin and 18% were from horses, compared to 72% and 14% last year.

There were 32 isolates identified this year as S. pullorum (standard
strain), isolated from chickens in nine states. It was the most common serotype, along with S. heidelberg, identified from cases of clinical disease in chickens. Last year there were 18 S. pullorum (standard) and 2 S. pullorum (intermediate) identified from cases of clinical disease in chickens, none were reported the previous year, and 4 S. pullorum (standard) were reported in 2000-2001. S. pullorum (standard) was isolated from the intestinal tract of a rat trapped on a farm where S. pullorum had been identified. It was also isolated from chickens and ducks on a neighboring farm. These isolates exhibited identical pulsed-field gel electrophoresis (PFGE) patterns.

Dr. James McKean, Iowa State University and Dr. Elizabeth Wagstrom, National Pork Board, gave a report on the initiatives to minimize Salmonella in swine and pork products. Salmonella prevalence on market hog pork carcasses, as measured by FSIS performance standard testing, has declined from a baseline of 8.7% to 3.2% for 2003 samples. Large slaughter establishments had a Salmonella positive rate in market hogs at 2.5%. This low rate at plants is also reflected in retail meats.

Although the level on carcasses and at retail is low, Salmonella tops the list of pre-harvest research priorities for the National Pork Board. Among these research priorities are a risk assessment for Salmonella throughout the pork production chain, and also research into the effect of pre-harvest interventions on final product contamination.

Interest in pre-harvest Salmonella control was spurred by the establishment of the Danish Salmonella Control program in 1995. Similar programs have been adopted recently in other European Union countries. The National Pork Board will be taking a study trip to Denmark in January, 2005 to fully investigate the benefits (public health and animal health) and costs of the program. Additionally, the National Pork Board is hosting a Salmonella Colloquium among members of the entire pork chain to discuss a U.S. program.

Additional National Pork Board efforts in Salmonella control include the development of critical literature reviews of pre-harvest interventions. The Board’s Salmonella Technical Working Group is also working with two American Association of Veterinary Laboratory Diagnosticians (AAVLD) committees to develop minimum standards for Salmonella isolation and determination of prevalence within a herd.

Dr. Paula Fedorka-Cray, USDA, Agricultural Research Service (ARS), provided the Committee with an update of the USDA multi-agency-program-the National Antimicrobial Resistance Monitoring System for enteric bacteria (NARMS).

Recognizing the potential utility of antimicrobial susceptibility testing for monitoring trends in antimicrobial resistance development and because of the public health concerns associated with the use of antimicrobials in livestock, the program was proposed by the Food and
SALMONELLA

Drug Administration (FDA), Center for Veterinary Medicine (CVM). This program was developed particularly as a post-marketing activity to help ensure the continued safety and efficacy of veterinary antimicrobials, especially fluoroquinolones.

In 1996, the FDA, USDA, and Centers for Disease Control and Prevention (CDC) initiated NARMS to prospectively monitor changes in antimicrobial susceptibilities of zoonotic pathogens from human and animal diagnostic specimens, from healthy farm animals, and from raw product collected from federally inspected slaughter and processing plants. Non-typhoid Salmonella was selected as the sentinel organism. Additional organisms were added to the program, and NARMS currently monitors antimicrobial susceptibility in non-typhoid Salmonella, Escherichia coli, Campylobacter and Enterococcus in humans and animals. Salmonella typhi, and Listeria, Vibrio and Shigella isolates collected from humans are also tested and the program has also expanded to include testing of isolates from retail meat.

The animal arm of NARMS resides at the USDA-ARS laboratory in Athens, GA, the human arm resides at CDC in Atlanta, GA, and the retail arm resides at FDA Office of Regulatory Affairs (ORA) in Laurel, MD.

The goals and objectives of the monitoring program are to 1) provide descriptive data on the extent and temporal trends of antimicrobial susceptibility in Salmonella and other enteric organisms from the human and animal populations; 2) facilitate the identification of resistance in humans and animals as it arises; 3) provide timely information to veterinarians and physicians; 4) prolong the life span of approved drugs by promoting the prudent and judicious use of antimicrobials; and 5) identify areas for more detailed investigation. Program information may be accessed at www.fda.gov/cvm/index/narms/narms_pg.htm. Additional information on results from the animal isolate testing, including percent resistance by animal species for each year testing has been conducted, can be found at www.arru.saa.ars.usda.gov. Dr. Fedorka-Cray distributed a CD-ROM containing a summary of the NARMS project data for the time period 1997 to 2003.

Dr. Elizabeth A. Krushinskie, U. S. Poultry & Egg Association in Georgia, gave the Broiler Industry perspective of the Salmonella Performance Standards.

Foodborne illness caused by Salmonella contamination of raw meat and poultry is estimated by the USDA Economic Research Service to result in 1.4 million cases at a cost $3 billion annually. Because of this human disease burden, FSIS issued the Pathogen Reduction: Hazard Analysis and Critical Control Point (PR/HACCP) Systems final rule in 1996 and the Salmonella Performance Standards in 1998. These regulations required raw meat and poultry processing plants to meet specific Salmonella Performance Standard (SPS) goals for a variety of
classes of raw products, including broilers and ground chicken, in order to verify that industry PR/HACCP systems are effective in controlling disease-causing bacteria with the goal of reducing human Salmonellosis cases.

The poultry industry, in turn, has implemented a large variety of new and innovative Salmonella reduction strategies both in the plant and pre-harvest. These include implementation of HACCP programs, improved process control, use of antimicrobial sprays and rinses in processing, and optimization of pH and chlorine levels in the chiller. They also developed and implemented numerous food safety best management practices during production and innovative vaccination strategies aimed at reducing Salmonella carriage into the processing plant.

Earlier this year, FSIS issued a progress report on the Salmonella Performance Standard testing results from 1998-2003. The results reported for broilers showed that the Salmonella prevalence from all sizes of establishments for all six years of testing was consistently lower than the prevalence reported from agency baseline studies and surveys conducted before PR/HACCP implementation. The Salmonella prevalence increased slightly from 11.5% in 2002 to 12.8% in 2003, however, the 2003 overall level for broilers was still well below the baseline prevalence of 20.0%. The results of six years of testing also showed that the approximately 90% of completed “A” sets achieved the performance standard requirements for broilers from all sizes of establishments. The percent of sample sets meeting the SPS declined slightly from 88.2% in 2002 to 86.6% in 2003.

Overall, the broiler industry is achieving the level mandated by the Salmonella Performance Standard by a wide margin (12.8% vs. 20%), but the prevalence rates achieved have been essentially static for the past six years showing no trend toward reduction. Interestingly, the rate of human Salmonella typhimurium cases has declined precipitously in spite of the stasis in the broiler SPS results indicating that other factors may have been more influential in reducing the incidence of Salmonellosis through this time period. Further investigation is needed to elucidate these relationships.

Dr. John Dunn, CDC, Foodborne & Diarrheal Diseases Branch, Epidemic Intelligence Service, gave a report on Salmonella trends in Emerging Infections Program Foodborne Diseases Active Surveillance Network (FoodNet). In the United States, an estimated 76 million persons contract foodborne and other acute diarrheal illnesses each year. FoodNet collects data on diseases caused by enteric pathogens transmitted commonly through food. FoodNet quantifies and monitors the incidence of these infections by conducting active surveillance for laboratory-diagnosed illness. During 1996-2003, the FoodNet surveillance population increased from 14.2 million persons in five sites to 41.5
SALMONELLA

million in nine sites (14% of the U.S. population).

FoodNet began active surveillance for laboratory-diagnosed cases of Salmonella in 1996. In 2003, there were 6,017 laboratory-diagnosed cases of Salmonella. Among the 5,455 (91%) Salmonella isolates serotyped, five serotypes accounted for 59% of infections: 1,104 (20%) Typhimurium, 759 (14%) Enteritidis, 653 (12%) Newport, 348 (6%) Heidelberg, and 331 (6%) Javiana. As in previous years, Salmonella infections affected children disproportionately. The incidence of Salmonella infection, defined as the number of laboratory isolations per 100,000 persons, was 122.7 for infants (i.e., aged <1 year) and 50.6 young children (i.e., aged 1-4 years), compared with 10.8 for other persons (i.e., aged ≥5 years).

From 1996 to 2003, the estimated incidence of Salmonella decreased 17% (95% CI = 26% to 7% decrease). The estimated incidence of the most common Salmonella serotype, S. typhimurium, decreased 38% (95% CI = 47% to 27% decrease). The incidence of the next most common serotypes, S. enteritidis, S. newport, and S. heidelberg, showed considerable variation by year and did not change significantly. The incidence of S. javiana increased 227% (95% CI = 66% to 546% increase) from 1996 to 2003; most of this increase occurred in Georgia. Although the incidence of Salmonella infection has declined, among the five most common Salmonella serotypes, only S. typhimurium demonstrated a sustained decline in incidence.

Salmonella infections are caused by many different Salmonella serotypes with different animal reservoirs; therefore, changes in overall incidence of Salmonella are influenced strongly by the most common serotypes and their reservoirs. Year-to-year variation in incidence can in part be attributed to outbreaks. Thus far in 2004, several large Salmonella outbreaks have occurred that reinforce the public health challenges that exist regarding human Salmonellosis. Outbreaks have included produce-associated S. javiana infections, multidrug resistant hamburger-associated and direct animal contact-associated S. typhimurium DT104 infections, and S. enteritidis infections associated with consumption of raw almonds. These outbreaks highlight the need for ongoing evaluation of reservoirs, sources of contamination, transmission routes and antibiotic resistance.

Salmonella remains as an important and ongoing burden to public health. It is estimated that there are 38.6 cases of Salmonella infection for each culture-confirmed case. Targeted control measures can be implemented in the future. On-farm prevention efforts should include reduction of egg contamination with S. enteritidis and preventing contamination of produce. Control of antibiotic use in food animals must be evaluated to address the serious problem of multidrug resistant Salmonella. Lastly, surveillance and epidemiological investigation of outbreaks by public health officials are critical to determine the reser-
voirs and risk factors for prevention of Salmonella infections.

Dr. John Braddy, FDA, presented an Update on FDA’s Proposed Regulation: Prevention of Salmonella enteritidis in Shell Eggs During Production. FDA is proposing measures to prevent Salmonella enteritidis (SE) contamination of shell eggs during egg production. The motivation for this proposal is a farm-to-table risk assessment of SE in eggs, which identified implementation of on-farm prevention measures as a very important step that could reduce the occurrence of SE infections from eggs. While voluntary quality assurance (QA) programs for egg production have led to meaningful reductions in SE illnesses, these programs are not always uniformly administered or uniformly comprehensive in their prevention measures.

Moreover, the most recent data from CDC show that SE illnesses have essentially remained steady for the past several years. CDC estimated that 118,000 illnesses were caused by consumption of SE-contaminated eggs in 2001. Accordingly, FDA believes that further actions to improve egg safety—building upon the safe consumer handling labeling and egg refrigeration at retail rule of 2000—are the most effective way to achieve our public health goals of a 50% reduction in overall Salmonellosis and a 50% reduction in SE outbreaks by 2010.

The proposed rule’s SE prevention measures include:

- Provisions for procurement of chicks and pullets;
- A biosecurity program;
- A pest and rodent control program;
- Cleaning and disinfection of poultry houses that have had an environmental sample or egg test positive for SE before new laying hens are added to the house;
- Refrigerated storage of eggs at the farm;
- Producer testing of the environment for SE in poultry houses—if the environmental test is positive, FDA proposes that egg testing for SE be undertaken, and that, if an egg test is positive, the eggs be diverted from the table egg market;
- Identification of a person responsible for SE prevention at each farm;
- Recordkeeping requirements for environmental and egg sampling and testing and for egg diversion; and
- Exemptions: the proposed rule would not apply to producers who sell all of their eggs directly to consumers or producers with fewer than 3,000 laying hens. In addition, if a producer has 3,000 or more laying hens and all eggs at a farm are to be given a treatment that will achieve at least a 5-log destruction of SE or processed into egg products, then only the proposed refrigeration requirements would apply.
The regulation as proposed will have an expected annual cost of $82 million and prevent an expected 33,450 illnesses due to SE annually, at a cost of $2,450 per illness prevented. The proposed regulation will provide expected total annual benefits of $580 million resulting in $498 million in net benefits annually.

Dr. Kenneth Petersen, FSIS, gave a regulatory update on Salmonella performance standards for Dr. Barbara J. Masters, Acting Administrator, FSIS. Significant food safety advancements have been made in the past year. In 2003, FSIS issued new procedures for utilizing Salmonella performance standards as a verification tool for food safety. Under these new procedures, instead of waiting for two consecutive failures of tests to trigger an in-depth review of plant Sanitation Standard Operating Procedures (SSOP) and HACCP plans, reviews are initiated after any series of tests fails to meet a standard. Improvements to the in-depth review process have also been implemented, such as the inclusion of Enforcement, Investigative Analysis Officers and other HACCP-trained personnel, in conducting HACCP and sanitation verification reviews at those facilities displaying negative performance trends. This process and other science based initiatives, including strategies implemented to reduce E. coli O157:H7, have played a significant role in reducing the prevalence of Salmonella in raw meat and poultry regulatory samples. Out of the number of regulatory samples collected and analyzed by FSIS between January 1 and October 31, 2003, 3.6 percent tested positive for Salmonella, as compared with 4.29 percent in 2002; and 10.65 percent in 1998.

While these results are positive, eliminating foodborne illness is an evolving challenge. Through analysis and discussions with the scientific community, public health experts, and all interested parties, issues have been identified that need to be addressed to attain the next level of public health protection. A brief description of these challenges is provided below. The resulting strategies should help FSIS pursue its goals and accomplish its mission of reducing foodborne illness.

The first challenge is the need to anticipate/predict risk through enhanced data integration. One significant way in which this can be accomplished is by thoroughly analyzing data obtained from FSIS' regulatory sampling, as well as other sources of data, so as to discern trends and identify connections between persistence, prevalence and other factors, such as plant practices, seasonal variations and establishment size.

The second challenge is the need for improved application of risk into regulatory and enforcement activities. Food safety problems need to be documented as they occur, so that conditions may be analyzed and, if need be, corrected as appropriate. A better understanding of the prevalence and types of food safety failures could allow better assessment of how to best address them. Data regarding the causes of
REPORT OF THE COMMITTEE

food safety violations, either within a specific establishment or within a class of establishments, can be utilized in order to better focus attention on the greatest risks. In addition, it can provide us with a tool to determine enforcement trends by district and by circuit, which supervisors can use to determine whether enforcement actions are being consistently applied.

The third challenge is the need for improved association of program outcomes to public health surveillance data. We have seen notable advances in preventing foodborne illness, which have been attributed in part to the implementation of HACCP. However, there still is a need to determine how specific policies affect public health. Data that links foodborne illness outbreaks with specific foods needs to be connected with prevalence data of specific pathogens in specific foods. To complete the linkage with public health outcomes, a strong connection with human health surveillance data is needed. FSIS, together with our partners in public health, is working to accomplish this through FoodNet. By focusing on these initiatives FSIS will further advance food safety in the U.S. and abroad. For more information, please read *Fulfilling the Vision: Updates and Initiatives in Protecting Public Health* available on the FSIS website at www.fsis.usda.gov.

Dr. Kunho Seo, FDA, reported on the development of a real time polymerase chain reaction (PCR) assay for the rapid and specific detection of *Salmonella enteritidis* in pooled eggs, ice cream, and raw almonds associated with human *Salmonella* outbreaks.

An assay was developed for the specific detection of SE in eggs, using an application of the fluorogenic 5' nuclease assay (TaqMan). In this assay, a segment of the gene *setA* specific to *Salmonella* group D strains such as SE was used. The amplification of the target gene products was monitored in real-time by incorporating a fluorescent dye-labeled gene-specific probe in the PCR reaction. This method correctly detected and distinguished SE from nearly 50 of non-group D *Salmonella* and other non-*Salmonella* strains. Detection of *setA* gene was linear for DNA extracted from approximately $10^2$ – $10^5$ CFU/ml in PBS and $10^3$ - $10^8$CFU/ml in raw egg. In two trials, when applied to detection of SE in homogenized egg pools and compared with conventional culture methods, the newly developed PCR method yielded a 100% correlation with results obtained using a conventional culture method. However, the PCR method required only 2 days, compared to the 5 days required by the cultural method. The sensitivity of this assay was approximately less than 1 CFU per 600 g of egg pool. The real-time PCR assay proved to be a rapid, highly sensitive test for detection and quantification of low concentrations of SE in egg samples. When applied to direct detection and quantification of SE in ice cream, the real-time PCR assay was as sensitive as the conventional plate count method in frequency of detection, but populations of SE derived from
real-time quantitative PCR were one to three logs higher than provided by most probable numbers and colony-forming units obtained by conventional culture methods.

Dr. W. Douglas Waltman, Georgia Poultry Laboratory Network, presented an overview of past and future poultry Salmonella diagnostic methods for environmental testing. Prior to the late 1980’s, Salmonella monitoring in poultry involved primarily looking for S. pullorum in the birds themselves, and occasional parathyroid salmonellae that may have been involved in clinical disease. With the emergence of S. enteritidis associated with eggs, the focus of Salmonella monitoring and detection switched from the bird to the bird’s environment. With this switch came the realization that the media and methods for detection were inadequate for environmental samples. Major improvements in the isolation of Salmonella from environmental samples came in the early 1990’s. The later 1990’s saw an emphasis on the poultry carcass, and with it came a need for more rapid detection. Numerous rapid kits became available, and have been adapted to the various sample matrices, from environmental samples to carcass rinses.

The epidemiology of Salmonella and Salmonella infections has become of greater significance over these last several years. Even though there exist well over 2000 serotypes of Salmonella, still only a couple dozen make up the vast majority of serotypes found. Various typing methods have been developed to further divide and separate individual strains within a serotype, and these include biotyping, antimicrobial susceptibility, and phage typing. More recently the use of molecular techniques involving DNA fingerprinting have been used successfully.

Dr. Richard K. Gast, USDA-ARS Southeast Poultry Research Laboratory (SEPRL), Athens, Georgia, presented the results of experimental infection studies on the deposition of Salmonella heidelberg inside eggs. Since the mid 1980’s, the production of internally contaminated eggs by chickens infected with Salmonella enteritidis has been an important source of human illness on several continents. In response to this problem, substantial public and private funds have been spent on detecting and controlling S. enteritidis infections in commercial laying flocks. Although Salmonella serotypes other than S. enteritidis are also commonly found in the housing environment of egg-laying flocks, these other serotypes have rarely been found inside eggs or implicated in transmitting egg-borne disease. However, CDC has recently reported a significant association between eggs or egg-containing foods and S. heidelberg infections in humans. Using an experimental infection model that has previously been applied to document the deposition of S. enteritidis inside eggs, the present study determined if several S. heidelberg isolates could colonize reproductive tissues and thereby gain access to the interior contents of eggs laid by infected...
In each of two similar trials, three groups of 24 specific-pathogen-free laying hens were orally inoculated with doses of approximately $10^9$ colony forming units (CFU) of either an *S. enteritidis* strain (which caused egg contamination in several prior studies) or one of four *S. heidelberg* isolates that were originally obtained from egg-associated human disease outbreaks. Fecal samples were collected from all hens at weekly intervals. Internal organ samples were removed from euthanized hens at one and three weeks post-inoculation. The contents of all eggs laid during the first three weeks after inoculation were also sampled. All samples were cultured to detect *S. enteritidis* or *S. heidelberg*.

All *S. enteritidis* and *S. heidelberg* strains colonized the intestinal tracts of most inoculated hens and were shed in the feces at similar frequencies. Likewise, all five *Salmonella* strains invaded to reach the livers, spleens, ovaries, and oviducts of inoculated hens, with no significant differences observed between strains for any of these tissues. All five *Salmonella* strains were isolated from the liquid contents of eggs laid by infected hens, although the *S. heidelberg* strains were found at lower frequencies (ranging from 1.1% to 4.5%) than was the *S. enteritidis* strain (7.0% for the two trials combined).

This study demonstrates that some strains of *S. heidelberg* possess the ability to colonize the reproductive tract of chickens and can thereby be deposited inside eggs laid by these birds. However, as all four *S. heidelberg* strains used in these experiments were already associated with egg-transmitted human disease, the overall frequency at which these abilities are distributed among other strains of this serotype is not certain.

Dr. Jean Guard Bouldin, USDA-ARS-SEPRL, the Sidney Kimmel Cancer Center, San Diego, CA, and the USDA-ARS, Antimicrobial Resistance Unit, Athens, GA, presented work on the genomic differences between *Salmonella enteritidis* PT4 and PT13a.

*Salmonella enteritidis* (SE) is the leading cause of human Salmonellosis in the world and it is currently the second leading cause in the United States. Its success as a pathogen correlates with an ability to contaminate the internal contents of eggs produced by infected hens that are otherwise healthy. Historically, the emergence of new phage types within regions is sometimes associated with an increased incidence of human illness. In general, a few phage types predominate, but they can be divided into PT4 and non-PT4 lineages. PT4 is related by expression of typing phage receptors to PT 6, 5, and 7. The non-PT4 lineage includes historically endemic strains within the United States such as 13a and 8. Recent advances in nucleic acid microarray technology now make it possible to directly compare PT13a *S. enteritidis* in DNA-DNA hybridization assays to the complete genomes of
Salmonella typhimurium LT2 and Salmonella enteritidis PT4 in order to detect how phage type correlates with genomic organization. They investigated how the PT4 and non-PT4 lineages compare by DNA-DNA hybridization, the sensitivity of DNA-DNA hybridization for detection of genomic differences between and within phage type, and whether DNA-DNA hybridization was suitable for studying small scale genomic differences that result in divergence of biology in subpopulations but not phage type.

They used a Salmonella-specific microarray that represented PCR amplified sequences from the annotated open reading frames (ORFs) in S. enterica typhimurium LT2 (STM) supplemented with annotated chromosomal ORFs from Typhi CT18 strain (STY) and Enteriditis PT4 (courtesy Sanger Center, United Kingdom), that are more than 10% divergent from Typhimurium. Overall STM genome coverage for the array is 96.6% (4,338 genes), overall coverage of the STY genome is 94.5% (4,348 genes), excluding plasmids.

Strains chosen for analysis were two prominent subpopulations of Salmonella enterica serovar Enteritidis that vary in their virulence potential. They have an observable difference in ribotype pattern. Wildtype (WT SE) S. enteritidis produces HMM LPS and it is associated with high incidence egg contamination following systemic injection. The second strain of S. enteritidis produces biofilm (BF SE) and it has enhanced oral invasiveness. High incidence egg contamination has occurred consistently after contact infection of hens when these two strains are combined.

Their results from DNA-DNA hybridization showed that so far, only bacteriophage related sequence differs between the two major phage lineages of S. enteritidis PT4 and PT13a, which is in agreement with previously published assessments of the Rowe and Ward typing system used to classify S. enteritidis. The only phage type known to express receptors that bind both sets of typing phages is PT1, which is not frequently encountered. It is possible that PT1 is inherently unstable, because of conflicting compatibilities between bacteriophages. These results indicate that DNA-DNA hybridization is a powerful tool for investigating epidemiology related to phage type of food borne pathogens. However, other types of analyses will be needed for characterization of the subpopulation biology of S. enteritidis. This is an important issue, because subpopulation biology rather than phage type has been found to be more important for generation of high incidence egg contamination.

Dr. Peter Holt of the USDA-ARS-SEPRL, presented work on the effect of prior infection with a different Salmonella serotype on Salmonella enteritidis infection in birds during molt. Previous work in their laboratory showed that Salmonella enterica serotype Enteritidis (S. enteritidis) infections were generally more severe in hens undergoing...
molt via feed withdrawal and they have been examining various situations that may affect the course of the infection. Laying hens can be infected with a variety of Salmonella serotypes besides S. enteritidis during the lifetime of the flock. While the presence of a potential human pathogen is a source of concern for the producer, this same organism could have a beneficial effect as earlier studies had shown that different salmonellae will compete for the niche in the chicken gut. Four trials were conducted which examined the effect of prior infection with S. typhimurium (trial 1-3) or S. muenchen (trial 4) on a S. enteritidis infection during molt. Levels of S. enteritidis were significantly reduced in hens receiving either the S. typhimurium or the S. muenchen indicating the potential benefits of having non-S. enteritidis serovars in the flocks. To examine this aspect further, a fifth trial was conducted in which hens received an aerosol dose of the live attenuated S. typhimurium vaccine MeganVac1 on day 1 of molt and then infected with S. enteritidis on day 4. There was a numerical but not significant decrease in S. enteritidis levels in those hens receiving the Megan Vac1, indicating that the available live Salmonella vaccines show promise as an intervention strategy for reducing potential S. enteritidis problems during a molt.

Dr. Anna Catharina Berge, Veterinary Medicine Teaching and Research Center, University of California-Davis, California, presented a report on the use of antibiotic susceptibility patterns and pulse field gel electrophoresis (PFGE) to compare historic and contemporary isolates of multi-drug resistant Salmonella enterica subspecies enterica serotype Newport. Recently, multi-drug-resistant (MDR) Salmonella enterica subspecies enterica serotype Newport reemerged as a public and animal health problem. The antibiotic resistance of 198 isolates and the PFGE patterns of 139 isolates were determined. Salmonella newport isolates collected between 1988 and 2001 were included in the study. One hundred seventy-eight isolates were collected from the San Joaquin valley in California and came from dairy cattle clinical samples, human clinical samples, bulk tank milk samples, fecal samples from preweaned calves, and waterways. Twenty clinical isolates from humans from various regions of the United States were also included in the study. Resistance to 18 antibiotics was determined using a disk diffusion assay. PFGE patterns were determined using a single enzyme (XbaI). The PFGE and antibiogram patterns were described using cluster analysis.

Although the antibiotic resistance patterns of historic (1988 to 1995) and contemporary (1999 to 2001) isolates were similar, the contemporary isolates differed from the historic isolates by being resistant to cephalosporins and florfenicol and in their general sensitivity to kanamycin and neomycin. With few exceptions, the contemporary isolates clustered together and were clearly separated from the historic iso-
SALMONELLA
lates. One PFGE-antibiogram cluster combination was predominant for the recent isolates, which were taken from human samples from all parts of the United States, as well as in the isolates from California, indicating a rapid dissemination of this phenotypic strain. The data are consistent with the hypothesis that the emergence of MDR Salmonella newport is not simply an acquisition of further antibiotic resistance genes by the historic isolates but reflects a different genetic lineage.

Mr. Kevin Elfering, Minnesota Department of Agriculture (MDA), presented a case report on the use of PFGE technology to link an outbreak of Salmonella enteritidis from French Toast to a Layer Flock. In November 2003, the MDA and Minnesota Department of Health (MDH) investigated a foodborne illness outbreak related to Salmonella enterica serotype Enteritidis (S. enteritidis) and shell eggs. The investigation utilized trace-back procedures and PFGE technology in linking the outbreak to a large egg production/processing facility. A proposed but never finalized USDA-APHIS rule was used in guiding the farm investigation.

On November 13, 2003, MDH started to receive reports of Salmonella infections from school nurses in Minnesota. One reported case was a school cook while the other was a student at a different area school who happened to work at a local restaurant. The following day, the MDH Public Health Laboratory confirmed the two reported cases as having S. enteritidis. Two additional isolates of S. enteritidis were also identified that day. All four isolates were indistinguishable by PFGE. This PFGE subtype was given the Minnesota designation SE1B1, the most common subtype in Minnesota. One of the newly identified cases was also from the same Minnesota county as the first two cases. An infection control practitioner (ICP) for the area hospital reported to MDH additional suspect cases seen at the hospital. Interviews of the confirmed cases and suspect cases by MDH staff revealed that they had all patronized the same restaurant. An investigation of the restaurant was initiated on November 17 by MDH Environmental Health (EH) specialists conducted an environmental assessment of the restaurant on November 17. The restaurant closed that day and remained closed until November 20 for cleaning, disinfection, disposal of food items and the conduction of an assessment of restaurant worker illness histories. MDH-EH specialists interviewed restaurant employees about recent gastrointestinal illness. All restaurant employees were asked to submit stool specimens for Salmonella testing. Employees who reported any gastrointestinal symptoms within the previous month, or who tested positive for Salmonella on their first specimen, were excluded from work until two consecutive stool specimens obtained at least 24 hours apart tested negative for Salmonella. Information gathered during routine interviews was reviewed by an MDH epidemiologist in order to identify other potential cases associated with eating at
REPORT OF THE COMMITTEE

the restaurant. Confirmed cases were defined as persons from whom *S. enteritidis* SE1B1 was isolated and who reported eating at the restaurant prior to symptom onset, or who worked at the restaurant. Probable cases were defined as persons who had diarrhea (defined as 3 or more loose stools in a 24-hour period) and fever and ate at the restaurant during the week prior to symptom onset, or who had diarrhea and ate at the restaurant with a confirmed case. Names of patrons who had eaten at the restaurant from October 20 to November 15 were obtained from credit-card receipts.

A case-control study was conducted to identify vehicles for infection. Officials from MDA investigated the source of the eggs and conducted laboratory analysis of environmental samples and of eggs remaining at the restaurant at the time of the investigation. MDA also conducted a trace-back investigation to identify the source of eggs used by the restaurant at the time of the outbreak. One supplier, (a small egg packer) was identified and as part of the trace-back investigation, an evaluation of egg-handling practices at the egg packer was conducted. Two farms were identified as the source of the eggs and producer interviews and environmental and manure drag samples were conducted.

This was an outbreak of *S. enteritidis* SE1B1 infections associated with eating at a Minnesota restaurant. The outbreak was identified through routine surveillance activities at MDH. Documented transmission to patrons of the restaurant occurred for more than two weeks. French toast was statistically implicated as a vehicle; however, multiple foods likely acted as vehicles for patrons. Shell eggs were confirmed as the ultimate source of *S. enteritidis* through trace back and environmental testing at the farm of origin. This investigation clearly shows the importance of using pulsed field gel electrophoresis technology in conducting a foodborne disease outbreak investigations. This technology enabled the investigators to rapidly identify the source flock.

Several deficiencies in food holding and preparation, such as inadequate refrigeration and potential for cross-contamination, were identified at the restaurant. These deficiencies likely contributed to the survival, proliferation and cross-contamination that led to the outbreak. Extensive *S. enteritidis* SE1B1 contamination was found at the source egg farm. Control measures, such as extensive testing and diverting eggs to pasteurization were implemented at the farm; however, a more effective rodent control program and adequate barn cleaning and disinfection must be implemented.

In 1993 the jurisdiction for conducting farm investigations related to *S. enteritidis* was shifted from USDA- APHIS to FDA. FDA has developed a guidance document patterned after the 1993 proposed APHIS rule for FDA investigators on how to conduct a farm investigation. However, nothing has been published as statute or rule regarding the di-
version of shell eggs. Since FDA’s jurisdiction is limited to interstate commerce, it is important to have FDA codify this guidance document as many states adopt Federal rules by reference. Trace-back investigations can be important in confirming the vehicle in foodborne outbreaks. By identifying an infected flock, we were able confirm that the vehicle in this outbreak was shell eggs, and to were able to prevent further distribution of contaminated eggs. For this reason, trace-back investigations should not be reserved solely for outbreaks in which the vehicle has already been confirmed, but also should be considered as a tool to help confirm vehicles when epidemiologic methods suggest but cannot confirm a food vehicle.

Dr. Jerry Maiers, Fort Dodge Animal Health, Overland Park, KS, presented work on the Salmonella enteritidis protection of commercial layers when vaccinated with attenuated live S. typhimurium prior to and/or during molt. Induced molting is an important economic tool used in the egg industry to recycle aging laying hens for a second egg production cycle. A popular method to induce molt is to withdraw feed until a specific loss of body weight is achieved. Studies by Holt, et al have shown that inducing molt by feed withdrawal altered the immune responsiveness. Antibody responses remained largely unaffected while cell-mediated immunity was greatly compromised. Further studies have shown that the stress caused by removal of water and feed resulted in greater shedding and horizontal transmission of Salmonella enteritidis organisms when challenged. Vaccination of pullets during the growing period with either Salmonella enteritidis bacterins or live attenuated Salmonella typhimurium vaccines have been commonly used by the poultry industry to reduce the susceptibility to Salmonella infection during the lay cycle. More recent studies have evaluated the benefit of administering a live Salmonella typhimurium vaccine before molt to increase protection during the second lay cycle.

Commercial layer pullets were administered live attenuated Salmonella typhimurium vaccine (PoulvacST) twice within the first three weeks by coarse spray. All birds were then administered a Salmonella enteritidis bacterin (Poulvac® SE) by injection at 13 weeks of age.

**Study 1.** At 64 weeks of age, two weeks before feed restriction, birds were divided into two groups. Group 1 was administered Poulvac ST (ST) by coarse spray and Group 2 was left unvaccinated. The Group 2 birds not receiving the pre-molt vaccination were removed from the house while the live ST vaccine was administered to Group 1. The unvaccinated Group 2 birds were then returned to the house 48 hours post vaccination. Eggs and egg belts were sampled a few hours post vaccination and again the following day. The ST vaccine was recovered at a fairly low rate the same day of vaccination but not on the following day, suggesting the vaccine did not survive in the environment for an extended period. Both groups of birds were removed from
feed at 66 weeks of age and then transported from the commercial farm to research facilities at Fort Dodge, Iowa.

Birds were housed in isolator units at the research facility. Both groups were challenged at 67 weeks of age, or one week after feed restriction. Twenty-five birds per group were given an oral dose of $2.17 \times 10^6$ S. enteritidis (SE) phage type (PT) 13a organisms. As there were no unvaccinated layers on the trial farm, Specific Pathogen Free (SPAFAS SPF) layers were challenged and used as unvaccinated controls (Group 3). Protection was evaluated at seven days post-challenge by culturing four organ pools: the reproductive tract, internal organs, intestines, and ceca. Negative cultures indicated protection from the SE challenge. Results showed a live/killed vaccination program without a pre-molt Poulvac ST vaccination gave solid protection against a moderate level of SE PT13a challenge through the first production period, even beyond the point of feed restriction. The addition of a live ST vaccination prior to molt (Group 1) did not lower the already low incidence of SE recovery post challenge (Group 2).

**Study 2.** The second part of the study evaluated protection into the second production cycle in birds from the same farm. Five groups of birds were evaluated. Group 1 was given ST at both pre- and post-molt, Group 2 was vaccinated only at pre-molt and Group 3 was vaccinated at post-molt when hens were not laying eggs. Group 4 was not ST vaccinated at either time and Group 5 was SPAFAS SPF layers that served as unvaccinated controls at the time of challenge. Birds were then brought to the Fort Dodge research facilities and challenged during the second production cycle at 74 weeks of age. SE phage type 13a was administered orally to each bird at a dose of $3.70 \times 10^8$ (about 100-fold higher than the first study).

The results indicate the live/killed pullet program without ST boost at molt did not offer a significant level of protection against the much higher level of SE PT13a challenge used in the second study. The addition of ST vaccination pre-molt (Group 2) or both pre and post-molt (Group 1), significantly enhanced protection from SE during the second production peak. Although ST administered to hens while out of egg production (post-molt Group 3) did not offer a significant level of organ protection, recovery rates of SE from the reproductive tract, intestines and ceca were similar to Groups 1 and 2.

Kathleen Kauffman of the New York State Cattle Health Assurance Program (NYSCHAP) and the New York State Animal Health Diagnostic Laboratory, Cornell University, College of Veterinary Medicine, Ithaca, NY, reported on the NYSCHAP and associated Salmonella Disease Module’s Best Management Practices for preventing bovine Salmonellosis. The NYSCHAP is an integrated disease prevention program that utilizes a team of advisors to develop a farm-specific herd health plan. The objectives of this integrated herd health plan are to increase
SALMONELLA

the herd’s health, productivity and profitability; assure food safety, public health, and consumer confidence in dairy and beef products; and promote environmental stewardship.

An advisory team can help develop management schemes that appropriately address complex issues faced by today’s cattle producers. One of the strengths of NYSCHAP is the strong emphasis on this cooperative ‘team’ approach to develop and implement the health assurance program. Program success requires active participation from the producer, herd veterinarian, nutritionist and consultants.

The following steps are taken to design the herd health plan:
1. Define farm goals and areas of concern;
2. Assess health risks to the farm;
3. Develop the herd plan;
4. Review the herd plan with all farm personnel to ensure proper implementation; and
5. Producer and herd veterinarian review the herd plan quarterly and annual with the entire NYSCHAP team.

All farms must participate in the core module, which focuses on overall biosecurity and herd health issues regardless of specific disease or area on the farm. Additionally, producers can participate in specific disease modules, one of these being Salmonellosis. The Salmonellosis module has a specific risk assessment to examine the risks of introduction of disease and spread within the farm. For farms already experiencing outbreaks there is a more detailed risk assessment. Educational materials are available for this module on the NYSCHAP web site, www.nyschap.vet.cornell.edu.

Dr. Ed Mallison, University of Maryland at College Park, MD, spoke on the topic of airflow at the litter/manure surface: a key HACCP consideration. A close relationship has been repeatedly seen between Salmonella-positive litter surfaces on broiler farms and Salmonella-positive carcasses at processing while Salmonella-negative carcasses have been related to Salmonella-negative litter surfaces. Follow-up studies seeking to understand why some litter surfaces were positive and others spontaneously negative have revealed that stagnant to low airflow velocities at the litter/manure surface were associated with an increased risk for Salmonella contamination (high prevalence rates and high Salmonella counts) while higher velocities over such surfaces were associated with a reduced risk for Salmonella contamination (zero to very low prevalence rates and, when present, low Salmonella counts). These observations support their contention that proper airflow at the litter/manure surface, or other areas of accumulating fecal wastes, is a promising on-farm, pre-harvest critical Salmonella control point (JAVMA, 2001, Vol. 218, No. 12, pgs. 1919-1922).

Airflow and the reduction of Salmonella risks were related to a commonly used technique for suppressing bacteria, the control of free,
REPORT OF THE COMMITTEE

gaseous molecular water or water activity/availability (AW). Bacterial populations dramatically increase when levels of free water molecules, in or near a substance, are high. Conversely, bacterial populations collapse when these levels are reduced. Depriving bacteria from water molecules essential to their survival and multiplication (Aw control) is routinely used, for example, in quality assurance in paper manufacture, by the pharmaceutical industry, and in food preservation and packaging. In food science, water-binding salts and sugars, drying and water-blocking metallic foils are employed to make molecular water, essential to a bacterium’s metabolism, unavailable.

Recent field studies have confirmed earlier investigations indicating that proper airflow over litter/manure surfaces is another practical way to reduce the availability of molecular water to bacteria. We have found that where ambient relative humidity was 70 to 80%, a modest drying airflow of 2 or more mph, three inches over the litter/manure surface, reduced both Salmonella isolations and counts. We also found that, in instances where ambient relative humidity was 90 to 100%, an airflow of 4 or more mph produced the same desirable effect.

Their results suggest that ventilation systems should be designed and operated to ensure that all litter/manure surfaces in a production facility receive proper minimal levels of airflow. Since Salmonella can be introduced into the food animal environment from previous flocks or herds, vermin, feed, hatcheries and parent stock, the provision of proper airflow appears to be a promising way to neutralize such introductions whenever or wherever they may occur. Collaborative research with agricultural engineers merits high priority to further explore the various parameters of this opportunity.

The Committee had an extensive discussion about the newly proposed FDA Salmonella enteritidis program. The following comments were recorded during the committee discussion:

Members stated that laboratory capacity varies by region and analytical standards to make labs eligible for participation have not been specified in the proposed rule. The possible role of state and federal laboratories (NVSL) and private laboratories remains unknown. The issues of laboratory standards and costs is uncertain.

A question was raised about the overall strategy, scope of the plan in relation to other federal salmonella programs. Dr. Braddy encouraged all parties to submit comments voicing questions and concerns to the public docket.

Committee members stated that states should conduct inspections and maintain ongoing relationships with egg producers. In addition, members felt that what FDA will accept as a “biosecurity” program may not be comprehensive enough in relation to existing quality assurance programs for example, pertaining to rodent control. In addition, training of farm personnel and related costs were of concern. Dr. Braddy
SALMONELLA

stated that training would be similar to that of the seafood HACCP alliance program including regional satellite programs, classes and courses.

Members voiced concern that producers and states will bear the major costs of the proposed rule since this is an unfunded mandate. Dr. Braddy stated that he was not able to respond to economic components of the plan. He stated that the average cost of the proposed rule is $20,000.00 per farm based on the 4,100 farms impacted by the proposed rule. Members stated that States do not charge producers to maintain existing voluntary egg quality assurance programs.

One member asked whether the requirement to test birds between 40-45 weeks of age was science-based and derived from a peer-reviewed study. Dr. Braddy stated that he was unfamiliar with the source of that data but that he would be willing to follow up on the question. In addition concern was voiced related to finding places to divert eggs to when a positive egg sample is detected. Some mentioned that current pasteurization capacity is limited. Others voiced concern wondering if customers would accept SE positive eggs for pasteurization and whether demerits would make marketing a financial burden to small producers. There does not seem to be enough surge capacity in the system to accommodate the proposed rule. One member asked whether indemnification is available if the flock must be destroyed in cases where egg diversion is not economically feasible or possible. Dr. Braddy encouraged members to submit such questions to the public docket.

Members noted that requirements on public health side to train food handlers has not kept pace with the important changes about to occur at farm level and that adoption and implementation of the FDA's model food code is consistent among States.

At the conclusion of the discussion, the Chair appointed a subcommittee to prepare written comments to FDA's public docket regarding the proposed rule affecting Salmonella enteritidis in shell eggs.

In addition, because the Committee has a vested interest in monitoring Salmonella Performance Standards, the Chair appointed a smaller subcommittee to deal with this issue over the coming calendar year.

Two resolutions were approved by the Committee and forwarded to the Committee on Nominations and Resolutions for approval by the general membership. The resolutions addressed:

1. Continuation of funding for the continuation of the molecular characterization of Salmonella field isolates for the NPIP program by NVSL.
2. Using a rigorous science-based approach to further developing Salmonella performance standards, for making these standards informal and non-regulatory, and that a secure data repository be developed to promote further analysis.
REPORT OF THE COMMITTEE ON SCRAPIE

Chair: Dr. Jim Logan, Cheyenne, WY
Vice Chair: Dr. Joe D. Ross, Sonora, TX

Dr. John R. Clifford, DC; Dr. Thomas F. Conner, OH; Dr. Wayne E. Cunningham, CO; Dr. Jerry W. Diemer, CO; Dr. Lisa A. Ferguson, MD; Dr. R. David Glauer, OH; Dr. Allen M. Knowles, TN; Dr. Donald P. Knowles, Jr., WA; Dr. Thomas F. Linfield, MT; Dr. Michael R. Marshall, UT; Ms. Sarah J. Mize, CA; Dr. Charles Palmer, CA; Dr. Kristine R. Pettrini, MN; Mr. Stan Potratz, IA; Mr. Paul E. Rodgers, CO; Dr. Joan D. Rowe, CA; Dr. Carsten Schroeder, ME; Dr. Pamela L. Smith, IA; Dr. Diane L. Sutton, MD; Dr. Lynn Anne Tesar, SD; Dr. Delwin D. Wilmot, NE; Dr. Nora E. Wineland, CO; Dr. Cindy B. Wolf, MN.

The Committee met on October 27, 2004, from 8:00 am-12:00 pm. The meeting was called to order by Chair Dr. Jim Logan. He was assisted by Vice Chair Dr. Joe D. Ross. There were 69 people in attendance. The Chair welcomed Committee members and others in attendance and all were given an opportunity to introduce themselves. This was the first meeting of this Committee. It was appointed after the 2003 Annual Meeting at the urging of several members of the Board of Directors. Because this is a new Committee, the first item of business was consideration of a mission statement. The Committee approved the following as the Committee mission statement:

“The Committee on Scrapie’s mission is to provide a forum to address federal, state, and industry regulatory issues including: periodic review of the Scrapie Uniform Methods and Rules (UM&R), new research, diagnostic techniques, surveillance, international and trade issues, and other matters as they arise to enhance scrapie eradication efforts in the U.S.”

Dr. Diane Sutton, United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), National Scrapie Program Coordinator reported on the National Scrapie Program. The report focused on utilization of a genetic based approach to flock clean up plans, cleaning up infected and source flocks, tracing and testing exposed animals and flocks, analysis and publication of the results of the Scrapie Ovine Slaughter Surveillance study (SOSS), implementation of regulatory slaughter surveillance (RSSS), producer education, and finalizing the Scrapie Eradication UM&R for FY2004. As of September 30, 2004, the Scrapie Flock Certification Program (SFCP) had 1868 participating flocks including 135 certified flocks, 1726 complete monitored flocks, and seven selective monitored flocks. There were seventy infected and source...
SCRAPIE

flocks identified as of September 30, 2004. In FY2004 a total of 103 new infected and source flocks reported with seventy-seven of those released in FY2004. As of September 30, 2004, 368 scrapie cases had been confirmed and reported by the National Veterinary Services Laboratories (NVSL), of which fifty-four were RSSS cases. One new goat case was reported. Approximately 3,058 animals were indemnified. Dr. Sutton also reported on the Scrapie ovine slaughter surveillance study and the Regulatory Slaughter Surveillance program. Scrapie testing was done on 25,006 animals in FY2004. As of September 30, 2004, 90,322 sheep and goat premises have been assigned identification (ID) numbers in the Scrapie National Generic Database. Official eartags have been issued to 64,040 of the premises.

Dr. Gary Ross, USDA-APHIS-VS gave an update on the scrapie database. The following items were discussed: Scrapie Flock Certification Program (SFCP); National Scrapie Eradication; Animal ID; Animal Genotyping Information; Data Entry Upgrades – a two year contract was made with General Services Administration (GSA) to make the database more user friendly for personnel in the field, labs and area offices; Implementation Plan; Field Data Entry; and that the scrapie national generic database and the national animal identification system will be able to share information.

Drs. Fran Ross and Patricia Meinhardt, USDA-APHIS-VS National Veterinary Services Laboratories (NVSL), gave a presentation entitled, “Resolving Genotyping Discrepancies – When two laboratories disagree.” USDA-APHIS-VS policy requires genotyping on all exposed sexually intact QRS and RR's that are not being depopulated conducted twice (in different labs) before release. QQs are only tested once unless owner requests second test. There are instances when the results from the two contract laboratories do not agree for an animal, or, multiple animals from a flock. In order to resolve these discrepancies and to assure such discrepancies do not occur in the future, a formal process has been established. Working in conjunction with all involved parties, the NVSL Genotyping Unit is now serving as the coordinator in resolving these discrepancies. Since June 2004, over 15 such discrepancies have been resolved. As a result of these investigations, several improvements have been implemented in the contract laboratories which should do away with future problems.

Drs. Frank Ross and Patricia Meinhardt, USDA-APHIS-VS-NVSL, reported on Genotyping Formalin-Fixed Tissue for the RSSS. Genotyping on samples collected in conjunction with the RSSS program is now being conducted on formalin-fixed tissues. The NVSL has validated the technique developed by the USDA Agricultural Research Service (ARS) for this effort. If formalin-fixed tissues are used, it is necessary to keep in mind that formalin degrades DNA. Therefore, those tissues should be places into paraffin blocks within 10-14 days.
Dr. Nora Wineland, USDA-APHIS-VS Centers for Epidemiology and Animal Health gave an update on the 3rd Eyelid Test Validation Study and the RSSS. APHIS and ARS have been working together to complete stage 3 validation per World Organisation for Animal Health (OIE) standards. Eight hundred sixty (860) animals have been successfully sampled ante-mortem from either field samples or a group of quarantined animals in research facilities. Based on the data gathered so far, the test has a sensitivity of 64-68% and a specificity of 97-99%.

The RSSS Program has shifted to targeting higher risk groups. This consists of mature black face or mottle faced sheep or white-faced sheep and goats showing clinical signs of scrapie. To date, 28,945 samples have been tested and 0.32%, or approximately 1 per 300, has been positive. One of the problems preventing even higher levels of surveillance is lack of identification on some of the animals.

The Committee considered several proposed changes to the Scrapie UM&R and reached agreement to accept some minor changes and have Dr. Sutton incorporate them into the UM&R. Those changes approved by the Committee were:

- The commingling definition was clarified to allow the designated scrapie epidemiologist to determine whether shared fence lines had resulted in commingling.
- Exposed flocks were split into two categories. Those that are being investigated will now be called “flocks under investigation” and only those that are determined to have some ongoing risk will be designated as “exposed flocks”. This change is then reflected throughout the UM&R.
- Definition of genetically susceptible animal was changed to include AVQR ewes epidemiologically associated with 136 VV or AV positive animals. There by including more AVQR ewes in the high risk category.
- Limited contact definition was clarified and changed to include any contact with a male animal.
- Low risk goat definition was changed to include goats commingled with sheep from low risk commercial flocks.
- Removed requirement for owner statement on CVI.
- Added requirement that animals required for test be restricted pending completion of testing.
- Numerous changes were also made for clarity.

Three (3) resolutions were considered and two (2) were approved and forwarded to the Committee on Nominations and Resolutions for approval by the general membership. The two resolutions approved addressed:
SCRAPIE

1. Having USDA-APHIS-VS conduct a thorough review of the Scrapie Flock Certification Program in order to determine how to harmonize it with current OIE standards.

2. Urging State Animal Health Officials to submit their Consistent State status pre-review checklist immediately and to take appropriate measures to be in full compliance; and to work with USDA-APHIS-VS to enforce compliance with interstate movement and Consistent State regulations.
REPORT OF THE COMMITTEE ON SHEEP AND GOATS

Chair: Dr. Cindy B. Wolf, St. Paul, MN
Vice Chair: Dr. Donald P. Knowles, Jr., Pullman, WA

Dr. Gary A. Anderson, KS; Dr. Derek J. Belton, NZ; Dr. Deborah Brennan, MS; Dr. John R. Clifford, DC; Dr. Max E. Coats, Jr., TX; Dr. Thomas F. Conner, OH; Dr. Wayne E. Cunningham, CO; Dr. Linda A. Detwiler, NJ; Dr. Nancy E. East, CA; Dr. Najam Q. Faizi, VA; Dr. Lisa A. Ferguson, MD; Dr. James E. Fox, GA; Dr. Anthony M. Gallina, FL; Dr. Chester A. Gipson, MD; Dr. R. David Glauer, OH; Dr. David W. Hertha, AL; Dr. John P. Honstead, CO; Mr. Joe N. Huff, CO; Dr. Cleon V. Kimberling, CO; Dr. Howard D. Lehmkuhl, IA; Dr. Mary Jane Lis, CT; Dr. Jim Logan, WY; Dr. Linda L. Logan, TX; Mr. Gordon Magness, SD; Dr. David T. Marshall, NC; Dr. Michael R. Marshall, UT; Dr. Charles Palmer, CA; Mr. Paul E. Rodgers, CO; Dr. Joan D. Rowe, CA; Dr. Mo D. Salmon, CO; Dr. John A. Schmitz, NE; Dr. William P. Shulaw, OH; Dr. Susan M. Stehman, NY; Dr. Diane L. Sutton, MD; Dr. David Thain, NV; Dr. Peter H. Timm, CA; Dr. George O. Winegar, MI; Dr. Nora E. Wineland, CO; Mr. David Winters, TX; Dr. Andres de la Concha, TX.

The Committee met on October 24, 2004, from 12:30 pm-5:00 pm. Chair Dr. Cindy Wolf presided. The Chair welcomed Committee members and guests to the meeting and provided all in attendance an opportunity to introduce themselves.

Dr. Hong Li, United States Department of Agriculture (USDA), Agriculture Research Service (ARS), Animal Disease Research Unit, reported on epidemiology of sheep-associated malignant catarrhal fever (MCF) virus in domestic sheep. Dr. Li reported that they had gleaned some of the information regarding transmission between sheep and bison from their investigation of several serious outbreaks of MCF in bison during the past 3 years. Detailed examination of these incidents have permitted them to draw insights into several important epidemiological factors, such as relationships between distances, numbers and ages of sheep, and the probability of transmission of MCF virus to bison.

Ovine herpesvirus-2 (OvHV-2), the major causative agent of MCF in ruminant species worldwide, has never been propagated in vitro. Using reverse transcriptase polymerase chain reaction (PCR), a striking, short-lived, peak of viral DNA, ranging from $10^5$ to over $10^8$ copies/2 mg DNA, was detected in nasal secretions from over 60.7% of adolescent sheep ($n = 56$) at some point during the period from 6 to 9 months of age. In contrast only about 18% of adult sheep ($n = 33$) experienced a shedding episode during the study period. There was
no seasonal pattern of shedding. The general pattern of the appearance of viral DNA in nasal secretions was a dramatic rise and subsequent fall within 24 to 36 hrs, implying a single cycle of viral replication. These episodes occurred sporadically and infrequently, but over the 3-month period, most of the 56 lambs (33, or 60.7%) experienced at least one episode. No corresponding fluctuations in DNA levels were found in either peripheral blood leukocytes or plasma. Using a DNase protection assay, complete, enveloped OvHV-2 virions were demonstrated in the nasal secretions of all sheep examined during the time when they were experiencing an intense shedding episode. OvHV-2 infectivity in nasal secretions was also demonstrated by aerosolization of the secretions into OvHV-2 negative sheep. The data herein show that nasal shedding is the major mode of OvHV-2 transmission among domestic sheep, and that adolescents represent the highest risk group for transmission.

Dr. Suelee Robbe-Austerman, USDA-ARS National Animal Disease Center (NADC), Ames, Iowa, gave an overview of small ruminant Johnes disease research. Details of a Johnes disease flock-status program in Australia were discussed relative to one being considered in the United States. Robbe-Austerman discussed the applications of antibody and cell-mediated immune response-based tests. Liquid media culture systems are recommended to optimize organism growth.

Dr. Janet Alverson, USDA-ARS made a presentation entitled, “Prion Accumulation in the Sheep Placenta and Goat Scrapie Genotyping Project.” The presentation was an update on the USDA-ARS project in Hettinger, ND. Genetically AAQR ewes that are progeny of scrapie-infected ewes are being bred to AAQQ rams and the placentas from these ewes are thoroughly examined for the scrapie agent. The AAQQ lambs are being held in quarantine for observation of any clinical signs of scrapie. This project is examining if AAQR females born from infected ewes are carriers of scrapie.

The goat PrP genotyping project is outlined with an appeal for more blood sample submissions for inclusion in the study, especially from the following breeds: Alpine, LaMancha, Nigerian Dwarf, Nubian, Oberhasli, Pygmy, Saanen, Spanish, Toggenburg, and TN fainting. An oral transmission study has been started in goats.

Drs. Jay Parsons and Cleon Kimberling discussed the Colorado Sheep and Goat Identification Pilot Project (CSGIPP) and Performance of Electronic ID in Sheep. The goal of the CSGIPP is to develop an economically feasible model for identifying sheep with unique radio frequency identification (RFID) capable of tracking animals from birth through all phases of production. The project is divided into four phases: a discovery phase, an implant and tag phase, a tracking phase, and an evaluation phase. They are currently in the tracking phase of the project. The purpose of their talk was to share their discoveries so far.
and to stimulate conversations about future directions.

The discovery phase of the Project was commenced in January 2004. During this phase they carried out an evaluation of using an under the skin implant in the caudal fold of the tail of sheep. RFID devices were placed on 150 head of feedlot sheep forty-five days prior to slaughter and they were tracked through to slaughter. The sheep were split into five treatment groups involving under the skin implants placed at the base of the ear, under the skin implants placed in the caudal fold of the tail, or RFID button ear tags. At the slaughter plant, they were able to read 148 of the 150 RFID devices and to physically retrieve all of the tail implants except one that had fallen out during the final seven days.

In April of 2004, the implant and tag phase of the project was started. Working with three cooperating producers, RFID devices were placed on 900 lambs at spring processing time. Half of those lambs received an RFID implant in the caudal fold of the tail and half received an RFID button ear tag. Three different manufacturers were used for both the implants and the ear tags. All of the animals also received approved scrapie tags. These animals had been grazing the rangelands of northern Colorado and southern Wyoming for the past six months. Recently, they had the opportunity to scan the animals of one of their cooperating producers and found the overall retention rates to be around 97% with ear tags slightly outperforming the implants. They will be scanning the rest of the animals in the next few weeks and tracking all of them through until the last of them are slaughtered in March of 2005.

Their project has also involved looking into the various works being done using RFID in sheep. Their travels have taken them as far away as Australia and they have learned many interesting things regarding sheep RFID applications. In light of what has been learned, they managed to expand the study considerably to look at a possible RFID application for on-farm disease management. They now have RFID ear tags on almost 3,000 head of ewes owned by one of the cooperating producers. That producer is utilizing the RFID devices to streamline a testing and sorting regime designed to eliminate ovine progressive pneumonia in the ranch flock.

Mr. Paul Rodgers, American Sheep Institute, discussed sheep industry concerns. Tissues available from the regulatory scrapie slaughter surveillance program may provide other disease surveillance possibilities for the sheep industry. Concerns regarding sample bias were discussed.

Dr. Howard Lehmkuhl, USDA-ARS-NADC discussed adenovirus infection in sheep and goats. Respiratory and enteric diseases are a cause of economic loss in the sheep and goat industries. Viral agents are well recognized as primary pathogens and even uncomplicated infections can cause substantial economic loss. A portion of their prob-
SHEEP AND GOATS

lem is attributable to adenoviruses, which have not been extensively evaluated. Currently, there are eight known types of ovine (OAdV 2 through OAdV 8) and 1 serotype of bovine adenovirus (BAdV 2) isolated and characterized from sheep. Two caprine adenoviruses serotypes have been isolated and characterized in goats (GAdV1 and 2) as well as OAdV 2 and 5. Our results from virus isolation and characterization, serologic, and pathogenesis studies indicate OAdV 5, 7 and 8 are important contributors to clinical disease in lambs in the United States. Less is known about adenovirus infection in kids, but GAdV 1 and 2 appear to be important contributors to clinical disease.

Dr. Lynn M. Herrmann, USDA-ARS and Washington State University, Pullman, WA, made a presentation entitled, “Predicting Ovine Progressive Pneumonia Virus Loads Using MHC Class II DRB1 Immunogenetics.” Screening and culling of ovine progressive pneumonia virus (OPPV) seropositive sheep is not an economical feasible option for the sheep industry. Therefore, an accurate prediction tool for determining which OPPV-infected sheep will actually progress toward clinical disease is highly sought. They are exploring if specific expressed MHC Class II DRB1 alleles or DRB1 allomorphs can be used as an accurate prediction tool of high OPPV loads. To determine this, a preliminary study using ten OPPV-infected sheep was conducted. The OPPV-infected sheep were evaluated for their OPPV loads using real time PCR and their MHC Class II DRB1 allomorphs were determined. Preliminary results indicated one MHC II DRB1 allomorph (H) associates with high OPPV loads. Larger studies using 300 sheep are being conducted to determine if specific DRB1 allomorphs can predict OPPV loads.

Dr. Jim Logan discussed, “Brucella ovis ELISA Testing - What Are the Concerns?” According to reports from technicians at several laboratories that are conducting Brucella ovis Enzyme-Linked Immunosorbent Assay (ELISA) testing, there are problems with both control sera and antigens produced/provided by USDA-APHIS-VS National Veterinary Services Laboratories (NVSL). There have been many false-positive tests results as a result of inconsistent quality in the control sera and antigens. NVSL has not contacted all affected labs, even though they have been made aware of this quality control issue. The outcome has been a loss of confidence in the test as control programs are threatened and the potential disease spread across state lines.

The committee discussed three possibilities regarding the reagent quality control issues. They were: NVSL must improve the quality of the B.ovis reagents that they provide; NVSL should contract with another laboratory to produce and provide such reagents; or reagents should be purchased from Australia where they are commercially available.

It was also brought up that there wasn’t a standard testing method
across all labs in part due to inconsistent quality of reagents. The committee expressed the desire to have NVSL uniformly communicate with all affected labs (California, Utah, Wyoming, South Dakota, North Dakota, Colorado) regarding this test.

The Committee approved a recommendation regarding Johnes Disease in small ruminants. The Committee recommended that USDA-ARS and other institutions conducting Johne’s disease research on small ruminants provide annual updates to the Committee.

One resolution was approved and forwarded to the Committee on Nominations and Resolutions. The resolution requested NVSL to provide a standardized *Brucella ovis* ELISA test and to provide testing for this process.
REPORT OF THE COMMITTEE ON TRANSMISSIBLE DISEASES OF POULTRY AND OTHER AVIAN SPECIES

Chair: Dr. John A. Smith, Baldwin, GA
Vice Chair: Dr. Willie M. Reed, Okemos, MI

Dr. Bruce L. Akey, NY; Dr. John K. Atwell, NC; Dr. Charles W. Beard, GA; Dr. Richard E. Breitmeyer, CA; Dr. Deborah L. Brennan, MS; Mr. Paul Brennan, IN; Dr. Max Brugh, GA; Dr. Karen E. Burns, GA; Dr. Donald W. Butts, VA; Dr. David M. Castellan, CA; Dr. Hector M. Cervantes, GA; Dr. Bruce R. Charlton, CA; Dr. Travis A. Cigainero, TX; Dr. Thomas F. Cline, SD; Dr. Max E. Coats, Jr., TX; Dr. Vergil S. Davis, DE; Dr. Sherrill Davison -Yeakel, PA; Dr. Richard L. Dutton, NE; Dr. Robert J. Eckroade, PA; Dr. Aly M. Fadly, MI; Dr. Oscar J. Fletcher, NC; Ms. Rose Foster, MO; Dr. G. Yan Ghazikhanian, CA; Dr. Hashim M. Ghor, AR; Dr. Eric N. Gingerich, PA; Dr. Eric C. Gonder, NC; Mr. Robert R. Green, DC; Mr. James C. Grimm, TX; Dr. Christopher M. Groocock, NY; Dr. Nancy E. Halpern, NJ; Dr. Carl J. Heeder, MN; Dr. Rudolf G. Hein, DE; Dr. David R. Hermes, IN; Dr. William W. Hewat, NC; Dr. Frederick H. Hoerr, AL; Dr. G. Thomas Holder, MD; Dr. Keith A. Honegger, IN; Dr. John P. Huntley, NY; Dr. Eric L. Jensen, AL; Dr. Hailu Kinde, CA; Dr. Daniel J. King, GA; Dr. Stanley H.. Kleven, GA; Mr. Ken Klippen, DC; Dr. Spangler Klopp, DE; Dr. Glenn E. Kolb, WI; Dr. Michael D. Kopp, IA; Dr. Kenton S. Kreager, IA; Dr. Elizabeth A. Krushinskie, GA; Dr. Hiram N. Lasher, DE; Dr. Dale C. Lauer, MN; Dr. David J. Ligda, IN; Dr. Mary Jane Lis, CT; Dr. Martha A. Littlefield, LA; Dr. Carol U. Meteyer, WI; Mr. Thomas R. Mickle, GA; Dr. David J. Mills, WI; Mr. Donald S. Munro, PA; Dr. Lee M. Myers, GA; Dr. Thomas J. Myers, DC; Dr. Kakambi V. Nagaraja, MN; Mr. Steven H. Olson, MN; Dr. Robert L. Owen, NC; Dr. James E. Pearson, IA; Dr. Kelly R. Preston, MD; Dr. Marshall Putnam, GA; Dr. Jo Anna Quinn, NC; Mr. Andrew R. Rhorer, GA; Dr. G. Donald Ritter, DE; Dr. Charles Roney, GA; Dr. A. Gregorio Rosales, AL; Dr. Y. M. Saf, OH; Dr. John P. Sanders, Jr., WV; Mr. James L. Scroggs, GA; Dr. Rick Sharpton, NC; Dr. H. L. Shivaprasad, CA; Dr. Lynne M. Siegfried, MD; Dr. Richard D. Slemons, OH; Dr. Erica Spackman, GA; Dr. Joe Starcher, WV; Dr. Bruce N. Stewart-Brown, MD; Dr. David L. Suarez, GA; Dr. David E. Swayne, GA; Dr. H. Leon Thacker, IN; Dr. H. Wesley Towers, DE; Dr. Deoki N. Tripathy, IL; Dr. Susan C. Trock, NY; Dr. W. Douglas Waltman, GA; Dr. Gary L. Waters, MT; Dr. James A. Watson, MS; Dr. David H. Willoughby, CA; Dr. Peter R. Woolcock, CA; Dr. Ching-Ching Wu, IN; Dr. Ernest W. Zirkle, NJ.

The Committee met on October 25 and 26, 2004 from 12:30 pm-5:30 pm each day. Sixty-one members and 71 visitors attended. Chair
REPORT OF THE COMMITTEE

John Smith presided. The Chair welcomed the Committee, summarized the 2003 meeting, and reported on the responses to the Committee's 2003 Resolutions and Recommendations.

Resolution 13 (2003) requested the formation of a United States Animal Health Association (USAHA) Exotic Newcastle Disease Task Force (ENDTF) to work with the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), Emergency Programs staff to further develop the National Exotic Newcastle Disease (END) Surveillance Program. Dr. Lee Myers, Georgia State Veterinarian and Chair of the END-TF, gave a report on the activities of the Task Force later in the meeting.

Resolution 14 (2003) concerned support for research and diagnostic capabilities for foreign animal diseases of poultry and received a favorable response from the USDA-APHIS-VS and USDA, Agricultural Research Service (ARS).

The following recommendations from the 2003 Committee meeting were discussed:

1. The critical need for USDA-ARS to continue support of avian retrovirus programs at the Avian Disease and Oncology Laboratory (ADOL) in East Lansing, Michigan pending and subsequent to any relocation of the program. Congress voted to restore funding in fiscal year 2003, plans to relocate the programs were cancelled and ARS indicated that the programs at ADOL would continue to be supported with available funds.

2. That USDA-APHIS-VS Center for Veterinary Biologics (CVB) should replace the complement fixation test for avian leucosis with more sensitive and specific tests such as enzyme linked immunosorbent assay (ELISA). That recommendation also received a favorable response from CVB and Dr. Donna M. Gatewood of USDA-APHIS-VS-CVB presented an update later in this meeting.

3. That USDA should use a definition of commercial and non-commercial poultry prepared by the Committee and employ that definition, and communicate the distinction between those classes of poultry and the justification for the distinction to disease reporting agencies and international trading partners. No formal response was received.

4. That USDA-APHIS-VS should continue progress on the live bird market (LBM) low pathogenic Avian Influenza (LPAI) program and the National Poultry Improvement Program (NPIP) LPAI program. Several reports during this meeting indicated the substantial progress being made in these areas.

5. That the USDA-APHIS-VS Center for Epidemiology and Animal Health (CEAH) National Animal Health Monitoring System (NAHMS) Poultry 2004 Study should be directed to the
biosecurity and health practices of non-commercial poultry. That recommendation was accepted by USDA and Dr. Lindsey Garber of USDA-APHIS-VS-CEAH delivered an update on this project later in the meeting.

Two ad hoc Subcommittees were appointed at the 2003 Committee meeting. The Subcommittee chairs gave reports of the activities of those Subcommittees since the 2003 meeting.

Dr. Ernest W. Zirkle, former New Jersey State Veterinarian and Chair of the ad hoc Subcommittee on Prevention and Control of Avian Influenza (AI) in the Live Bird Marketing System (LBMS) reported on his Subcommittee activities. The LBMS is comprised of storefront markets, which sell individual birds to customers who then ask the storeowner to kill and dress the birds. The birds always leave the market processed. This process does not fall under the USDA, Food Safety and Inspection Service (FSIS) Meat and Poultry Inspection law because the customer owns the birds before the birds are killed and hence the operation is defined as custom kill. There are approximately 85 of these markets in New York City, 32 in New Jersey, 10 between New York City and Boston and 3 in Philadelphia. This system handles 25 million birds annually. Approximately 70% are grown in Pennsylvania, 15% in Canada and the rest from surrounding states in the Northeast.

Most of the birds supplied to these markets follow a network of entities similar to the “commercial” poultry industry. These include the hatcheries, farmers or growers, contractors, haulers, wholesalers and finally the LBM. A majority of production goes through this system of entities and the wholesaler ends up being the firewall separating the production side from the end market side. In the ideal situation all equipment–trucks, crates etc—are cleaned and disinfected at the wholesaler location before going back to the farms. Approximately 85% of the poultry go through these channels and the states require that all birds come from AI monitored flocks. In spite of this the percentage of markets testing positive for LPAI over the years has ranged from 15% to 80%.

There is a percentage of poultry suppliers who do not abide by these guidelines and requirements. They deliver directly to the markets and return to the farms, auction markets or assembly points. Biosecurity here is non-existent. The Ad Hoc Subcommittee was charged with helping establish a set of guidelines to close this gap. The only way is to establish a Memorandum of Understanding (MOU) that all suppliers are required to honor no matter how big or small.

To assist with enforcement there needs to be a system of identification of the individual birds within the markets to determine that the birds meet the test requirements as well as indicate the farm of origin, for trace back capabilities.
REPORT OF THE COMMITTEE

At the 2003 Annual Meeting in San Diego, the Committee on Transmissible Diseases of Poultry and Other Avian Species (the Committee) recommended that “APHIS continue with development of the current program to address the present and dangerous situation in the northeastern system. The Committee will appoint a subcommittee to serve as a resource and sounding board for the Live Bird Market working group in further development of the Uniform Methods and Rules (UM&R). This subcommittee will include members both within and outside of the northeastern live bird marketing area.” The subcommittee was appointed by Chair John Smith and began to function immediately after the New Year Holiday. Members of the subcommittee included State Veterinarians from the three most involved states, market growers, wholesalers, haulers, producers, a hatchery owner, USDA and other states (FL, TX & CA). A draft document was completed in four months and sent to the Chair of the Committee for further action.

The draft document was reviewed by the Committee, modified slightly for clarification and then approved and sent to the USAHA Executive Committee for review. The Board of Directors approved the document via an email vote and forwarded it to USDA, May 11, 2004.

The UM&R standards have been designed to prevent contact between the poultry growing industry and the LBM. While we cannot prevent producers from selling directly to a LBM (which is restriction of trade), we can, and must, decree that all poultry entering and equipment leaving the LBMS go through similar sanitary and biosecurity requirements as outlined in the UM&R.

The Subcommittee concluded that: if our guidelines are imposed in such a way as to elevate all segments of the LBMS to the level of biosecurity practiced by the “commercial” poultry industry we will have accomplished our goal. All producers, contractors, haulers, wholesalers/dealers must reach the same standard of biosecurity. This is not restriction of trade, but rather maintains a marketing system that has emphasis on the health of poultry as well as minimizing potential risk to human health.

Update on Individual Bird Identification:

The LBM Subcommittee made the following statement regarding individual bird ID: The LBM Subcommittee commends USDA for moving forward and funding a study to determine if individual bird identification is feasible in the LBMS. The review and then testing of two techniques (Fastack and Glue Tag) confirms that there are two tagging systems available, which potentially could be applied to the entire system. We urge USDA to continue with this research and determine through pilot studies the recommendations for the application of these tags with the goal of having a system ready to put into place within 2 years. This system must have readily readable tags in the LBM and a
TRANSMISSIBLE DISEASES OF POULTRY AND OTHER AVIAN SPECIES

trace back/record keeping system that will find the source of birds in a minimum of time.

USDA-APHIS has established a statement of work to continue the study of individual bird identification as requested by USAHA. At this point in time the contract has not been awarded but is anticipated to be in the near future. Some of the points to clarify are:

- Refinement of available identification tags to maximize effectiveness for use in hatchling and mature groups of poultry and other avian species. This includes:
  - Testing applications at the producer level
  - Observing tagged birds in the LBM’s and documenting durability and readability
  - Determining applicability and cost effectiveness of RFID technology to an avian tagging system
  - Using tagging systems of choice that fulfill criteria for animal identification under the National Animal Identification System (NAIS), and following tagged birds through the LBMS to evaluate the following:
    - The tag of choice in the different components of the LBMS
    - How tags may be issued and where they will be printed
    - Who may apply tags and where
    - Poultry identification responsibilities of the producer, distributor & LBM
    - Estimates of costs of tag application and monitoring
    - Capture costs of tags, printers, labor, administration and record keeping
    - Find hidden costs associated with program
    - Develop recommendations for cost recovery
    - Determine requirements for an electronic record keeping system for premises ID and for distribution of tags compatible with the needs of the LBMS. Assure applicability to NAIS database.

Dr. Lee M. Myers, Georgia State Veterinarian and Chair of the ad hoc ENDTF gave the following report on the activities of the Task Force.

Background

After the outbreak of END in California, USDA requested and received 9.4 million dollars for a national END surveillance and mitigation program. States were asked to submit proposals on a short deadline for cooperative agreements to monitor and control END, and a number did so. However, USDA put these proposals on hold, and developed a new plan. On October 2, 2003 Dr. Larry Granger, newly
appointed Associate Deputy Administrator for Emergency Programs, USDA-APHIS-VS, issued a “Veterinary Services Policy on the Updated Plan for the Enhanced National Surveillance of Exotic Newcastle Disease through fiscal year 2004.” Dr. Granger outlined the new direction for the proposed END National Surveillance Program during the 2003 Committee meeting. Highlights of the presentation were:

1. $9.4 million commodity credit corporation (CCC) funds from Office of Management Budget (OMB) have been designated for an END National Surveillance Program to be distributed as follows:
   - $4,404,300 to the USDA Legislative and Public Affairs (LPA) office to develop outreach materials
   - $500,000 to the USDA-APHIS-VS National Veterinary Services Laboratory (NVSL) for database development
   - $995,700 to NVSL for cooperative agreements with National Animal Health Laboratory Network (NAHLN) laboratories and other designated laboratories for laboratory support
   - $2 million to NVSL for “Fee for service” laboratory testing reimbursement
   - $1.5 million for state cooperative agreements for enhanced surveillance

The Committee expressed serious reservations about the utility of several parts of the proposed USDA program and registered concern that the present direction would not effectively provide the level of END surveillance that is needed or desired. The Committee outlined the following concerns in a resolution:

1. That 50% of the $9.4 million designated funds would remain within USDA ($4.4 million to LPA and $500 thousand to NVSL). Although outreach materials are needed, they can best be developed at a local level due to regional differences (cultural, socio-economic, ethnic, etc.) in non-commercial poultry industries. It is understood that the actual production/printing/etc. of these materials could be done centrally.

2. That of the remaining funds, $900 thousand would be distributed to NAHLN labs through cooperative agreements with NVSL, rather than going through state agencies. With only 12 NAHLN pilot labs identified, most states do not currently submit samples to a NAHLN laboratory to conduct routine poultry surveillance such as NPIP, export, and poultry disease monitoring programs. Also, there appears to be no supportive funds for additional personnel and supplies necessary to conduct the testing. The program, as outlined, leaves no flexibility for other options.
TRANSMISSIBLE DISEASES OF POULTRY AND
OTHER AVIAN SPECIES

3. That money is specifically allocated to NAHLN laboratories for
diagnostic workups of active non-commercial poultry submis-
sions. Although this is an admirable initiative, there appears to
be a lack of flexibility to allow states to use these funds for
other purposes if this type of service is already provided.

4. That the plan is heavily funded at the top with an insignificant
field component. Resources are needed at the field level to (1)
locate non-commercial poultry entities, (2) conduct active sur-
veillance at aviaries, poultry sales establishments, exhibitions,
etc., (3) conduct educational programs for non-commercial
poultry bird owners (4) conduct passive surveillance since many
of these bird owners do not use a veterinarian.

USAHA passed Resolution 13, “Immediate Review of the USDA-
APHIS-VS Emergency Programs Proposed Exotic Newcastle Disease
National Surveillance Program.” The Resolution states, “The USAHA
requests that United States Department of Agriculture (USDA), Animal
and Plant Health Inspection Service (APHIS), Veterinary Services (VS),
Emergency Programs (EP) immediately work with a multi-disciplinary
Task Force appointed by the USAHA to further develop the National
Exotic Newcastle Disease (END) Surveillance Program. The Task Force
shall include representatives from USDA, state animal health officials,
the commercial poultry industry, non-commercial poultry industries,
avian and poultry veterinarians, laboratory diagnosticians, the National
Poultry Improvement Plan (NPIP), etc. The Task Force shall offer rec-
ommendations for the direction of the National END Surveillance Pro-
gram.” Dr. Don Lein, 2004 USAHA President, appointed the USAHA
Ad Hoc Exotic Newcastle Disease Task Force (END-TF).

APHIS response to the Resolution states, “The U.S. Department of
Agriculture, Animal and Plant Health Inspection Service, Veterinary
Services (VS), has been working directly with the United States Animal
Health Association (USAHA) exotic Newcastle disease (END) Task
Force. VS appreciates USAHA’s valuable contributions. The national
END surveillance program will undoubtedly improve as a result of
USAHA’s contributions. VS is committed to continuing the important
and mutually beneficial relationship with the USAHA END Task Force.
Additional meetings and conference calls are planned.”

ENDTF Activities:

Through a series of conference calls and electronic mail communi-
cation, the ENDTF developed a consensus document (9 pp) within 30
days of the resolution that listed five positive aspects of the END pro-
posed guidelines; 26 concerns about the new guidelines; 15 clarifica-
tions and questions; and 19 other comments and suggestions. From
that document 7 action items were forwarded to USDA on November
REPORT OF THE COMMITTEE

19, 2003 for consideration. Action items included:

1. Allow laboratory funding to be channeled to laboratories that are recognized and recommended by the state animal health official, independent of NAHLN. (Action taken in part.)

2. Allow flexibility in flow of laboratory funds; allow to channel through state animal health official, if that is best for the state (not strictly from the National Veterinary Services Laboratory directly to laboratory). (USDA's decision was to channel funds for END testing directly to the laboratories to create a direct relationship between testing laboratories and NVSL.)

3. Allow flexibility in funding of outreach materials; include a significant portion of $4.4M into state agreements rather than designate full amount to LPA. It would be preferable to see approximately 50 percent of the targeted $4.4M of outreach funds channeled directly to the state for targeted materials to populations specific to the state situation. USDA should use their portion for theme and boilerplate development, national awareness, and the like. The high-risk bird owners are best reached through field personnel interaction at local auctions, flea markets, swap meets, feed stores, etc. (USDA responded that no flexibility was allowed due to Office Management and Budget (OMB) designation of funds to LPA.)

4. Need improved oversight of bird transportation. A major deficit in the plan is lack of integrated national and state oversight of the movement of birds of undocumented health status through the transportation industry (air, cargo, postal, etc). (No action. This activity may not be directly related to disease surveillance.)

5. Allow funding of additional resources (laboratory personnel, training, supplies, etc.), if needed, in a state to conduct diagnostic testing. (Action taken through cooperative agreements with states.)

6. Allow funding of field personnel in a state, if needed, to identify, contact, and network with non-commercial poultry industry. (USDA's intent was to accomplish this through cooperative agreements with states.)

7. Allow majority of funding to go to the states. Except for education, it appears the proposed plan is relying heavily on state efforts with federal monitoring. If that is the case, the majority of funding should go directly to the states where the work has to get done, based on the work plan and their commitment to the project. (No action.)

A conference call was held with ENDTF members, including USDA representatives, and each point was discussed. USDA informed the Committee that OMB allocated the $4.4 million specifically to the USDA
LPA office to develop outreach materials and that the funds could not be redistributed to another entity.

In November 2003, a USDA memorandum was issued on the “Guidance on fiscal year 2004 Funding for the Exotic Newcastle Disease Surveillance Program.” The Guidance document further described the four major focus areas to (1) increase the capacity to perform additional suspect END case investigations and increasing diagnostic testing capabilities for END virus through cooperative agreements for laboratory equipment and reimbursed diagnostic testing at NAHLN laboratories and other designated END laboratories, (2) educate owners of noncommercial poultry and other birds through production and distribution of educational messages and materials, (3) increase outreach and contacts with noncommercial poultry owners through cooperative agreements with a limited number of States, and (4) develop adequate database capabilities, e.g. reports of END diagnostic tests from NAHLN and other END laboratories, report of other outreach or monitoring activities and data on locations of noncommercial poultry premises. The ENDTF was not consulted about the content of the guidance document prior to issuance.

In December of 2003, Dr. Larry Granger notified the ENDTF Chair that, “The national END surveillance plan is a comprehensive, coordinated, integrated surveillance system that builds on partnerships with States, animal industries, veterinary practitioners, universities, and diagnostic laboratories.” The letter also stated that, “Our Legislative and Public Affairs Staff (LPA) will be working with the ENDTF and with State information coordinators to ensure that educational and outreach programs regarding END surveillance are tailored to local needs... For a surveillance program to succeed, close cooperation between State, federal, and industry representatives must occur. VS will work closely with the ENDTF to ensure that the goal of enhancing our existing surveillance, as well as expanding surveillance to previously under sampled populations, is achieved.”

In February of 2004, the ENDTF was informed that USDA allocated END Surveillance funds to 29 Participating Laboratories in 28 states. USDA stated that the allocation was based on two criteria, foreign animal disease (FAD) submissions and the value of poultry production. The ENDTF was not consulted about the allocation or the announcement.

In March of 2004, USDA LPA invited Communication Officials of State Departments of Agriculture (COSDA) representatives and cooperative extension communicators located in states determined to be “END high risk” by USDA to attend an END communicators meeting in Riverdale, MD. Select members of the ENDTF requested to attend and were granted permission. The meeting agenda included an overview of END, the END enhanced national surveillance program, public
affairs perspective of the 2002/2003 END outbreak, and public outreach programs in California and North Carolina. Camera-ready brochures, fact sheets and other materials were presented for review. LPA did not seek further input from the ENDTF on the development and distribution of educational and outreach materials. In the ensuing months, the ENDTF became indirectly aware of materials (letter to veterinarians, packet to state veterinarians, fact sheets, brochures, etc.) distributed by LPA.

In May of 2004, the ENDTF Chair requested an update of the outreach activities from Madelaine Fletcher of USDA LPA, ENDTF member. Ms. Fletcher LPA reported that in April of 2004 a mailing was sent to approximately 51,000 veterinarians using mailing lists from the American Veterinary Medical Association (AVMA) to alert them to the start of the program. Subsequently, the same mailing was sent to Area Veterinarians-In-Charge (AVIC’s) and State Animal Health Officials with a cover letter. Electronic mail was sent to AVIC’s to alert them about the start of the program and the communicators meeting. An article on the campaign appeared in May 13, 2004 AVMA Bulletin (on-line edition). In early April a letter and flyers were provided electronically to the public affairs contacts of extension agents and USDA, Farm Service Agency (FSA) for distribution. Other products included a website on the VS home page www.aphis.usda.gov/vs; alerts on AI, END and backyard biosecurity printed in large quantities (English and Spanish) and used in veterinarian mailing; biosecurity brochures (English and Spanish), biosecurity posters (English and Spanish); AI and END disease cards (English and Spanish); and display banners. A press release was issued on May 4 announcing the beginning of the campaign. LPA also distributed informational packets at the National Association of Farm Broadcasters meeting and had coverage in Feedstuffs Magazine on May 17, 2004. Bookmarks, rulers and post-it note/scratch pads were developed. A biosecurity video was being developed in DVD and VHS formats. A toll free number was initiated that rings into the AVIC’s office in the state where caller is located. A public relations firm was hired to set a benchmark for the national awareness campaign and identify cost-effective media outlets. The ENDTF was not consulted on the development and distribution of these educational/outreach materials, with the exception of input from select members who attended the communicators’ meeting in March 2004.

In October 2004, the ENDTF Chair received a list of additional END outreach publications from the USDA Eastern Regional Director. The Committee learned during the 2004 USAHA meeting that the END surveillance program has been transferred from the USDA-APHIS-VS Emergency Programs staff to USDA-APHIS-VS National Animal Health Programs staff in the spring of 2004.

The ENDTF has not received updates or progress reports related
TRANSMISSIBLE DISEASES OF POULTRY AND OTHER AVIAN SPECIES

to the major focus areas, associated use of funds for the focus areas, achievement of established milestones and outcome of basic performance measures for the end of 2004.

Conclusions

The ENDTF was successful in completing the objective to “offer recommendations for the direction of the National END Surveillance Program” within the first thirty days of the 2003 USAHA meeting, although USDA did not demonstrate a commitment to seriously explore and consider possible implementation of the recommendations.

The ENDTF was disappointed that they were unable to fulfill the remaining objective outlined in USAHA Resolution 13 (2003). The intent of the resolution was for USDA and USAHA to work collaboratively and in partnership to further develop the national END Surveillance Program. This did not happen. USDA actions did not parallel their written response to the resolution that (1) the agency “has been working directly” with the USAHA END Task Force; (2) “VS appreciates USAHA’s valuable contributions”; (3) “the national END surveillance program will undoubtedly improve as a result of USAHA’s contributions”; and “VS is committed to continuing the important and mutually beneficial relationship with the USAHA END Task Force.”

The ENDTF was essentially discounted and received little to no direct communication from USDA, unless prompted. There was no apparent plan to include USAHA in the further enhancement of the focus areas, milestones and performance measures of the national END surveillance program. It appeared that USDA chose to adhere to the program parameters outlined in the October 2, 2003 memorandum, and was unwilling to seriously consider the ENDTF recommendations and offer any modifications. As a result, the ENDTF was precluded from effectively evaluating the four major areas outlined in the END guidance document because no data or reports were provided. Also, state animal health officials reported that they were unable to monitor or follow up with END activities in their state due to a lack of effective communication with USDA program staff.

USDA failed to follow the written assurances to the ENDTF in December 2003. USDA did not build a partnership with States, animal industries, veterinary practitioners, universities, and diagnostic laboratories to develop a comprehensive, coordinated, integrated surveillance system. LPA did not work with the ENDTF to ensure that educational and outreach programs regarding END surveillance were tailored to local needs. The ENDTF agrees with the statement in Dr. Granger’s December letter that program success depends upon close cooperation between State, federal, and industry representatives. Regrettably, this did not occur. USDA did not work closely with the ENDTF to ensure that the goal of enhancing surveillance was achieved.

The ENDTF is not convinced that the educational and outreach
portion of the program is as effective as it could have been. The ENDTF is not totally aware of all facets of the LPA program and would like to receive a report on objective and measured outcomes. Anecdotally, there remains little awareness of the “biosecurity for the birds” campaign and little behavior change in back yard poultry owners as a result of the outreach component. Despite LPA working with extension communicators, extension agents remain broadly unaware of the program. The ENDTF believes that the program would have been more effective if funds were distributed to the states to tailor materials to local cultures rather than Congress allocating funds to a national level for standardized materials produced in bulk.

In summary, the ENDTF does not believe the USAHA resolution objectives were accomplished in total because the END program appeared to be predetermined prior to the 2003 USAHA meeting with little opportunity for input. USDA is advised to work effectively with stakeholders throughout the conceptual, development and implementation stages in a sincere spirit of cooperation. The ENDTF believes that the motto of the Undersecretary for Marketing and Regulatory Programs, Bill Hawks, should become an action plan because “working together works”. USDA must improve the working relationship with the Committee by fostering a more open process and approaching issues with a sincere spirit of cooperation in order to develop effective poultry disease surveillance programs.

The ENDTF suggests that the Committee and USDA National Animal Health Program staff establish a process to exchange information and work collaboratively on poultry health issues throughout the year. The ENDTF also requests a final report on the expenditures, milestones and performance outcomes (including number of birds tested) from the $9.4 million CCC funds allocated for an END National Surveillance Program.

Industry Annual Disease Status Reports

Broiler Industry Report:

The broiler industry report was presented by Dr. Travis Cigainero, Pilgrims Pride Corporation, Pittsburg, Texas. With a few exceptions, overall broiler health and production have been good thus far into 2004. Information presented is based on three industry surveys, personal correspondence, and Agristats. Comparing January thru June 2003 to the same period in 2004 indicates that whole bird condemnation, parts condemnation, and whole bird dispositions have remained essentially unchanged. With the consistency of the previous indicators, it is interesting that livability declined 0.31% for the same period from 2003 to 2004. The most plausible explanation for this is that good markets resulted in increased demand and slight expansions. More pounds of
chicken were produced in essentially the same number of houses meaning that weight and age were increased. This also has an effect on downtime. Increased density, increased pounds per square foot, and decreased out time usually impact performance negatively.

AI has not been a primary problem in broilers in 2004, but the problem in limited breeder flocks and the Asian crisis has caused many to rethink the importance of this disease and implement better biosecurity plans as well as monitoring plans. Bronchitis remains problematic in some areas and the Arkansas or Arkansas related viruses are still the most often implicated viruses. No major new serotypes have been identified. There have been a few reports of problems involving Newcastle disease (ND). The issues seem to revolve around too much protection where vaccine and environment actually cause a problem or too mild vaccination over too long of a period of time resulted in an increased challenge. Laryngotracheitis (LT) has also been problematic in some areas of the Southeast. All the LT isolates have been molecularly similar to vaccine virus.

One of the most significant changes from 2003 to 2004 is the incidence of Gangrenous Dermatitis. Dermatitis has been a major disease issue in some complexes. It is difficult to trace the problem to a single etiology as many things can play a role in the disease from immune competence to feed issues to infectious agents such as Infectious Bursal Disease (IBD) and Chicken Anemia Virus (CAV).

Finally, political issues have continued to take more and more resources. A survey sent to production veterinarians by Dr. Bob Owen indicated unanimous agreement that issues unrelated to bird health continue to take more and more time each year. These issues tend to be a blend of factual science, pseudo-science, and political science. Most of the issues are manmade, but they act much like a virus, as they seem to be infectious from company to company just as a virus may be spread bird to bird.

References:

2. Emerging Diseases and Conditions in Broilers and Breeders, Paper presented by Dr. Bob Owen, AAAP, 2004

Table Egg Industry Report:

The table egg industry report was presented by Dr. Eric Gingerich, University of Pennsylvania, Kennett Square, Pennsylvania. Overall health of the national table egg layer flock is excellent. This is due to the availability of high quality vaccines, professional, well-trained flock supervisors, readily available technical assistance from the primary breeders, vaccine companies, and diagnostic laboratories, improved
nutrition, and improvements in biosecurity.

A handful of diseases are still of concern, namely colibacillosis, *Mycoplasma gallisepticum* (MG), AI and *Salmonella enteritidis* (SE).

Colibacillosis is a problem mainly of young flocks, with mortality rates of 0.5 to 2% per week starting shortly after housing. It is felt that this condition is most often secondary to upper respiratory challenges with MG, *Mycoplasma synoviae* (MS), ammonia, infectious bronchitis (IB), etc. It also may be a primary problem if water lines are contaminated with *E. coli*.

MG is mainly an issue in multi-aged facilities and is successfully controlled in most cases through vaccination. Each complex must customize its vaccination program to control the strain on the farm. Ts-11 and 6/85 live vaccines are used for controlling mild strains of MG while F-strain live vaccine is being used to control more pathogenic strains. The live pox-vectored recombinant vaccine is being used in a variety of situations and the success of this vaccine has not yet been fully determined. Spread of MG to single-aged units has occurred as well and is dealt with using medication programs using tylosin or tetracycline antibiotics.

AI has been an issue in Pennsylvania (H2N2), and Connecticut (H7N2). Flocks in two Pennsylvania complexes were detected by routine active surveillance. No clinical syndrome was observed, the flocks were placed under quarantine, spread was limited in each complex, and quarantine was released after negative virus isolation attempts from sentinel birds. The Connecticut complex that became positive with H7N2 in February 2003 had been vaccinating with H7 vaccine since April of 2003. Only one positive isolation of virus from sentinel birds occurred after vaccination was initiated. The quarantine was lifted October 1, 2004 after all birds that were present at the time of the initial outbreak had been sold. California had problems with H6N2 for a few years and was using an autogenous vaccine for control until 2003 when this program was halted. No new breaks have been reported in layers since that time. H7N2 continues to thrive in the live bird markets of New York City and New Jersey and are a continual concern to egg producers in the Northeast.

SE was felt to be an issue that was being addressed adequately by state and industry egg quality assurance programs until the announcement on September 22, 2004 that the Food and Drug Administration was proposing a program “Prevention of SE in Shell Eggs During Production”. Many issues will need to be thoroughly discussed in this proposed program namely 1) laboratory procedures and laboratory availability for testing, 2) funding for testing, costs incurred if eggs are diverted, and administration of the program, 3) lack of egg pasteurization facilities in many egg producing areas to be able to effectively divert eggs from high risk flocks, 4) wet washing houses required be-
TRANSMISSIBLE DISEASES OF POULTRY AND OTHER AVIAN SPECIES

tween flocks where SE positive manure samples were found in the previous flock whereas dry cleaning, fumigation, vaccination of in-coming pullets, plus good rodent control has been found to be effective, 5) the requirement for 45 F egg storage prior to processing and so forth.

Diseases under control and of low incidence include infectious laryngotracheitis (ILT), IB, coccidiosis, necrotic enteritis, fowl coryza, and urolithiasis/gout. These diseases tend to be localized to a region or a farm. Good success using the recombinant pox-vectorized ILT vaccine in a region of high ILT incidence has been seen.

Diseases that are very rarely a problem are pox, Marek’s, Newcastle, IBD, CAV and fowl cholera. Poultry welfare concerns are minimal as compliance to program requirements for participants have been met. The possible requirement for full feed molting is a concern as the full feed molting programs have not been universally successful in all operations where they have been tried.

The egg industry saw very good profits during the last quarter of 2003 and the first quarter of 2004 due to very good egg prices. Expansion caught up however as nearly 9 million layers were added from August 2003 to August 2004. A recent drop in feed prices has eased the losses however. The percent of eggs that are processed is fairly stable at about 30% with only 1% of eggs exported.

Turkey Industry Report:
The turkey industry report, prepared by Drs. Steven Clark, Eric Gonder and James Barton was given by Dr. Gonder, Goldsboro Milling Company, Goldsboro, North Carolina. Dr. Clark and turkey industry colleagues, Drs. Gonder and Barton, contacted several U.S. turkey industry professionals and veterinarians involved in turkey production to inquire about the health status of turkeys produced in October 2003 through October 2004. The turkey industry reports several disease challenges for this 12 months varying by geographical regions within a state and across the United States. This report will list, in alphabetical order, the challenges by disease.

Poul (viral) enteritis was a cause of relatively higher early morbidity and mortality, especially in the lower Midwest and Southeast. Astrovirus was identified by polymerase chain reaction (PCR) and enterovirus was identified by virus isolation in these cases. Respiratory problems with Avian Paramyxovirus-1, E. coli, Ornithobacterium rhinotracheale (ORT) and Bordetella avium (BART) are problems in some flocks, resulting into poor performance and excessive mortality. No commercial vaccine is available for ORT. Fowl Cholera has been diagnosed more frequently in the Southeast associated with the wetter season and was particularly severe in some breeder operations. Osteomyelitis (OM) continues to be a problem in some flocks. Other diagnoses of particular interest include Blackhead, Cellulitis and Avian Pneumovirus (APV).
Turkey production totaled 5.65 billion pounds in 2003. Production declined 1.25% (71 million pounds) for the year 2003, only the third annual decline since 1982 (Sparks Companies Inc, March 2004). Heads slaughtered was down 1.3% and average live weight increased by 0.2 pound (0.09%). Declines were mainly the result of poor profitability in predominately further processed items from heavy toms. Ready-to-cook production in 2004 is expected to be 2-3% lower than 2003. Overall domestic demand for turkey products is strong, while exports have been limited to due chicken outbreaks of highly pathogenic and low pathogenic AI. Exports in 2004 are expected to reach 514 million pounds. Export bans and higher feed costs are expected to be the two major challenges for 2004.

Over the past decade, the industry has adapted its production systems from multi-age facilities to single-age operations. An informal survey (Clark, 2001) was conducted of the United States turkey industry to identify single-age production systems (all-in/all-out, brood-and-move). In 2001 there was 26% single-age production, compared to the 1995 estimate of 19%. This trend continues. The increase in single-age production is due primarily in an attempt to control/minimize disease challenges specific to different areas.

The lack of effective therapeutic agents remains a concern of the industry, including the loss and potential loss of efficacious treatments for bacterial diseases. The judicious use of antibiotics, including fluoroquinolones, appears to be reducing mortality in many turkey flocks. The turkey industry wants to ensure that any Food and Drug Administration antibiotic resistance policy is scientific and results in no loss of available drugs unless there is clear scientific evidence those drugs pose a danger to human or animal health.

Mr. Dennis Senne of USDA-APHIS-VS-NVSL presented the Avian Import Activities summary and the AI and ND Diagnostic summaries.

**Avian Import Activities – FY 2004:**

- Poultry and Hatching Eggs: During fiscal year (FY) 2004, 17,742,984 poultry including day old chicks, and 14,993,440 poultry hatching eggs imported into the United States;
- Commercial Birds: The imports of commercial birds are limited to those that are exempt for the Wild Bird Conservation Act, serviced by the U.S. Fish and Wildlife Service. During FY 2004, 234,856 commercial birds were released from USDA-supervised private bird quarantine facilities;
- Pet Bird Program: There were 3,430 pet birds imported into the United States and quarantined at a USDA-operated animal import centers during FY 2004. The number of home quar-
Ratite Importations: No ratites or ratite hatching eggs were imported into the United States. The current price of ratites and hatching eggs does not justify the cost of importing such birds; and

Smuggled/confiscated birds: There were 387 birds confiscated by U.S. Customs during FY 2004.

Avian Influenza:

**LBM's:** Monitoring of LBM’s in Northeastern states for presence of AI virus continued at a record level during FY 2004 in efforts to reduce the prevalence of low pathogenic H7N2 in the LBMS. A total of 9,358 specimens in 919 submissions originating from 6 states (New York, New Jersey, Massachusetts, Connecticut, Rhode Island, and New Hampshire) were tested for presence of AIV by virus isolation in embryonated chicken eggs at NVSL. Also, 1,435 tracheal swab specimens from LBM's were tested at NVSL for presence of AI virus by the real-time RT-PCR (RRT-PCR). For the first time, LBM testing was performed in 2004 by state laboratories approved by the USDA to conduct RRT-PCR tests. This report does not include the number of LBM tests performed at state laboratories. At the NVSL, the H7N2 virus was isolated from 441 of 7,135 specimens from New York (NY), 197 of 2,072 specimens from New Jersey (NJ), and 6 of 35 specimens from Connecticut (CT). Specimens from Massachusetts (n=84), Rhode Island (n=28) and New Hampshire (n=4) were negative for avian influenza virus (AIV). No significant changes were observed in the amino acid motif at the cleavage site of the hemagglutinin protein of 193 H7N2 isolates sequenced in 2004. In addition to H7N2, one isolate of H5N8 and two isolations of H7N3 were made from NY LBMs. Pathogenicity of representative H7N2, H5N8, and H7N3 viruses was determined by the chicken pathogenicity test and deduced amino acid profile at the hemagglutinin cleavage site; all viruses were of low pathogenicity. Other AI virus subtypes and the numbers isolated from NY LBMs were H2N2 (3), H3N2 (19), H3N6 (1), and H9N2 (1). A single isolate of H2N2 also was recovered from one LBM in NJ. In addition to AIV, avian paramyxovirus type-1 (APMV-1) was isolated from 240 specimens in 104 submissions from NY (n=191), NJ (n=45), and Rhode Island (n=2). All but 9 isolates were characterized as low virulent (lentogenic pathotype) strains; the 9 other isolates were characterized as pigeon paramyxovirus type-1 (PPMV-1).

**Highly Pathogenic AI (HPAI) virus:** On February 23, 2004 HPAI was diagnosed in the United States for the first time in 20 years when a non-commercial broiler flock near Gonzales, TX was diagnosed with HP H5N2. The flock of 6,600 broilers was being raised for the live bird
market outlets in Houston, TX. Subsequently, two of five LBMs in the Houston area were also found to be positive for HPAI H5N2. Extensive surveillance did not detect additional infections. The H5 infection was initially detected by RRT-PCR at the Texas Veterinary Medical Diagnostic Laboratory following a routine submission of dead chickens from the index flock. The RRT-PCR was confirmed by the NVSL and the virus was subsequently characterized as HPAI virus. The H5N2 virus was unusual in that it meets the molecular criteria of HPAI but did not produce disease or death in experimentally inoculated chickens. Phylogenetic analysis of the virus showed that the hemagglutinin was most closely related to an H5N3 virus isolated in Texas in 2002. The virus was not related to recent H5N2 viruses circulating in Mexico or the 1983-84 U.S. lineage of HPAI H5N2 viruses.

**HPAI Surveillance in Washington State:** Because of the presence of HPAI H7N3 in the Frazer Valley, British Columbia, Canada, the USDA activated the incident command system (ICS) in April to conduct AI surveillance along the U.S-Canadian border in Washington State. Voluntary testing of backyard and commercial flocks within a 10-mile zone adjacent to the Canadian border generated 1,621 specimens for RRT-PCR testing and 2,863 serum samples for detection of antibodies to AIV. No H7N3-positive flocks were detected.

**Low Pathogenicity AI (LPAI) virus in Commercial Poultry:** In January 2004, LPAI H3N2 was isolated from 34-week-old turkey breeders in Ohio with a history of drop in egg production. The premises had five houses, each containing about 2,500 birds. The virus could not be propagated in embryonated chicken eggs without prior passages in cell culture. Also, the virus could not be subtyped with conventional AI reference antisera in the hemagglutination-inhibition (HI) and neuraminidase-inhibition (NI) tests. Molecular analysis of the virus showed it to be H3N2 subtype and related to recent viruses circulating in swine.

On February 6, 2004 an H7N2 AI virus of low pathogenicity was isolated from a non-commercial broiler flock in Kent County, Delaware. The flock of 12,000 birds had an epidemiological link to the LBM’s in NJ. Extensive surveillance detected a single positive commercial flock of 72,000 4-week-old broilers located 5 miles from the index case. Although there was no epidemiological link between the two premises, the H7N2 viruses from the two premises were indistinguishable. No other AI-positive flock was detected. The NVSL tested approximately 6,290 surveillance specimens by RRT-PCR in support of this outbreak.

On February 13, 2004, a flock of 500,000 layers in Lancaster County, PA were positive for antibodies to H2N2 AI virus as a result of routine surveillance. No significant production drop was noted. An H2N2 virus was isolated from the flock and was characterized as LPAI by the chicken pathogenicity test. Surveillance of nearby flocks did not detect addi-
tional infections; however, a second layer flock was found positive for the H2N2 virus in late February 2004.

On March 6, 2004, presence of LPAI H7N2 virus was confirmed in a flock of 118,000 6-week-old broilers located near Pocomoke City, MD. The infection was detected as a result of a pre-movement testing program established because of the infections of LPAI H7N2 in DE earlier in February. The flock was depopulated and an additional 210,000 2-week-old broilers located within 1 mile of the positive premises and owned by the same company, were preemptively killed as a proactive step to prevent spread of infection. Molecular studies showed that the H7N2 virus from the MD flock was related to recent H7N2 viruses from the LBM’s in Northeast U.S. but differed from the DE H7N2 virus.

In May 2004, routine serologic surveillance detected antibodies to H7N3 in two commercial breeder (chicken) premises and one small backyard flock in Hopkins County, Texas. None of the flocks showed clinical signs of infection. The two commercial breeder premises had 25,000 and 26,000 chickens, respectively. Attempts to isolate the virus were unsuccessful and extensive surveillance did not identify additional positive flocks. All three flocks were destroyed.

**LPAI virus in Non-commercial Poultry:** The isolations of AI virus or detection of AI virus-specific antibodies in serum from non-commercial poultry are presented in Table 1.

**RRT-PCR Proficiency Test Panels:** Laboratories conducting surveillance testing for AI and ND are required to have one or more diagnosticians pass an annual proficiency test to perform official RRT-PCR tests. In FY 2004, RRT-PCR proficiency panels were sent to 96 diagnosticians in 38 laboratories for ND and 80 diagnosticians in 38 laboratories for AI. Currently, 80 diagnosticians in 38 laboratories and 77 diagnosticians in 37 laboratories, respectively, are approved to conduct ND and AI RRT-PCR tests.

**AI Diagnostic Reagents Supplied by the NVSL:** A total of 13,586 units of Agar Gel Immunodiffusion (AGID) reagents were produced and shipped to state, university, and private laboratories during FY 2004. The quantity is sufficient for approximately 1.6 million tests. An additional 362 units (43,440 tests) were shipped to international laboratories.

**Newcastle Disease:**

**Isolations of Virulent Newcastle Disease Virus (vNDV):** Only one isolation of vNDV was made in FY 2004. The isolate was from a group of finches imported from South Africa and Tanzania and quarantined at a California quarantine center. The lot of birds was refused entry into the United States.

**Isolations of Low virulent Avian Paramyxovirus Type-1 (APMV-1):** During FY 2004, 70 submissions of APMV-1 from 16 states (AL,
REPORT OF THE COMMITTEE

AR, CA, CT, FL, GA, MN, IN, NC, NJ, NM, NY, PA, TX, VA, and WI) were received for virus characterization at the NVSL. All were characterized as non-virulent NDV. In addition, pigeon paramyxovirus type-1 (PPMV-1) from pigeons or doves was identified in 15 submissions from 10 states (AR, AZ, CA, FL, KY, LA, NY, PA, TX, and WA).

ND and AI Surveillance Programs: Following the outbreak of vNDV in backyard game fowl in 2002-03, the USDA established a ND and AI surveillance program specifically targeting backyard birds. Twenty-nine laboratories were identified by the USDA to participate in the program with laboratories being reimbursed for the cost of testing. Under the program in 2004, 3,080 specimens from 12 states (FL, GA, LA, MI, MS, MO, OH, OK, PA, NC, SC, and WA) were tested for AI and 2,603 specimens from 8 states (MI, MS, OH, OK, PA, NC, SC, and WA) were tested for ND.

Dr. David A. Miller of USDA-APHIS-VS-NVSL
Diagnostic Bacteriology report

Pasteurella:

During a 12-month period, NVSL received 320 Pasteurella multocida isolates for characterization. Of these, 120 were submitted for somatic type analysis, 46 were submitted for DNA fingerprint analysis, and 154 isolates were submitted for both tests. Results indicated that 31% were type 3, 4; 12% were type 1; 8% were type 2, 5; 10% were type 3; and 6% were type 4. A total of 29% of the isolates were identified as other somatic types. The somatic type of 5% of the isolates could not be identified. Of the isolates submitted for DNA fingerprint analysis, 7% had profiles identical to those of P. multocida attenuated vaccine strains, 9% matched the profile of somatic reference type 3, strain P-1059 (type 3 component used to manufacture bacterins), and 84% were wild-type profiles.
Salmonella:
In support of the NPIP, a total of 1,800 ml of stained microtiter antigen, 830 ml of tube test antigen, 144 vials of positive control serum, and 76 vials of negative control serum were provided to industry and diagnostic laboratories. A total of 113 sera were tested for pullorum-typhoid in the microagglutination test, and 54 sera were tested for *S. typhimurium* using the tube agglutination test. The NVSL serotyped 11,493 *Salmonella* isolates recovered from animals, their environment, or feed. Of the 3,677 poultry isolates (32% of total isolates), 2,020 were recovered from chickens or their environment and 1,657 were recovered from turkeys or their environment. The most common serotypes found in poultry this year are listed in Tables 2 and 3.

<table>
<thead>
<tr>
<th>Table 2: Most Frequently Identified <em>Salmonella</em> Serotypes From Chickens</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical</td>
</tr>
<tr>
<td>Heidelberg</td>
</tr>
<tr>
<td>Pullorum (Standard)</td>
</tr>
<tr>
<td>Enteriditis</td>
</tr>
<tr>
<td>Kentucky</td>
</tr>
<tr>
<td>Typhimurium</td>
</tr>
<tr>
<td>All Others</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 3: Most Frequently Identified <em>Salmonella</em> Serotypes From Turkeys</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical</td>
</tr>
<tr>
<td>Senftenberg</td>
</tr>
<tr>
<td>Montevideo</td>
</tr>
<tr>
<td>Hadar</td>
</tr>
<tr>
<td>Heidelberg</td>
</tr>
<tr>
<td>Muenster</td>
</tr>
<tr>
<td>All Others</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

Mycoplasma
The NVSL performed 231 avian *Mycoplasma* hemagglutination in-
hibition tests and 440 plate tests. During this same period, 1250 ml of hemagglutination antigen and 1050 ml of control sera were provided to other diagnostic laboratories.

**Mr. Andrew R. Rhorer presented the NPIP Activities report.**

**Pullorum-Typhoid Status:**
In calendar year 2003, there were eight isolations/outbreaks of *Salmonella pullorum* reported to the Poultry Improvement Staff. There were 42 isolations/outbreaks of *Salmonella pullorum* reported during calendar year 2004 from January to October 1, 2004. There have been no isolations of *Salmonella gallinarum* since 1988 in any type poultry. The isolates in 2003 were both standard and intermediate strains of *Salmonella pullorum*. The number of birds in *Salmonella pullorum* positive flocks (January 1, 2003-October 1, 2004) was as follows:

There were no egg-type chicken breeding flocks with isolates of *Salmonella enteritidis* in calendar year 2003 and the first 9 months of calendar year 2004.

<table>
<thead>
<tr>
<th>Number of Birds</th>
<th>No. of Flocks</th>
<th>Strain of Pullorum</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;5&lt;25</td>
<td>1</td>
<td>Standard</td>
</tr>
<tr>
<td>&gt;25&lt;50</td>
<td>1</td>
<td>Standard</td>
</tr>
<tr>
<td>&gt;50&lt;100</td>
<td>6</td>
<td>Standard and Intermediate</td>
</tr>
<tr>
<td>&gt;100&lt;500</td>
<td>19</td>
<td>Standard</td>
</tr>
</tbody>
</table>

**Mycoplasma Status Report:**
There were 4 egg-type chicken breeding flocks positive for *Mycoplasma synoviae* during Calendar Years 2003 and the first 9 months of Calendar Year 2004.

There were 13 meat-type chicken breeding flocks positive for *Mycoplasma gallisepticum* during calendar year 2003 and the first 9 months of calendar year 2004 and 34 meat-type chicken breeding flocks positive for *Mycoplasma synoviae* during calendar year 2003 and the first 9 months of Calendar Year 2004.

There were 4 turkey breeding flocks positive for *Mycoplasma gallisepticum* during calendar year 2003 and the first 9 months of calendar year 2004 and 5 turkey breeding flocks positive for *Mycoplasma synoviae* during Calendar Year 2003 and the first 9 months of Calendar Year 2004 and 2 turkey breeding flocks positive for *Mycoplasma meleagridis* during the same period of time.
Dr. Fred J. Hoerr, Auburn University, Auburn, Alabama presented the Mycoplasma Subcommittee report which included the following reports:

Mr. A. Rhorer reported on NPIP data on MG, MS and MM (table 3 below). The value of the mycoplasma workshops and serology quality control program provided by Dr. S. Kleven at the University of Georgia was recognized.

<table>
<thead>
<tr>
<th>Mycoplasma gallisepticum, Mycoplasma synoviae, and Mycoplasma meleagridis positive breeding flocks: National Poultry Improvement Plan 2003-2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>WEGBY</td>
</tr>
<tr>
<td>Mycoplasma gallisepticum</td>
</tr>
<tr>
<td>Mycoplasma synoviae</td>
</tr>
<tr>
<td>Mycoplasma meleagridis</td>
</tr>
</tbody>
</table>

Dr. A. McRee reported that *M. synoviae* rapid serum plate antigen was in adequate supply following an interruption in MS antigen production.

Dr. S. Kleven reported on the development of live MG vaccine strain, K5054, which shows promise as being safe and effective for both chickens and turkeys (Avian Dis 47:523-530, 2003; 48:91-99, 2004). This represents an improvement over current live MG vaccine strains because of its safety and efficacy in turkeys. F strain is too virulent for turkeys, ts-11 vaccine seems not to be able to infect turkeys, and 6/85 has shown mixed results as a turkey vaccine, but field evidence suggests that upon passage in the field it may develop virulence for turkeys. A motion was adopted for the Mycoplasma subcommittee to recommends to the Committee the adoption of a recommendation to USDA-APHIS-VS-CVB for continued support, review and licensing of live mycoplasma vaccines that are safe and efficacious for both turkeys and chickens.

Dr. S. Davison with S. Kleven and M. Garcia reported on using turkeys as sentinels for *Mycoplasma gallisepticum* detection in layer flocks. MG was successfully cultured from sentinel turkeys in 50% of 15 trials. Two “ts-ll-like”, and five “wild” type MG’s were isolated; an additional MG isolate failed to grow in further cultures. One “ts-ll-like” MG and two “wild” type MG’s that had been identified by RAPD and GTC were used in the pathogenicity trials in layers and turkeys. The “ts-ll-like” strain demonstrated minimal pathogenicity relative to the negative (no challenge) and positive (R strain) control groups. The two “wild” types demonstrated a greater degree of pathogenicity over the
“ts-11-like” strain in every measured parameter including clinical signs of infection, air sacculitis, and tracheitis. This approach identified MG organisms affecting commercial layers and defined their pathogenicity, which will be utilized as a baseline for future MG vaccine protection evaluations.

Of general concern were low virulence strains of *M. synoviae* that were detectable by ELISA and culture and/or PCR but failed to elicit antibody detected by the rapid serum agglutination test.

The Mycoplasma subcommittee proposed, during the meeting of the Committee, a recommendation to the USDA-APHIS-VS-CVB that there remains a need for continued support, review, and licensing of live mycoplasma vaccines that are safe and efficacious for both turkeys and chickens. This recommendation was based on a perceived fear by at least one manufacturer that CVB would contend that there were sufficient existing live mycoplasma vaccines. Although initially approved, after further discussion on the following day, it was rescinded.

Dr. Fred Hoerr also presented a review of the “Infectious Laryngotracheitis (LT) Eradication Guidelines” proposed by the Committee in 1990 (USAHA Proceedings 94:337-339, 1990). The plan had a four-phase implementation that included disease reporting, vaccine usage, diagnostics, surveillance, and biosecurity, and progressed to disease-free states or regions that prohibited vaccine usage and depopulated and indemnified positive flocks. In the past decade, LT epidemiology has improved using molecular analysis of the LT virus and Global Information System (GIS) mapping of outbreaks. The high prevalence of virus isolates indistinguishable from chick embryo origin vaccine virus is recognized. A fowl pox virus-vectored vaccine is now licensed and in use. In view of these developments, the reactivation of the LT Subcommittee was approved by general consent. Dr. Sherrill Davison of the University of Pennsylvania, who formerly chaired this subcommittee, agreed to resume the chair. The Subcommittee was charged to develop a white paper for presentation to the Committee at the 2005 meeting evaluating current diagnostic and epidemiological techniques and new vaccine technology, and proposing new control strategies in light of these advancements.

Dr. David Suarez, USDA-ARS, Southeastern Poultry Research Laboratory (SEPRL), of the AI and ND Subcommittee gave a report on Research Activities at USDA-ARS-SEPRL for Subcommittee chair Dr. David Swayne, who could not attend.

Dr. Lindsey Garber of USDA-APHIS-VS-CEAH reported on the NAHMS Poultry 2004 Study. NAHMS has launched its Poultry 2004 study. An information needs assessment process solicited input from potential poultry information users, including industry, researchers, and Federal and State government personnel. This needs assessment concluded with the recommendation from the Transmissible Diseases
TRANSMISSIBLE DISEASES OF POULTRY AND OTHER AVIAN SPECIES

of Poultry Committee (2003) that NAHMS poultry activities in 2004 focus on the nontraditional poultry industries, such as backyard flocks and live-bird markets. Based on this recommendation, the NAHMS Poultry 2004 is taking a three-pronged approach, with studies addressing backyard flocks, game fowl breeders, and live poultry markets. The objectives of the studies are to: 1) help provide information to improve management practices that affect bird health, 2) assist animal health officials and industry members in identifying research needs, and 3) provide owners of small-production or backyard flocks with information on AI, END and effective biosecurity practices.

Data collection began for the small-production backyard flock component on October 1, 2004 and will continue through November 15, 2004 in the leading poultry states, which include: Alabama, Arkansas, California, Delaware, Georgia, Iowa, Indiana, Maryland, Minnesota, Missouri, Mississippi, North Carolina, Ohio, Oklahoma, Pennsylvania, South Carolina, Texas and Virginia. The National Agricultural Statistics Service (NASS) randomly selected commercial poultry operations. Field data collectors will search for noncommercial premises that house birds within a 1-mile radius of each selected commercial operation. Animal health officials will then administer a confidential (will not include any identifying information) questionnaire to those who choose to participate in and contribute to the NAHMS Poultry 2004 study. The questionnaire focuses on bird health management, biosecurity practices, and movement patterns. Data collectors will not enter the bird areas or handle birds, and no testing of birds will be performed.

The LBM component of the study will be conducted from January 1, 2005 through April 30, 2005 in seven participating areas—California, Florida, New England, New Jersey, New York, Pennsylvania, and Texas. Animal health officials will visit every known market in these areas. The market visits will be incorporated into routine activities (e.g. AI surveillance). Questionnaires that focus on bird movement, cleaning and disinfecting information, and management will be administered one time to market owners or managers. For the purpose of this study, tests will not be conducted; however, the questionnaire does ask for historical information on AI testing. In order to maintain confidentiality, markets will be identified by coded identification numbers only.

NAHMS is also in the process of developing a survey to be mailed to the members of the United Gamefowl Breeders Association (UGBA). The purpose of this questionnaire will be to examine important issues in game fowl industry related to bird health management, biosecurity practices and movement.

Once all data have been collected and analyzed, NAHMS will generate national and regional summary reports for dissemination to owners/managers, producers, members of industry, researchers and ani-
Ms. Madelaine Fletcher, Public Affairs Specialist, USDA-APHIS-LPA presented an update on the USDA Newcastle Disease Outreach and Education Campaign.

In 2003, USDA received emergency funding for surveillance, outreach, and education for END. The outreach and education focuses on several key messages: recognition and reporting of sick birds to veterinarians and State and/or Federal authorities and practicing biosecurity. The messages are targeted to the owners of noncommercial poultry and birds currently outside normal communication channels, specifically in States where there is a large presence of backyard poultry. Secondary target audiences include veterinarians, extension agents, hatcheries and suppliers, auctions and sales, pet stores, and feed and bird supply outlets.

The campaign began with focus group testing of messages and benchmark research. A public relations firm was hired to help develop and implement a communications strategy. Research showed that the target audience – owners of small flocks – did not know very much about END, AI or biosecurity.

Advertising, public relations, and marketing strategies are being employed in the campaign. Advertising placements include mainstream agricultural publications, rural electric cooperative newsletters, agriculture related newspapers, Hispanic, Filipino, Vietnamese and Native American local papers, Web banner ads, major bird magazines, and agriculture-related radio stations. Public relations activities to date include preparation of an electronic media kit, press releases, articles in media outlets, and radio public service announcements.

Marketing activities to date include a partnership with the Future Farmers of America (FFA) whereby they distributed literature at State and county fairs. A cooperative agreement has been signed with FFA to produce instructional materials for agricultural education teachers. Outreach has been done with private sector veterinarians, hatcheries and COSDA as well as the agricultural bankers group of the American Bankers Association. Assistance has been provided to at least 35 states, USDA's Cooperative State Research Education and Extension Service and FSA and others by providing campaign materials.

Materials developed include brochures, flyers, posters, giveaways, displays, advertising, a Web site, press kit, and public service announcements.

Dr. Donna M. Gatewood presented a report on Extraneous Avian Leukosis Virus (ALV) in Marek’s Disease Vaccines by Drs. Scott P. Taylor and Donna M. Gatewood of USDA-APHIS-VS-CVB. Extraneous ALV was recently discovered in Marek’s Disease vaccines (MDV)
TRANSMISSIBLE DISEASES OF POULTRY AND OTHER AVIAN SPECIES

by Joseph Schultz, Director of Laboratory Services for Cobb-Vantress, Inc. This discovery has been corroborated by other laboratories including the ADOL and CVB.

The extraneous ALV was detected using ALV group specific antigen (gsa) p27 ELISA. The standard test used by the vaccine manufacturers for extraneous ALV is found in Title 9, Code of Federal Regulations (9CFR 113.31). SAM 405 describes the details of the COFAL assay which uses a complement fixation assay (CF) to detect the p27 gsa of ALV. CVB has confirmed that the COFAL assay failed to detect the extraneous ALV in 7 contaminated MDV serials.

Characterization performed by Dr. Guillermo Zavala at the University of Georgia, corroborated that the extraneous ALV found in these MDV’s belong to subgroup A and behave as exogenous viruses. In vivo, the extraneous ALV established a short-lived viremia and induced a significant serological response. The use of these contaminated MDV’s in the field and the results from laboratory experiments indicate that the extraneous ALV isolates are avirulent. For example, Dr. Zavala did not detect ALV-related clinical disease, mortality or tumors in specific pathogen free chickens challenged at one day of age and followed for 16 weeks.

Evidence suggests that the source of this extraneous ALV was likely from contaminated specific pathogen free eggs used in the production of these MDV serials.

CVB has tested 129 MDV serials, 7 of which were positive for extraneous ALV using p27 ELISA. Five of these serials were the initial serials discovered positive by Schultz’s laboratory and by ADOL. The other two serials were found positive for extraneous ALV by the manufacturers and CVB using p27 ELISA. Again, the COFAL assay was unable to detect the extraneous ALV within these serials.

Other findings at the CVB laboratory indicate that this recent ALV contaminant behaves differently than other known subgroups of ALV. For example, the extraneous ALV will grow in chicken embryo fibroblasts as do other ALV controls however, the p27 gsa of this variant extraneous ALV will not react in the CF assay, whereas known controls for ALV subgroups A, B, C, D, & J will.

The ability of the p27 ELISA to detect the variant extraneous ALV indicates a broader spectrum of specificity than the CF assay. Preliminary work at the CVB laboratory also indicates that the p27 ELISA has a higher sensitivity than CF for known ALV subgroup controls.

Based upon this evidence, we have concluded that the existing CF assay for the detection of ALV gsa p27 is inferior to ELISA.

In regards to testing for extraneous ALV in poultry biologics, the poultry industry has made it clear that they are concerned about the presence of any extraneous ALV and specifically any replicating p27 activity. With this in mind, CVB continues to focus its attention towards
test development that will amplify extraneous ALV from samples and detect the p27 gsa using ELISA.

A revision to SAM 405 has been completed which removed the use of CF and replaced it with p27 ELISA as the method for detection of ALV p27 gsa. Changes to 9CFR 113.31 regarding the standard requirements for extraneous ALV testing are being proposed. These changes will allow for the use of p27 ELISA instead of the CF assay.

Dr. Stanley H. Kleven, University of Georgia, Athens, Georgia presented the following update on National Animal Health Reporting System (NAHRS).

**Overview:** The purpose of NAHRS is to help protect the global market share of America’s animals and animal products. NAHRS is part of the United States’ comprehensive, integrated National Animal Health Surveillance System and is one source of information used to complete World Organisation for Animal Health (OIE) reports by USDA-APHIS-VS. The NAHRS program is a collaboration of participating States, the American Association of Veterinary Laboratory Diagnosticians, United States Animal Health Association, and USDA-APHIS. NAHRS is designed to gather data on the confirmed presence of OIE Lists A and B diseases of cattle, sheep and goats, horses, pigs, birds, and fish. NAHRS is a voluntary program. Confirmed clinical disease data are provided by the State Veterinarians (or representatives) of participating States utilizing disease reporting criteria developed by the NAHRS steering committee and set forth in the NAHRS Uniform Methods and Rules (UM&R). Reporting criteria for each disease include references to compatible clinical signs, the specified standard of laboratory testing, and any additional epidemiological information. Additional information about NAHRS and its reporting criteria can be obtained at the Center for National Animal Health Surveillance Web site at: [http://www.aphis.usda.gov/vs/ceah/cnahs/nahrs](http://www.aphis.usda.gov/vs/ceah/cnahs/nahrs).

**State Participation:** Participation in NAHRS is increasing. To date, all except 9 states have participated in NAHRS. These are AR, CT, GA, IA, KS, MO, NM, OK, and RI. Four states, AR, KS, NM, and CT are moving toward participation. Only two states (GA, OK) have definitely elected not to participate. In 2003, 35 states reported all 12 months.

**Reporting Data:** NAHRS annual summary is presented without any information that identifies the State, owner, or premises of origin. When reviewing 2003 NAHRS summary data, it is important to remember that NAHRS is currently a qualitative reporting system. The system collects data on the confirmed clinical presence of OIE List A and B diseases in the reporting States. A “yes” response from a State indicates that at least one new positive case of disease was confirmed during that specific month. A “no” response indicates that no new positive confirmed cases of disease were noted in the State during that
specific month. Endemic diseases, as with all NAHRS reportable diseases, are reported only when there is a confirmed report of clinical disease, as determined by the Chief State Animal Health Official utilizing NAHRS disease reporting criteria.


(Excerpted from NAHRS 2003 annual report and from recent data presented at the NAHRS Steering Committee meeting in Fort Collins in September 2004).

Dr. Spangler “Buzz” Klopp, Townsends, Inc., Georgetown, Delaware gave an update on the National Animal Health Surveillance System (NAHSS) Steering Committee (SC). NAHSS-SC is a steering committee for USDA disease surveillance in animals throughout the United States. The SC is comprised of 14 members from different areas of perspective—APHIS, university, state veterinarians and producer (pork, cattle and poultry) personnel.

USDA-APHIS is changing the way it conducts disease surveillance. Dr. Valerie Ragan of USDA-APHIS put this change into focus. NAHMS will stay under the direction of Dr. Nora Wineland. However, surveillance for FAD, Emerging Disease (ED) and Program Disease (PD) will be under the direction of the National Surveillance Unit (NSU) headed by Dr. Brian McCloskey.

The SC will focus heavily on the NSU, but will “steer” the NAHSS, which includes NAHMS. Additionally, the SC will be a source of expertise for APHIS-VS personnel in the development of surveillance systems for the three types of diseases mentioned above (FAD, ED and PD). Currently, AI and END are the diseases of concern for poultry. The poultry representative is the information source for these diseases.

As the poultry representative, my intention is to consult with other broiler veterinarians and especially turkey and table egg veterinarians since those segments of the industry are not currently represented on the committee. BSE, classical swine fever (hog cholera) and foot and mouth disease are examples of diseases of other animals that are of concern.

A great deal of the change in NAHSS results from concerns about protection of the food supply from both terrorists and from natural phenomena. This focus gives the Undersecretary of Agriculture access to information from DHS (Department of Homeland Security) that was previously unavailable. Accordingly, access of marketing and food service groups to this information will be restricted from Freedom of Information Act and available only on the basis of “need to know.”

NAHSS will not involve endemic disease such as IBD, cholera, etc. as this agency does not have authority or the desire to do so. Also,
NAHSS will interact with NPIP. The intent is to maximize cooperation and communication.

Dr. Charles W. Beard of the United States Poultry and Egg Association (USPEA) gave an update on the Research Programs Sponsored by USPEA. USPEA awarded $1,093,464.88 in competitive research grants in 2003. In the first 6 months of 2004, $528,870.00 has been awarded. These grants have funded research at a number of universities, government laboratories, and private research institutions, and cover all areas of interest to the poultry industries, including diseases, poultry nutrition, food safety, production management, processing, poultry products, environmental issues, and worker health and safety.

Symposium on Avian Influenza

Dr. Bill Smith of USDA-APHIS-VS gave an update on the H7N2 case in Connecticut. A large commercial layer complex in Connecticut developed signs of disease in January 2003, and was diagnosed with LPAI H7N2 in February 2003. Due to lack of funds for and the likely economic impact of depopulation, the decision was made to quarantine and vaccinate. The replacement pullets were vaccinated twice and the hens in lay were vaccinated once with a killed H7N2 vaccine. In August 2003 the supplies of H7N2 vaccine were exhausted, and an H7N3 vaccine was used. Unvaccinated sentinel birds were maintained and tested exhaustively. The last positive virus isolation was in June 2003. On September 30, 2004, 21 months post infection, the program was brought to a successful conclusion.

Dr. Annette Whiteford of the California Department of Food and Agriculture presented a review of the H6N2 situation in California. The H6N2 outbreak in California was successfully managed by industry-imposed biosecurity plans along with the use of a killed vaccine. The last positive virus isolation in commercial birds was in September 2003. There have been 27,000 negative tests in commercial birds since then. Isolations were made in custom slaughter plants in February and April of 2004, and on a quail farm in July 2004. Vaccination of commercial birds was stopped in June 2004.

Dr. Bruce Stewart-Brown of Perdue Farms, Salisbury, Maryland gave a report on the H7N2 outbreak in Delaware and Maryland. The Delmarva Peninsula is a well established, mature, and complex mix of poultry growing programs. We have four integrated poultry companies that contract with producers who own and maintain a variety of farm and house styles. This peninsula has some of the most densely populated poultry areas in the United States. These are just a few of the issues that have historically meant that infectious diseases were very difficult to isolate quickly.
TRANSMISSIBLE DISEASES OF POULTRY AND OTHER AVIAN SPECIES

AI is one of the most contagious viruses we deal with in poultry (particularly this H7N2 virus). To have only 3 flocks infected in the late winter/early spring of 2004 was surprising and a result about which all in the poultry industry were elated. The basics of our approach to the plan and the progression of the Delmarva Surveillance and Eradication Program will be described and discussed

Guiding Principles:

With the help of our previously developed MOU, we had a strong sense of what our approach to AI would be if and when there was an introduction into the commercial industry. The MOU allowed us to go forward with the following process without a time consuming philosophical discussion of approach. These principles were either already established or developed quickly as we worked:

- Two-mile radius - quarantine zone is established and immediately tested. Geographical ties are not always a problem early in an outbreak but proximity breaks are an obvious risk that has one of the highest priorities;
- Six-mile radius - buffer zone is established and tested. Six-mile zones generally catch a number of opportunities to test the next potential infected farm. A six-mile zone will have a larger number of farms that contract with the integrator that may have had the initial infected farm. It will have the opportunity to catch traffic that may be common to the infected farm and another farm – planned (grower, flock supervisor, feed truck, etc) and unplanned (whatever you can think of);
- High mortality flocks. This would be our highest priority. It was how we found both the infected commercial flocks. Although it is always likely to be a very high priority in any break, the type of virus and type of poultry will likely alter how useful it will be in finding positive flocks. It is also the experience of other AI outbreaks that some of the positive flocks found towards the end of the eradication effort are found positive very early in the infection and little if any of the typical clinical picture has had time to develop.
- Determine epidemiological links to the positive farm and test. Epidemiological links are determined from grower and integrator interviews. The obvious things include grower movement to any other farm, grower relatives (if applicable), electrical service calls (any other service call), flock supervisor visit (included to time of virus introduction not just time of diagnosis), and even traffic that would not include anyone entering the poultry house (such as feed truck visits).
- Don’t move any flocks to processing that have been infected. It is generally accepted as a very high-risk practice to move
REPORT OF THE COMMITTEE

flocks to processing in the middle of an infection. Virus is shed in large amounts through various materials and increases the likelihood of spread to neighboring flocks as well as flocks along the transportation route.

- Business processes will be disrupted. The poultry industry can and does work around challenging issues everyday. It has been very successful in determining options and figuring out how to be a consistent and dependable supplier of poultry products. Having said that, this is a disease eradication process and we weren’t looking for compromises that put the eradication effort at risk (even small risk). If a test was missed but they were on the processing list for that night, the flock was held until tested. All companies were fully supportive of this principle.

Types of Tests Defined:
The tests were all performed from trashcans at the end of the lane to the farm. Twelve birds from each house were placed in the trashcans early in the morning of the scheduled test day. We had two types of sample collection groups available: Federal and State veterinarians and technicians - local flock supervisors that had been trained by the Federal and State teams – both in the classroom and in the field.

<table>
<thead>
<tr>
<th>Test</th>
<th>Sample Collection by</th>
<th>Goal to complete</th>
<th>Follow-up Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 mile quarantine</td>
<td>Federal and State Teams</td>
<td>If over 3 weeks old, within 24 hours of initial diagnosis</td>
<td>Retest every 7-10 days after initial test</td>
</tr>
<tr>
<td>6 mile buffer</td>
<td>Federal and State Teams</td>
<td>Within 72 hours of initial diagnosis</td>
<td>Retest every 7-10 days after initial test</td>
</tr>
<tr>
<td>High mortality</td>
<td>Federal and State Teams</td>
<td>Within 24 hours of initial diagnosis</td>
<td>Retest if cause of mortality is not identified and if mortality continues</td>
</tr>
<tr>
<td>Epi Links</td>
<td>Federal and State Teams</td>
<td>Some within 24 hours, some within 5 days</td>
<td>Determined on a case-by-case basis</td>
</tr>
<tr>
<td>Pre-Slaughter</td>
<td>Within 6 mile - Federal and State Teams Outside 6 mile - Local Teams</td>
<td>2 and 6 mile radius farms cannot move until tested Expansion of pre-slaughter testing - as needed</td>
<td>NA</td>
</tr>
</tbody>
</table>
As discussed in the Guiding Principles above, there were five different reasons for testing a flock. Table 1 defines the test, responsible group for collection, our expectation for completion, and any follow-up testing requirement. It is obvious that the goals are difficult to accomplish in the initial case. However, they were very attainable for the 2nd commercial break.

**Challenges for the future:**

We had many planning and logistics challenges and those will have been addressed through other papers and other speakers. Beyond a discussion of scale-up, the logistics of collecting the samples or running the samples was never really a significant consideration in the design of the surveillance and eradication program. This is a tribute to all involved. We determined relatively early in this outbreak that we would need to preslaughter test the complete shore area for us to be confident of this eradication process. On February 16th we had made this decision to preslaughter test the complete shore – starting as soon as possible - for up to 4 weeks following the last positive. This gave us some confidence that we still were under some control when the 2nd commercial flock was diagnosed on March 5th. We had been preslaughter testing flocks throughout the area of the second break for several weeks and knew we had not moved any positive flocks to processing. We have more densely populated areas for poultry than the two commercial farms that became infected. It is apparent that a positive in one of these most populated areas presents an even more daunting challenge for planning, collecting, and performing the tests needed.

In a disease eradication situation, there is a tremendous strain on all involved. Days generally lose their names and become numbers following the last positive flock. Weekends are a concern because people generally want to or need to relax and think about other things — early in an eradication effort this can be a detriment.

Practice and planning are all very important parts of our success in any future challenges we are likely to have. The more the tools are utilized for everyday aspects of poultry health or company processes the more we will be able to expect from them in an emergency. Use of GIS is an example of a tool very important in a disease outbreak that is very useful in the every day management of a poultry industry.

Dr. Jose A. Linares gave a report prepared by Jose A. Linares, Tom Blount, Lelve Gayle, Lloyd Sneed, Gayne Fearnleyhough, Floyd Golan and William Wigle, Texas Veterinary Medical Diagnostic Laboratory (TVMDL), on the H5N2 and H7N3 cases in Texas. In February of 2004, H5N2 AI was diagnosed in black and red broiler chickens grown for sale at the Houston LBM's. The chickens were submitted on February 16 to the TVMDL, Poultry Diagnostic Laboratory in Gonzales, Texas. The flock had a history of gasping and the chickens submitted to the
laboratory had easily heard moist rales. Given the history and lesions observed, pooled sinus/tracheal exudate was tested immediately with the BD Directigen™ Flu A test. The Directigen™ result was positive. Arrangements were made to deliver sinus/trachea swabs for AI PCR to TVMDL, College Station. The next day four of six serum samples collected at necropsy tested AI AGID positive and College Station reported AI Matrix RRT-PCR positive and AI H5 RRT-PCR positive results. Subsequently, NVSL, Ames, IA confirmed our results and isolated H5N2 AI. The index flock was depopulated on February 21 and a total of 6,608 chickens were destroyed. In addition, epidemiological investigations conducted by the Texas Animal Health Commission (TAHC) identified two live birds markets in Houston with AI positive chickens. These two markets were depopulated and three additional markets voluntarily depopulated. On February 27, USDA reported that the amino acid sequence of the hemagglutinin cleavage site of our isolate was compatible with Highly Pathogenic Avian Influenza (HPAI). On March 1, NVSL completed their intravenous pathogenicity index (IVPI) testing and reported that no deaths or illness were observed in the inoculated chickens. A joint USDA/TAHC surveillance program was conducted in order to regain HPAI-free status for Texas and the U.S. A total of 2,938 serum samples were tested by AI AGID and a total of 3,595 trachea and cloacal swabs were tested by AI RRT-PCR. No additional positive flocks were identified. On April 1, the outbreak was declared over.

On the positive side, TVMDL was ready for the diagnosis and the TAHC was ready for control activities. An experienced TAHC/USDA response team was assembled. This was a very limited outbreak but resources and personnel were stretched beyond our limits. The declaration of the isolate as HPAI based on sequence analysis took us by surprise as the clinical findings, diagnostic findings and IVPI were consistent with low pathogenicity. The resulting media frenzy generated headlines such as “Deadly strain of avian flu in Texas” and “…first high pathogenic strain in 20 years.” This limited outbreak had serious logistical and economic implications for the poultry industry, the state and country.

In May of 2004 sera from a 50 wk-old broiler breeder flock submitted to TVMDL, Gonzales for regular AI surveillance tested AI AGID positive. Follow-up HI serology performed also at the Gonzales laboratory was H5 negative and H7 positive. NVSL confirmed our results and added complete serotyping as H7N3. Follow-up surveillance found another seropositive breeder flock and a backyard flock. The three flocks were depopulated. TAHC tested nearly 600 flocks. TVMDL processed, tested and reported results for 17,460 AI AGID’s and 2,724 trachea/cloacal swabs for AI RRT-PCR. The H7N3 virus was not isolated. The TAHC/USDA Command Center was closed on August 6, 2004.
TRANSMISSIBLE DISEASES OF Poultry AND OTHER AViAN SPECIES

AI is an ever-present worldwide challenge and it is thriving in the clash between “new” and “old” poultry husbandry practices. Wild birds, LBM’s and commercial poultry combined with breaches in biosecurity lead to predictable consequences. The politicization of AI due to the globalization of the poultry trade has a heavy toll on everyone. The emergence of public health issues is a worrisome trend. Active surveillance is the key to early detection, limited outbreaks and a quick resolution.

Dr. Erica Spackman of USDA-ARS-SEPRL presented a report on the H73 outbreak in British Columbia.

Outbreak History: On February 19, 2004 AI was detected on a commercial chicken breeder farm in British Columbia, Canada. The virus was characterized as an H7N3 subtype. Clinical signs on the index farm initially were mild drops in egg production and feed consumption and a minor increase in mortality. Gross lesions observed included lung lesions and inflamed tracheas. Within two weeks of the initial virus detection mortality in a second, younger flock on the index farm increased drastically.

Characterization of the virus isolated from the first flock by the National Center for Foreign Animal Disease determined the virus to be LPAI and the virus isolated from the second flock on the same farm was determined to be HPAI. During late-March the number of infected commercial operations and back-yard flocks had increased to 20 and 6 respectively, and a pre-emptive slaughter of all poultry in the high-risk zone was ordered. On April 5th, all poultry in the larger “control area” were ordered to be depopulated, an estimated 19,000 birds. In mid-April a third group of farms were determined to be positive for the virus, all birds within a 3 Km radius of any infected farm were immediately depopulated. By May spread of the virus slowed and ended; the last positive commercial premise was identified on May 13th and the last positive back-yard flock was identified on May 18, 2004. By the end of the outbreak 42 infected commercial farms and 11 infected back yard flocks had been identified. Approximately 17 million birds were destroyed during the outbreak. Furthermore, during the outbreak two human cases of H7N3 influenza were confirmed in two individuals, who had extensive exposure to HPAI infected poultry. Mild symptoms including conjunctivitis, runny nose, cough, headache and sore throat were reported by both individuals. Both patients were treated with the anti-flu drug Oseltamivir, and symptoms resolved in about a week.

Bibliography:
REPORT OF THE COMMITTEE

Dr. David Suarez of USDA-ARS-SEPRL presented a paper on the International AI Situation. A case of H5N1 HPAI was reported in Korea on December 3, 2003. Between January and February 2004, and number of other Asian nations were affected, and by June 2004 nine countries were affected. It is likely that this virus was present in many of these countries for some time before they were detected or reported by the governments. All of these H5N1 viruses can be traced back via molecular lineage to the Goose/Guangdong/1/96 virus. The 1997 Hong Kong virus had the same H gene, and the 1999 Hong Kong goose virus was almost identical to the 1996 virus. A second wave of infections has been reported since July 2004, and a tenth country (Malaysia) has been reported to be infected, but most of these new cases likely represent a recrudescence of the previous outbreaks.

An update on Prevention and Control of H5 and H7 LPAI Virus in the LBMS – Uniform Standards for a State-Federal-Industry Cooperative Program by Drs. Lynne Siegfried, TJ Myers, Fidelis Hegngi, USDA-APHIS-VS Certification and Control Team and Dr. Andrea Miles, USDA-APHIS-VS Eastern Regional Office was given by Dr. Siegfried.

At the 107th Annual Meeting of the USAHA (2003), the Committee responded to the presentation on the LPAI-LBMS program with a number of questions. Since that time, Dr. Ernie Zirkle has chaired a subcommittee of the Committee to address them. Results of a survey questionnaire from this subcommittee were provided to APHIS-VS to assist in further development of the Program. To build on the activities of this Subcommittee, the State-Federal-Industry Live Bird Market Working Group was reactivated. All interested individuals were added to the Working Group resulting in more than 60 members. Daylong meetings of the Working Group were held on May 13 and September 23, 2004 to work on the undecided Program issues. The product of these interactions is the completed first edition of the Program, “Prevention and Control of H5 and H7 Low Pathogenicity Avian Influenza Virus in the Live Bird Marketing System - Uniform Standards for a State-Federal-Industry Cooperative Program.” The Uniform Standards document was distributed at this meeting.

The Program addresses requirements for premises licensing, worker education, AI testing, record keeping, premises sanitation and biosecurity, disease surveillance, and response when AI-positives are found. Each of these requirements is covered for the LBM’s, for the various distributors of the marketing system, and for the suppliers (or producers) for the LBM’s. Appropriate States regulations are required for compliance with the Program Standards. APHIS supports the Program through providing personnel resources at the Federal level and personnel and laboratory resources at the State level, the latter through cooperative agreements. In addition, APHIS Investigative and Enforce-
TRANSMISSIBLE DISEASES OF POULTRY AND OTHER AVIAN SPECIES

ment Services is being funded to provide personnel assistance to the States in enforcement of their AI regulations. Under the Program, all participants must be licensed and have a premises identification number and biosecurity protocol. All personnel working within the LBMS must have been trained in biosecurity principles and procedures. All bird movement must be accompanied by paperwork that includes origin of the birds with Global Positioning System coordinates, test certificates, dates for all sales and movements, and numbers of birds and species. Federally approved laboratories in the northeast perform rapid turn-around virus-identification tests, allowing AI-positives to be addressed immediately. The Program Standards include specific protocols for inspections and specimen collection by animal health officials and the procedures to follow when positives are found at any level of the marketing system. Efforts will be made to trace all positives to their origin.

Indemnification and assistance with cleaning and disinfection and depopulation will be provided at all levels of the LBMS; a standard for calculating indemnity is under development.APHIS is currently funding a project that will provide information needed for the addition of a feasible bird identification requirement in the Program Standards. It is thought that the Standards will be revised to include this bird identification component by October 2006.

Mr. Andrew R. Rhorer of the NPIP gave a report on NPIP AI Program Activities. He also proposed a recommendation that the Committee support a recommendation from the NPIP to provide AI Hemagglutination Inhibition (HI) reagents to approved regional laboratories. NPIP Resolution 1, approved by the Official Delegates of the 37th Biennial Conference of the National Poultry Improvement Plan, July 10, 2004 San Francisco, California was:

Whereas: Avian influenza is an important disease to domestic poultry production and to the population of the United States as well as to the export of poultry and poultry products; and

Whereas: Diagnostic testing is essential to the control of avian influenza; and

Whereas: The rapid identification of H types of avian influenza is valuable in the control of avian influenza.

Therefore be it resolved: That National Veterinary Services Laboratories (NVSL) provide the Hemagglutination Inhibition antigens for all avian influenza Hemagglutinin types in carefully selected reference laboratories in each region of the country where commercial poultry is produced. All H5/H7 sample positives must be confirmed by NVSL, and, Be it Further Resolved: That the Senior Coordinator distributes copies of this resolution to the Deputy Administrator, USDA, Animal and Plant Health Inspection Service, the director of NVSL and Chair-

565
In response to the presentation of this NPIP resolution to the Committee, Mr. Paul Brennan, Indiana State Poultry Association, proposed the following Committee resolution:

The current importance of AI to bird health and trade in poultry products needs no elaboration. The USDA-APHIS-VS, in concert with the states and industries, is making great strides in addressing this threat to the domestic poultry industry via programs such as the Live Bird Market Working Group and the NPIP AI monitoring and control programs. An important component of these programs is rapid identification of AI and typing of the Hemagglutinin subtype by HI testing. While final determination of the subtype and pathotype of AI isolates should remain in the hands of NVSL, rapid preliminary determination of the HI subtype by carefully selected, trained, and qualified laboratories in each poultry-producing region of the country would enable more rapid application of control measures in the case of suspected outbreaks.

The proposed resolution would have recommended that the USDA-APHIS-VS-NVSL provide HI antigens, training in performance of the HI test, certification of proficiency, and periodic test monitoring to carefully selected NPIP reference laboratories in the major poultry producing regions of the United States.

Dr. Hashim Ghori of the Arkansas Livestock and Poultry Commission proposed an amendment to limit the reagents to H5 and H7 only. After considerable debate with observations by numerous Committee members, the resolution was not approved by the Committee.

Dr. Thomas J. Myers of USDA-APHIS-VS gave a progress report on USDA-APHIS-VS plans for control of LPAI H5 and H7 in commercial poultry. In 2004 a line item appropriation of $870,000.00 was made for control of LPAI. The creation of a line item is a positive development because it suggests the possibility of continued funding. In addition, $13.5 million was released on May 12, 2004 from CCC funds for the highly pathogenic AI outbreak in Texas ($2.8 million) and the LPAI program ($10.7 million). Of the latter, $6 million was earmarked for indemnity, $2.2 million for state cooperative agreements, $1 million for NPIP reagents and laboratory support from the NVSL, $600,000 for personnel and support, $500,000 for an AI vaccine bank, $300,000 for the bird identification study, and $200,000 for education and training. For fiscal year 2005, the President's budget calls for $12 million for LPAI. Appropriations bills have not been passed. The Senate version calls for $12 million for LPAI, while the House version calls for $23 million. It is hoped that the actual figure will be somewhere between these two, and the breakdown of funds would be similar to this year.
TRANSMISSIBLE DISEASES OF POULTRY AND OTHER AVIAN SPECIES

Current regulations authorize 50% indemnity for LPAI. NPIP has requested 100%, and it remains to be seen whether the agency will support this level. The vaccine bank contract has been awarded to Fort Dodge Animal Health. The current contract calls for production of 10 million doses of frozen antigen for each of two H5 and two H7 antigens, for a total of at least 40 million doses. It is anticipated that this amount will expand if funding is continued. There have been extensive discussions within the live bird market working group concerning the possibility of another market-wide closure. The current thinking is to get the system up and running and then evaluate the need for a market-wide closure at that time.

Dr. Michael J. David, Director of Sanitary International Standards, National Center for Import and Export, USDA-APHIS-VS reported on the “New OIE Disease Notification System and Updates to AI Code Chapter.”

**OIE disease notification system:**

Recent resolutions passed by the International Committee (OIE Member Countries) asked the OIE’s Central Bureau to establish a single list of notifiable diseases for terrestrial animals to replace the current List A and List B disease lists. The criteria for listing a given disease are as follows:

- Could it have significant international spread?
- Is it an emerging agent?
- Does it have zoonotic potential?
- Will it have significant spread in naïve populations?

In general, each criterion is associated with a given set of parameters, and if a disease agent meets at least one of these parameters, it becomes a notifiable disease. In addition to the disease agent, events of epidemiological significance associated with the disease become notifiable. Such events will require immediate notification and are as follows:

- The first occurrence of a listed disease and/or infection in a country or zone/compartment;
- The re-occurrence of a listed disease and/or infection in a country or zone/compartment following a report declaring that the outbreak has ended;
- First occurrence of a new strain or pathogen of a listed disease in a country or zone/compartment;
- A sudden and unexpected increase in the distribution, incidence, morbidity or mortality of a listed disease prevalent within a country or zone/compartment;
- Evidence of change in the epidemiology of a listed disease.
REPORT OF THE COMMITTEE

(including host range, pathogenicity, strain) in particular if there is zoonotic impact

These changes become effective beginning January 2005. Routine reports will be required to be submitted every 6 months, and emergency reports, as they are currently, will be required to be submitted within 24 hours of disease confirmation.

**Progress on the proposed revised chapter on AI:**

The United States has supported the efforts to have the Chapter reviewed and clarified, as long as such revisions are consistent, science-based and non-discriminatory. The latest draft revision redefines notifiable AI, and addresses various issues such as the definition of poultry, compartmentalization, control strategies including the use of vaccination, surveillance, the waiting period to regain freedom, and the safety of poultry commodities as it pertains to notifiable AI. The recommended import measures for trading in poultry commodities are based on the presence or absence of notifiable AI.

APHIS-VS, with significant input from industry, provided the OIE with comments to most of the Articles outlined in this second draft proposal. Due to the significance of our comments as well as of those from other Member countries, the OIE will re-convene its AI expert ad hoc group during November 2004 to review the comments and to make further recommendations to the Terrestrial Animal Health Standards Commission. A third draft of this AI Code Chapter should become available to the Member countries in February 2005 for review and further comment. It is anticipated that this third iteration will be adopted by the Member countries during the May, 2005 General Session and thus become the new international standard.

Dr. Bob H. Bokma, Regional Coordinator for the Americas, USDA-APHIS-VS National Center for Import and Export, gave the following report on Current AI reporting requirements of certain trading partners (Russia, Japan, others).

The United States has an obligation to report to the OIE any findings of HPAI. At this time, there is no requirement to notify OIE of non-reportable avian influenza findings, including LPAI H5 or H7. As a result of negotiations between trade policy and/or technical staff of the United States and their governmental counterparts in a variety of importing countries, the U.S. is also obliged separately from its OIE obligations to report findings of otherwise non-reportable AI.

The U.S. has entered into formal reporting agreements with the Russian Federation and Japan, and takes action to suspend exports to those countries. Russia requires reporting any avian influenza subtype finding in poultry, as well as action by the U.S. to suspend exports. Japan requires reporting of any H5 or H7 subtype only and places bans as a result. Other trading partners such as Mexico and Cuba also
TRANSMISSIBLE DISEASES OF POULTRY AND OTHER AVIAN SPECIES

expect the U.S. to report both reportable and non-reportable AI and may place bans. Many countries do not acknowledge having avian influenza in their bird populations. Based on the confirmation by NVSL of AI breaks, APHIS reports to the appropriate trading partners and to OIE as discussed here.

The media makes it obvious to all when there has been a finding of AI in the U.S. and has gone so far as to report subtypes such as H2 or H3 when they have learned of these. Media reports of non-H5 and H7 AI may be come from reports given by State laboratories, State Departments of Agriculture, county agents, and poultry companies. With the heightened interest in AI, reporters may not wait for information to come from an APHIS spokesperson or check on the importance of the subtype. In fact, APHIS may learn about the public report from the media. These reports quickly go international. When premature or unwarranted reports occur, trade disruptions may follow regardless of how minor the related influenza break may be.

Dr. T. J. Myers of USDA-APHIS-VS reported that he had contacted Dr. Byron Ripke of USDA-APHIS-VS-CVB in regard to the Committee's proposed resolution on mycoplasma and had received assurances that the number of existing vaccines had never been and would not be a criterion for the decision to review or approve any vaccine. After some discussion, the Committee agreed that the recommendation approved the previous day was unnecessary and voted to rescind it.

Dr. Stanley H. Kleven, University of Georgia, Athens, Georgia nominated Dr. John Hahn of USDA-APHIS-VS and Mr. Dennis Senne of USDA-APHIS-VS-NVSL to represent the Committee on the NAHRS Steering Committee. No further nominations were received from the floor and this slate was accepted by acclamation.

The Committee approved one two-part recommendation. At the urging of the ENDTF, the Committee recommended that USDA-APHIS-VS Deputy Administrator designate someone from the National Animal Health Programs and Policy staff who will establish a process to exchange information and work collaboratively on poultry health issues throughout the year with the Committee. In addition, USDA-APHIS-VS should prepare a final report on the expenditures, milestones and performance outcomes (including number of birds tested) from the $9.4 million CCC funds allocated for an END National Surveillance Program and share this with the Committee.

The Committee approved two resolutions and forwarded them to the Committee on Nominations and Resolutions for approval by the general membership. The resolutions addressed:

1. *Salmonella* performance standards. This resolution was also approved by the Committee on Salmonella.
2. Establishment of a process with USDA-APHIS-VS to exchange information and work collaboratively on poultry health issues
REPORT OF THE COMMITTEE

throughout the year with the Committee. In addition, this reso-
lution would request a final report on the expenditures, mile-
stones and performance outcomes (including number of birds
tested) from the $9.4 million CCC funds allocated for the END
National Surveillance Program.
TRANSMISSIBLE DISEASES OF SWINE

REPORT OF THE COMMITTEE ON
TRANSMISSIBLE DISEASES OF SWINE

Chair: Dr. Thomas J. Burkgren, Perry, IA
Vice Chair: Dr. Mark Engle, Colorado Springs, Colorado

Dr. Paul L. Anderson, MN; Mr. Philip E. Bradshaw, IL; Dr. Corrie C. Brown, GA; Dr. William L. Brown, KS; Dr. Eric J. Bush, CO; Dr. James E. Collins, MN; Dr. Gene A. Erickson, NC; Dr. James M. Foppoli, HI; Dr. Nancy A. Frank, MI; Dr. Thomas W. Freas, IN; Dr. Anthony M. Gallina, FL; Dr. Michael J. Gilford, MD; Dr. Joel Goldman, LA; Dr. Larry M. Granger, MD; Dr. Robert M. Harbison, AR; Dr. Howard T. Hill, IA; Dr. Richard D. Hull, IL; Dr. John A. Johnston, IN; Dr. John P. Kluge, IA; Dr. John A. Korslund, MD; Dr. Elizabeth A. Lautner, NY; Mr. James W. Leafstedt, SD; Dr. Donald H. Lein, NY; Dr. Charles E. Massengill, MO; Dr. James D. McKeen, IA; Dr. Robert B. Miller, VA; Dr. Sandra K. Norman, IN; Dr. Phillip A. O’Berry, IA; Dr. Richard E. Omohundro, AZ; Dr. Gary D. Osweiler, IA; Dr. Kristine R. Petrini, MN; Dr. Kurt D. Rossow, MN; Dr. Leon H. Russell, Jr., TX; Dr. Mo D. Salmon, CO; Dr. John P. Sanders, Jr., WV; Dr. Roy A. Schultz, IA; Dr. Rick L. Sibbel, IA; Mr. Dennis Slate, NH; Dr. Harry Snelson, NC; Mr. James E. Stocker, NC; Dr. Paul L. Sundberg, IA; Dr. H. Leon Thacker, IN; Dr. Lyle P. Vogel, IL; Dr. Margaret A. Wild, CO.

The Committee met on October 26, 2004 from 12:30 pm-5:30 pm. Approximately 15 committee members and 20 visitors were recorded on roll. The chair welcomed the Committee members and each was given the opportunity to introduce themselves.

Paula Fedorka-Cray gave an overview of the Collaboration on Animal Health and Food Safety Epidemiology (CAHFSE). This program has the potential to address many animal health issues and food safety issues, as well as national security issues. Current design calls for 48 sentinel farms collecting quarterly data. In addition, in-plant data for these farms will also be collected. Antimicrobial resistance testing is completed for Campylobacter, Salmonella, Enterococcus, and E. coli isolates. In the future, aggregate data will be available on a web site. Results from this long-term surveillance project within the meat-production system will:

- Monitor changes in pathogen prevalence;
- Monitor changes in pathogen antimicrobial resistance patterns;
- Indicate factors associated with resistance;
- Serve as the basis of hypotheses for on-farm and in-plant research; and
- Indicate factors which impact animal and human health.
REPORT OF THE COMMITTEE

Eric Bush updated the Committee on activities within the National Animal Health Monitoring System (NAHMS). All Swine 2000 reports have been released. There is a pending trend report derived from the last three studies. NAHMS is cooperating with the CAHFSE program in gathering data on production practices on the sentinel farms and in developing a web site to report findings. Bush reported on the re-organization of the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), Center for Epidemiology and Animal Health (CEAH) into the National Center for Animal Health Surveillance (NCAHS). Work is ongoing on the development of the National Animal Health Surveillance System (NAHSS). Plans are being prepared for the Swine 2006 study. Topics will include the non-ambulatory swine issue and general farm report.

John Korslund gave a historical perspective of the Classical Swine Fever (CSF) surveillance program. He then reported on the current status of CSF surveillance. Increased efforts have been made in surveillance, especially in high risk areas. A new polymerase chain reaction (PCR) test has been validated but not yet used for surveillance. It is sensitive and specific. Plans are being made for a new CSF Surveillance program, but at this point there is no formal program for CSF surveillance. A budget request will be made upon completion of the plan.

Mark Engle provided the Committee with an issue brief on emerging animal diseases and the recognition of these diseases. He highlighted differences between emerging diseases and foreign animal diseases. There are several recently emerged diseases in swine, including Porcine Reproductive and Respiratory Syndrome, Post-Weaning Multisystemic Wasting Syndrome, Porcine Dermatitis Nephropathy Syndrome and swine influenza. The Swine Futures Project serves as a “roadmap” for recognition of emerging animal diseases. Engle cited the importance for a coordinated surveillance system to detect emerging diseases. This system would include the use of state swine health advisory committees and a national swine health council. Communication and coordination is essential for success. Engle profiled the response to the Severe Acute Respiratory Syndrome outbreak in humans in 2003. A number of important lessons can be learned from the successful efforts to identify and respond to SARS. Keys to this success were adequate resources, central coordination and information sharing. The full text of Dr. Engle’s report is included in these proceedings.

Mark Wagner provided a practitioner’s observations on a case of high mortality in feeder swine in Minnesota. These pigs were imported from Canada. In this case, there was rising death loss over the course of the disease. Clinical presentation was coughing, lethargy, fevers
and some CNS signs. Treatment was based on clinical signs. Concurrent infections of influenza and *Hemophilus parasuis* were confirmed. Treatment response was dismal. Total mortality was 673 out of 992 pigs (63 percent). The surviving pigs were virtually normal.

Jerry Torrison presented a second practitioner’s perspective on the high mortality case. Twelve pigs were sent to the Minnesota Veterinary Diagnostic Laboratory representing dead pigs, downer pigs, normal-appearing pigs with a deep cough and normal pigs. Serology was also performed on pigs representing these same categories of pigs.

Kurt Rossow reported on the high mortality case from the perspective of the veterinary diagnostic laboratory. Gross lesions were seen in the lungs and meninges. Diagnostic tests included histopathology, bacteriology, molecular diagnostics, virology and serology. PCR tests were positive for BVD/Pestivirus. This was significant because CSF is caused by a pestivirus. Other positive results included *H. parasuis*, Type-2 porcine circovirus, and swine influenza (H1N2). The causative agent may have been swine pestivirus (BVD-like), but it is possible that the cause was a highly virulent *H. parasuis*. Further studies have been hampered by a delay of funding. The intent is to infect pigs with the pestivirus.

Samia Shawkey highlighted the response to the high mortality case by the USDA-APHIS-VS Foreign Animal Disease Diagnostic Laboratory (FADDL). The main concern was CSF. A foreign animal disease diagnostician was sent to the farm to collect samples. The samples were sent to FADDL at Plum Island for testing. Efforts concentrated on agent detection. A pestivirus was detected by PCR testing as well as virus isolation. Animal inoculation was also performed. Inoculated animals showed no clinical signs or gross lesions. No virus was isolated from inoculated animals. CSF was ruled out as a possible diagnosis. Future work will include genomic characterization. She recommended that foreign animal diseases be included in differential diagnoses for any case of high mortality in swine.

Jim Lewis gave his perspective as the owner of the pigs in the high mortality case. The mortality was the most dramatic aspect of this case. He was pleased with all the individuals, institutions and laboratories involved in this case. The actual financial loss of this case was $62,000. He stated that they were still waiting for a definitive diagnosis for this case and was looking forward to more study of the isolated agents.

Vicki Bridges updated the Committee on the Center for Emerging Issues (CEI) at CEAH. CEI continuously examines the external environment for issues that may impact animal health. Efforts include disease tracking and analysis. CEI is working in concert with the National Surveillance System. The CEI is developing guidelines to approach emerging issues. An Emerging Veterinary Events (eVe) database has been developed. Work will continue on an Emerging Animal Health
Issues Action Plan that will identify, investigate, assess, and respond. Communication will be essential in all aspects of the action plan.

The chair reported to the Committee that the two resolutions (29 and 30) approved by the Committee in 2003 were approved by the general membership. USDA responded to the resolutions. Copies of the resolutions and the responses were made available to the Committee.

Two resolutions was approved and forwarded to the Committee on Nominations and Resolutions for approval by the general membership. The resolutions addressed:

1. Development of a defined mechanism by USDA to detect, investigate, evaluate and respond to emerging diseases in swine.
2. USDA taking steps to protect the confidentiality of scientific data on microbial isolates.
EMERGING ANIMAL DISEASE RECOGNITION
AND RESPONSE – THE SARS COMPARISON

Mark J. Engle, DVM
Des Moines, Iowa USA

Introduction

“The key to recognizing new or emerging infectious diseases is surveillance. Surveillance and rapid response to identified disease threats are at the core of preventive medicine.”[1]

For public health purposes, the Centers for Disease Control and Prevention (CDC) defines surveillance as the ongoing systematic collection, analysis, and interpretation of health data essential to the planning, implementation, and evaluation of public health practice, closely integrated with the timely dissemination of these data to those who need to know. Additionally, no public health surveillance system is complete without being linked to action.[2]

The Swine Futures Project (SFP), the US swine industry’s “blue print” for an effective surveillance system, defines surveillance as an ongoing process of collection, analysis, and interpretation of health related events occurring in a population followed by timely dissemination of results to those involved in the planning, implementation, and/or evaluation of prevention and control measures.[3] Thus, by definition, effective surveillance must be ongoing or continuous with timely dissemination of results to allow an appropriate and adequate response by stakeholders.

The common themes in these two definitions are collection of health data, analysis of the data, and the timely dissemination of that information to those who can respond appropriately. These common themes are not by chance. For some time, pork producers have recognized the need for a coordinated, comprehensive, and integrated surveillance system to effectively identify and respond to emerging diseases. Public health surveillance principles and methodologies have served as the model for plans to evolve the current swine surveillance system beyond traditional regulatory disease surveillance. A recent public health response to an emerging disease, specifically Severe Acute Respiratory Syndrome (SARS), provides a unique opportunity to make comparisons against emerging disease recognition and response mechanisms in the swine industry.

Emerging Diseases

The occurrence of significant animal health events around the world has heightened interest by producers and veterinarians in emerging animal disease surveillance. The SFP defines emerging animal diseases to include foreign animal diseases, new diseases or re-emeri-
EMERGING ANIMAL DISEASE RECOGNITION
AND RESPONSE – THE SARS COMPARISON

gence of existing diseases. Classical Swine Fever (CSF) outbreaks in
The Netherlands, Haiti, Dominican Republic, Republic of Korea and
France; Foot and Mouth Disease (FMD) outbreaks in Taiwan, the U.K.
and Europe; and the Nipah virus outbreak in Malaysia, have increased
awareness of the risk associated with foreign animal disease (FAD).
Porcine Reproductive and Respiratory Syndrome virus (PRRS), E. coli
F18, H3N2 swine influenza virus, Postweaning Multi-systemic Wast-
ing Syndrome (PMWS) and erysipelas are examples of the recently
emerged and re-emerged diseases that have been very costly to pork
producers in the United States and around the world. Explosive growth
in global travel and world trade coupled with continual evolving pork
production practices; result in an increasing risk of emerging diseases
and their rapid spread within a country and around the world. For the
remainder of this paper and to be consistent with the recently formed
National Surveillance Unit, emerging diseases will reference the emer-
gence of novel pathogens or syndromes.

In the realm of public health, emerging diseases have economic,
social, and political repercussions. The globally mobile and tightly in-
terconnected human population provides new opportunities for dis-
eases to emerge and spread rapidly. Well-publicized, recently emerged
diseases such as influenza, West Nile fever, Monkeypox and Severe
Acute Respiratory Syndrome (SARS) have created an increased aware-
ness among public health officials as well as the general public in the
area of emerging disease surveillance.

Severe Acute Respiratory Syndrome (SARS) Epidemic

SARS was the first severe and readily transmissible new disease to
emerge in the human population in the 21st century. The first cases of
SARS are now known to have emerged in mid-November 2002 in
Guandong Province, China. The SARS virus was carried out of
Guandong Providence on the 21st of February 2003 to a hotel in Hong
Kong by an infected medical doctor who had been treating patients in
his hometown. His room was on the ninth floor. The guests and visitors
that stayed on that same hotel floor then seeded the disease into hos-
pital systems of Hong Kong, Viet Nam, and Singapore. Simultaneously,
the disease was spread to Canada by a traveler who had stayed on the
ninth floor in that same hotel during that time and subsequently re-
turned to Toronto. The virus was quickly transferred to other parts of
the world as medical professionals that had treated the early cases in
Viet Nam and Singapore traveled internationally for medical and other
purposes.[4]

On, March 15, 2003, the World Health Organization (WHO) de-
clared SARS a worldwide threat and issued travel advisories. At that
time, WHO formulated response plans and issued case definitions
and guidelines for infection control in hospitals. By March 17, 2003,
WHO set up three virtual networks including laboratory, epidemiology and clinical to expedite research on the SARS causative agent, to promote understanding of epidemiological features and to develop clinical guidelines respectively. These respective networks held daily conference calls to update case definitions, track the disease, discuss clinical treatment and share diagnostic information. On April 17, 2003, the laboratory network announced conclusive identification of the SARS causative agent: a novel coronavirus (SARS-CoV) unlike any other known human or animal virus in its family. Complete sequencing of its genome followed shortly. Reagents needed to calibrate and standardize diagnostic tests were provided at no cost to approved laboratories for regional diagnosis.

The important work of both the epidemiology network and the clinical network were key components in managing the outbreak and identifying the causative agent.

The diagnostic techniques employed to identify this novel virus deserve mention. The WHO international laboratory network had multiple groups attempting to identify the causative pathogen simultaneously. A review of publications from three groups, United States, Canada, and Germany, demonstrates that very similar diagnostic techniques were utilized.[6,7,8] Amazingly, each of these groups published articles at www.nejm.org reporting isolation of a novel coronavirus within a ten day window. In regards to methodology, each group first applied a "traditional" battery of diagnostic tests for known human pathogens that could be implicated in "diffuse alveolar damage" including bacterial/fungal culture, enzyme-linked immunosorbent assay (ELISA), immunofluorescent antibody techniques, immunohistochemistry, pathogen specific polymerase-chain-reaction (PCR), etc. As these tests returned negative or inconclusive results, electron microscopy (EM), virus isolation in cell cultures (VI), and nonspecific viral family PCRs were run almost simultaneously. In all three laboratory settings, VI on Vero cell cultures was the diagnostic technique that resulted in the isolation of the causative agent for SARS. EM and PCR were then used to identify the isolates and revealed them as novel coronaviruses.

At first glance, multiple laboratories working to isolate the same pathogen may appear to be a duplication of efforts. Arguably, it would be more efficient to direct all resources to one laboratory. However, with transparency and sharing of resources, the redundancy can be minimized. For example, after sequencing their coronavirus isolate, CDC immediately reported it on the WHO network website thereby allowing other laboratories to amplify CDC fragments in order to compare their isolates.[8] The fact that multiple laboratories isolated the same novel pathogen from case-defined patients in different parts of the world within a ten day period actually helped to validate that the isolate was significant and most likely a factor in the SARS outbreak.
EMERGING ANIMAL DISEASE RECOGNITION AND RESPONSE – THE SARS COMPARISON

SARS Lessons

The lag time between the first identified cases of SARS in November 2002 and the notification of the international community of “atypical pneumonia” in February 2003 was due to the lack of open reporting by China, one of the 192 member states of WHO. Interestingly, even though SARS was not on the WHO list of reportable diseases, the expectation was that this emerging disease should have been reported in a more timely manner. As with many diseases of concern in swine, the initial symptoms of SARS are non-specific, quite common and not immediately recognized as “reportable” clinical signs.

When a “traditional battery of tests” prove to be inconclusive, funding is not a limiting factor in the public health sector to continue the investigation into the realm of the unknown. In animal agriculture, lack of funding limits diagnosticians from further investigation into the possibility of a novel pathogen due to the lack of funding. The reality is 1) the producer has experienced enough economic loss and is not willing to create addition expense and 2) practitioners and diagnostic labs are fee based service providers. When increased morbidity and mortality occur in people due to an unknown cause, public health officials are not concerned with who’s going to pay for the investigation. In animal agriculture, unless a funding mechanism is developed to take investigations beyond the “tradition battery of tests” the lack of resources will continue to impede our recognition, identification, assessment and response to emerging animal diseases.

WHO has the International Health Regulations (IHR). The IHR provides the legal framework for global surveillance and reporting of human infectious diseases. This international reporting system is basically a passive reporting system that mirrors the passive surveillance system utilized in US animal agriculture for the detection of FADs and for documenting our nation’s herd health status through the National Animal Health Reporting System (NAHRS). Simply stated, passive surveillance relies upon the reporting of the cases to be initiated by the reporter. Potential reporters are assumed to have awareness and knowledge of the case definitions for reportable diseases and are also aware of their responsibility to report. In the public health sector, case definitions for reportable diseases are available through CDC in the United States and WHO internationally. Case definitions for reportable diseases in animal agriculture are available through the Office International des Epizooties (OIE) and NAHRS at http://www.aphis.usda.gov/vs/caah/cahm. Case definitions for reportable diseases in animal agriculture should be continually reviewed, refined and made readily available to practitioners, producers and diagnosticians.

Reporting disease occurrence based on well-accepted case definitions is fairly straightforward. However, emerging diseases are not as clear cut. When SARS emerged and was first recognized, obviously a
case definition did not exist and as stated above, the initial symptoms are non-specific. A case definition was developed once the syndrome was considered to be a significant health concern to encourage passive surveillance. This case definition was refined over time as the clinical disease was further characterized and diagnostic tests developed. The first case definition relied heavily on epidemiological patient history, such as travel and contacts. As more knowledge of the disease became evident, the SARS case definition became more specific. A mechanism to develop and deliver emerging disease case definitions in animal agriculture is needed to enhance our passive surveillance system. A recent assessment of the swine industry’s passive surveillance system has identified the need to increase coverage to those producers not using veterinarians, update case definitions for reportable diseases and create awareness among those responsible for reporting.[9] SARS clearly demonstrated the value of global alerts to increase awareness. Increased awareness is directly correlated to increased identification of suspect cases.

SARS was first identified as atypical pneumonia by medical professionals at the local level in Guandong Province. It is also recognized that emerging diseases in animal agriculture will first be identified at the local level by producers, practitioners, and diagnosticians. The National Pork Board and the American Association of Swine Veterinarians, in collaboration with USDA’s Veterinary Services (VS), has taken the initial steps in organizing emerging swine disease networks. These Swine Health Advisory Committees (SHAC) consist of producers, private practitioners, State and Federal veterinarians, laboratory diagnosticians, and others involved with pork production or swine research. The goal is to develop SHACs at the state and local level for early recognition and assessment of emerging diseases as well as sharing surveillance information through a local state, and national network. As described earlier, the timely dissemination of surveillance information is a key component of any surveillance system. However, during an epidemic, on-going communication and sharing of information becomes even more critical.

SARS also demonstrated the importance of communication to the general public. As many observers noted, the fear of SARS spread faster than the virus. Clear and factual messages need to be issued by trusted authorities.[4] In the event of a FAD or another emerging disease, proper communication to industry stakeholders as well as the general public will be critical to increase awareness without creating unfounded food security or safety concerns.

Conclusion
During the SARS outbreak, the WHO provided strong but politically neutral leadership to establish global coordination, develop ca-
EMERGING ANIMAL DISEASE RECOGNITION AND RESPONSE – THE SARS COMPARISON

Capacity, establish communications and mobilize experts to ensure an appropriate and rapid response to an emerging disease. Today, in animal agriculture, there is a void relating to response mechanisms regarding emerging animal diseases in the US. On an international scale, the Office International des Epizooties (OIE) establishes international standards for managing known diseases however; emerging novel diseases have not been addressed. Adequate resources, central coordination and information sharing at both a national and global level would be invaluable for the early detection, assessment and response of emerging animal diseases.

References
REPORT OF THE COMMITTEE ON TUBERCULOSIS

Chair: Dr. Charles E. Massengill, Jefferson City, MO
Vice Chair: Dr. Kathleen M. Connell, Olympia, WA

Mr. John B. Adams, VA; Dr. L. Garry Adams, TX; Dr. Bruce L. Akey, NY; Dr. Robert D. Angus, ID; Dr. Joan M. Arnoldi, WI; Dr. Daniel R. Baca, TX; Dr. Lowell R. Barnes, IN; Dr. Nathan Bauer, TX; Dr. Terry L. Beals, OK; Dr. Carole A. Bolin, MI; Dr. Steven R. Bolin, MI; Dr. Richard E. Breitmeyer, CA; Dr. Charles E. Brown, II, WI; Dr. John R. Clifford, DC; Dr. Thomas F. Conner, OH; Dr. Robert A. Cook, NY; Dr. Miguel M. Cordoba, MEX; Mr. Ed Corrigan, WI; Ms. Caren Cowan, NM; Dr. Donald S. Davis, TX; Dr. Jere L. Dick, NC; Dr. Anita J. Edmondson, CA; Dr. Dee Ellis, TX; Dr. Roger G. Ellis, NY; Dr. Steven R. England, NM; Ms. Ethel M. Evans, CO; Mr. Joe B. Finley, TX; Dr. John R. Fischer, GA; Dr. James M. Foppoli, HI; Mr. Bob Frost, CA; Dr. Michael J. Gilsdorf, MD; Dr. R. David Glauer, OH; Dr. Larry M. Granger, MD; Dr. Thomas J. Hagerty, MN; Dr. Burke L. Healey, OK; Mr. Del E. Hensel, CO; Dr. Jorge Hernandez, FL; Dr. Bob R. Hillman, TX; Dr. E. Ray Hinshaw, AZ; Dr. Donald E. Hoenig, ME; Dr. Sam D. Holland, SD; Dr. John P. Huntley, NY; Dr. Luisa Ibarra Lemas, MEX; Dr. Carolyn Inch, CAN; Dr. Billy G. Johnson, AR; Dr. Tom Kellner, NE; Dr. Victor P. LaBrane, MA; Dr. Maxwell A. Lea, Jr., LA; Dr. Thomas F. Linfield, MT; Dr. Daniel M. Manzanares, NM; Dr. Bret D. Marsh, IN; Mr. Daniel P. Marsh, MI; Mrs. Phyllis Menden, WI; Dr. Robert M. Meyer, CO; Dr. Andrea Mikolon, CA; Dr. Michael W. Miller, CO; Dr. Michele A. Miller, FL; Mr. Richard E. Nelson, VT; Mr. Tommy Oates, TX; Dr. James E. Oosterhuis, CA; Dr. Mitchell V. Palmer, IA; Dr. Janet B. Payeur, IA; Dr. Angela Pelzel, TX; Mr. Scott Petty, Jr., TX; Dr. Anette Rink, NV; Dr. Mo D. Salman, CO; Mr. Tom A. Scheib, WI; Dr. David D. Schmitt, IA; Dr. Stephen M. Schmitt, MI; Dr. Gerhardt Schurig, VA; Mr. Charly Seale, TX; Dr. Sarah B. Shapiro Hurley, WI; Dr. Clarence J. Siroky, ID; Mr. Les C. Stutzman, OH; Mr. George Teagarden, KS; Dr. Tom Thorne, WY; Dr. Paul O. Ugstad, CA; Dr. Joseph S. Vantiem, MD; Dr. Ray Waters, IA; Ms. Diana L. Whipple, IA; Mr. Dave Whittlesey, CO; Dr. Richard D. Willer, AZ; Mr. Ross Wilson, TX; Dr. George O. Winegar, MI; Mr. David Winters, TX; Mr. Steve Wolcott, CO; Dr. Glen L. Zebarth, MN.

The Committee met on October 25, 2004, from 12:30 pm-7:00 pm. There were over 145 attendees. Chair Chuck Massengill presided assisted by Vice Chair Kathleen Connell. After welcoming the Committee members and guests, the Chair reviewed the day’s agenda.

Dr. Massengill briefly discussed the revised Bovine Tuberculosis (TB) Eradication Uniform Methods and Rules (UM&R) for cattle and
bison. When the subcommittee formed to revise the UM&R provided a
final draft, the document received unanimous approval from the full
Committee. The recommended changes to the UM&R will be submit-
ted to the USAHA President to be forwarded to the Deputy Administra-
tor, United States Department of Agriculture (USDA), Animal and Plant
Health Inspection Service (APHIS), Veterinary Services (VS). Attend-
ees were urged to submit any suggested changes after reviewing and
using this document.

Dr. Eric Ebel, USDA-APHIS-VS, gave a status report of the bovine
TB eradication program in the United States. The full text of his report
is included in these proceedings.

Dr. Carolyn Inch, National Manager, Disease Control, Animal Health
and Production Division, Canadian Food Inspection Agency, Ottawa,
Ontario, Canada, presented the “Status Report on Bovine Tuberculo-
sis in Canada” prepared by Dr. Maria Koller, Senior Staff Veterinarian.
Dr. Inch provided details on eradication, surveillance and area surveil-
lance testing efforts for cattle, farmed bison and farmed cervids. Dr.
Inch’s complete report is included in these proceedings.

Dr. Luisa Pamela Ibarra, Director of Animal Health Campaigns,
Secretaría de Agricola, Ganadería, Desarrollo Rural, Pesca y
Alimentación (SAGARPA), Mexico City, Mexico, gave the “Status Re-
port on the Campaign Against Tuberculosis in Mexico.” Dr. Ibarra dis-
cussed the classifications of states, TB testing and the Accredited Free
herds. There are 18 states approved to ship cattle to the United States
and 14 Non-approved states. Many Accredited Free herd owners re-
ceive a premium for their milk, which is an immediate benefit of the TB
program and the producers.

Mexico reported that 2,590,583 tuberculin tests have been per-
formed this calendar year. A reactor rate of 0.40% representing 10,455
animals in 2004 compares to a reactor rate of 0.54% in 2003. Mexico
has accredited 3,759 tuberculosis free herds so far in 2004. The cattle
export season of 2003/2004 resulted in the movement of 1,372,456
cattle compared to 969,191 cattle in 2002/2003. Slaughter surveil-
lance in the United States discovered 15 animals with tuberculosis for
a infection rate of 0.15/10,000 for 2003/2004 compared to a rate of
0.21/10,000 for 2002/2003. Dr. Ibarra described many of the ongoing
initiatives in Mexico including work to modify the national animal health
program standards, continue training of veterinarians involved in all
aspects of the tuberculosis program, continue to identify regions of low
tuberculosis prevalence, and continue depopulation of affected herds.

Dr. Billy Johnson, Bi-National TB and Brucellosis Committee (BNC)
Coordinator, Conway, AR, and Dr. Alejandro Perera, USDA-APHIS,
International Services, Mexico City, Mexico, presented a report on BNC
activities. In addition to reviewing the history of the BNC, he discussed
TB reviews in Mexico, the waiver conditions document and the current
status of states.

Dr. Johnson gave a brief history of the 16 member BNC from the
formation in 1993, the time of operation under the Border States Consensus Document, the transition to the current operation under the standards of the United States domestic rule and the addition of brucellosis programs. He discussed the effect of the waiver of the whole herd test required in Accreditation Preparatory states. He explained that all approved states must submit an annual report to USDA of the activities in their bovine tuberculosis. He reported that as the eradication program continues in each country new problems develop and an example of these problems was the concern over the movement of animals from non-status states to states approved to export cattle to the United States. The movement of breeding stock under these conditions was addressed by establishing Certified Accredited Free Herds. The Committee will follow this program to assure that it is working as intended and does not allow the spread of tuberculosis.

Dr. Perera gave a presentation describing the ten conditions evaluated during review of a Mexican state for status under the USDA standards. He explained the five status levels and cattle movement requirements associated with each level. He explained in detail the particular information used to evaluate the compliance with each condition.

Dr. Michael S. VanderKlok, Michigan Department of Agriculture, Lansing, MI, gave an update on bovine TB activities in Michigan. Michigan began a cooperative effort in 1995 with USDA, Michigan Department of Natural Resources, Michigan Department of Community Health, Michigan State University and the livestock industry to control and eradicate bovine TB from the state. This program was enhanced at routine intervals since that time and was expanded from efforts based primarily in the northeastern portion of Lower Michigan, where the disease had been discovered in free-ranging wildlife and livestock, to include surveillance of all cattle, goat and bison herds within the state.

Since the implementation of mandatory statewide whole herd TB surveillance in January 2001, over 990,000 animals in 17,000 herds have been tested. In addition, mandatory TB surveillance instituted for privately owned cervid herds in 1998 has resulted in over 34,000 negative single cervical tests and over 3,600 animals declared negative on slaughter surveillance. No bovine TB has been discovered in any privately owned cervid herds since that time. Currently, 32 cattle herds, all located in the Modified Accredited area of Lower Michigan, have been found to be infected. Only 70 positive animals have been found in the approximately 3,000 animals contained within those herds and 30 of the herds contained 2 or less infected animals. The number of TB infected cattle herds has decreased from seven in Fiscal Year 2001, to five in FY 2002 and three in FY 2003.

In addition, extensive TB surveillance in wildlife has included over 123,000 white tailed deer tested and over 1,500 non-cervid wildlife tested. This testing has revealed 481 infected white tailed deer and 42 positive non-cervid wildlife. Over 80 percent of the infected deer were
located in a small area of the northeastern section of the Modified Accredited area and distribution of lesions in non-cervid wildlife has indicated that it is a spill-over host and not likely to cause transmission of the disease. Apparent prevalence in white tailed deer in the core area has been reduced from 4.9 percent in 1995 to 1.7 percent in 2003. The infection in yearlings, an indicator of newly infected animals, has been reduced from 1.9 percent to 0.3 percent in that same time frame. The strategies of reducing herd numbers and eliminating feeding and baiting, thought to be the primary causes allowing perpetuation of the disease, appear to be having an effect.

Michigan was granted official bovine TB split state status on April 19, 2004, which moved the majority of the Lower Peninsula and the entirety of the Upper Peninsula to Modified Accredited Advanced status. Along with this approval, state authorities were modified to require surveillance and movement requirements that are equivalent to those contained within the current draft revision of the UM&R. An aggressive animal identification, tracking and monitoring system was instituted for all cattle within the Modified Accredited area, which includes radio frequency identification device identification of all animals and an electronic tracking and permitting system for all cattle moved within this area. In addition, automatic tracking systems were installed and are operating in 12 Michigan livestock markets and seven slaughter plants located around the United States. A premises and individual animal identification system for the rest of Michigan is in the final stages of implementation.

Surveillance in the Modified Accredited zone is entering its third annual period. This surveillance includes annual whole herd testing of all 1,100 cattle herds located within this area and a random based surveillance program of 1,800 herds in the Modified Accredited Advanced area every two years. This random surveillance program is designed to detect 0.2 percent prevalence at 95 percent confidence, in addition to ongoing slaughter surveillance of over 350,000 cattle that undergo USDA, Food Safety Inspection Service inspection from Michigan each year.

Expansion of activities to eliminate the risk of TB transmission between livestock and wildlife is being implemented. This expansion includes mandatory risk reduction procedures in previously infected and TB accredited free-herds and implementation of educational programs and continued research into ways to eliminate this risk. USDA-APHIS Wildlife Services (WS) is a key contributor in this effort, including intensive efforts relating to assessment and control activities at infected farms. Michigan has also recently submitted an application for Accredited Free status for the Upper Peninsula, which has not had a case of bovine tuberculosis in any species, including wildlife, since prior to 1975.

Mr. Peter Butchko, State Director, Okemos, MI, and Mr. Mike Dunbar, Project Leader, both from USDA-APHIS-WS, presented a report on
the activities of Wildlife Services in Michigan. USDA-APHIS-WS is participating in many programs to reduce the risk of transmission of bovine tuberculosis from wildlife to cattle. They provide deer removal at the request of the landowner. The meat is donated to charity and the heads are submitted for Chronic Wasting Disease (CWD) surveillance. This assistance has been requested on ten farms so far. Another program is to provide fencing materials and the pay the cost of fence construction to exclude wildlife from feed storage areas. The landowner is responsible for maintenance of the fence and Wildlife Services makes visits to evaluate effectiveness. So far the fences have excluded wildlife from the fenced areas. Areas under fence range from 0.1 acre to 3 acres.

By working cooperative with the involved agencies and the livestock producers, wildlife services is able to perform observations on affected premises before the herd is depopulated and therefore better able to evaluate the interaction between wildlife and cattle. There is also more intensive sampling of wildlife including deer and small mammals.

The trapping of wild deer, collection of blood samples and application of a radio collar that can be detached remotely allows for the testing of animals with the Cervigam® test. The positive animals can be located and culled. Radio collars from negative animals can be detached and recovered for re-use.

USDA-APHIS-WS in Michigan also assists with the research projects in Michigan.

Mike Dunbar discussed the findings of a variety of animal species testing positive for bovine tuberculosis in Michigan. The positive animals were white tail deer, coyote, bobcat, red fox, grey fox, raccoon, opossum, and black bear. Dunbar also described studies to determine the amount of direct contact between cattle and deer. During the study, on case of direct contact occurred and was concluded to be an extremely rare occurrence. However, indirect contact between deer and cattle was found to be a fairly common occurrence. Various studies are in process to evaluate such means as dogs, fences, and scary devices to protect cattle from direct and indirect contact with wildlife. A study is also in process to evaluate the use of coyotes as sentinel animals due to their relatively small home range and their status as second most common tuberculosis infected wildlife in the study area.

Dr. Konstantin Lyaschenko, Chembio Diagnostic Systems, Inc., Medford, NY, gave a presentation entitled “Serological based assay for detection of tuberculosis in multiple species.” He described the MultiAntigen Print ImmunoAssay, a rapid test based on lateral-flow immunochromatography, and the use of various antigens including synthetic peptides, recombinant proteins and polyepitope fusion proteins.

The assays detect antibody responses in samples from white-tailed deer and cattle experimentally infected with *M. bovis*. The assays have
also been used for detection of antibody responses in naturally infected
cattle, elephants and other animal species. Results presented demon-
strated that antibody responses varied among different antigens used
for the assays. Using a combination of antigens resulted in detecting
more infected animals than using any single antigen.

Ms. Diana L. Whipple, USDA, Agriculture Research Service (ARS),
National Animal Disease Center (NADC), Ames, IA, and chair of the
Scientific Advisory Subcommittee (SAS), gave the SAS report. The
report was approved by the Committee and is included in these pro-
ceedings.

Dr. Dan Baca, USDA-APHIS-VS, San Antonio, TX, reported on
Tuberculosis Surveillance in Captive Cervids. Dr. Baca serves as Chair
of the Cervid TB State Status Working Group. Dr. Baca discussed the
amount of sampling to detect tuberculosis at various levels of infection
with various levels of confidence in a herd and in a state. The working
separated cervid herds into marketed operations which move live ani-
mals and non-marketed operations which do not move live animals. He
described the specific requirements for cervid tuberculosis status
in a state or zone including:

- State authority and infrastructure;
- Demographics of the cervid industry;
- Interstate and intrastate movement regulations;
- Movement test requirements;
- Animal identification requirements;
- Surveillance-live animal tests, slaughter inspection, postmor-
tem examination;
- Biosecurity in states or zones with a wildlife reservoir of TB;
and
- Monthly and annual reports.

He also discussed four proposed TB surveillance plans for a state
or zone. The working group recommended the adoption of the plan
with four levels of state classification. That plan assigned: Non Status-
infected herd prevalence of 6% or greater; Modified Accredited-infected
herd status less than 6%; Modified Accredited Advanced-infected herd
status less than 1%; and Accredited Free-infected herd status less
than 0.1%.

The Committee instructed the chair to forward the information to
the Cervid Uniform Methods and Rules Subcommittee encouraging
the use of the four status level recommended by the working group.

Dr. Bill Johnson, TB Eradication Strategic Plan Subcommittee Fa-
cilator, Conway, AR, presented the 2004 Strategic Plan for the Eradi-
cation of Bovine Tuberculosis in the United States. Dr. Johnson re-
ported that the subcommittee was formed at the request of President
TUBERCULOSIS

Don Lein and President-Elect Rick Willer. Twenty-three people were appointed to the subcommittee and worked for three months to revise the 2000 Strategic Plan in 2004. Four strategies were delineated in the 2000 plan: an eradication strategy with a total cost estimate of $10.4 million; a wildlife management and TB strategy with a total cost estimate of $2.55 million; a laboratory and diagnostic support strategy with a total cost estimate of $5.3 million; and a surveillance strategy with a total cost estimate of $5.6 million. Two additional strategies were added to the 2004 plan: an outreach strategy with a total cost estimate of $2.04 million; and a risk mitigation strategy with a total cost estimate of $7.45 million. The total per year cost of the 2004 Strategic Plan for the Eradication of Bovine Tuberculosis is $38.84 Million for five years. The 2004 Strategic Plan for the Eradication of Bovine Tuberculosis is included in these proceedings.

Dr. Dan Baca, USDA-APHIS-VS, San Antonio, TX, gave a report on Use of the Gamma Interferon Assay in Texas in 2004 Dr. Baca had presented the same report in writing during the SAS meeting.

Dr. Larry Judge, USDA-APHIS-VS, Lansing, MI, presented a talk entitled “Gamma interferon testing experiences in Michigan”. Dr. Judge had presented the same talk earlier during the SAS meeting.

At the conclusion of the formal presentations, Dr. Massengill reported on Resolutions and Recommendations from 2003. Dr. Ron DeHaven, former Deputy Administrator, USDA-APHIS-VS, had responded in writing to all three recommendations from 2003. Dr. Massengill read those responses to the attendees.

Three recommendations were approved by the Committee.

1. USDA-APHIS-VS should compile and analyze data on all skin testing done on reindeer in the United States. Data should be presented to the SAS before the 2005 USAHA meeting to determine if the scattergram for reindeer should be further modified to improve specificity of the CCT.

2. USDA-APHIS-VS should adopt and implement the revisions to the TB UM&R as prepared by the special subcommittee on the UM&R and adopted by the Committee.

3. The Cervid UM&R Subcommittee should include the state status surveillance plan recommended by the working group on surveillance methods.

One resolution was approved by the Committee and forwarded to the Committee on Nominations and Resolutions for approval by the general membership. That resolution urged USDA-APHIS-VS to adopt and implement the 2004 Strategic Plan for the Eradication of Bovine Tuberculosis.
Part I. Status and operations

For the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), National Tuberculosis (TB) Program, fiscal year (FY) 2004 saw some decline in the number of cattle herds that were found to be TB-infected relative to the previous year. In FY2003, a total of 10 infected herds were found. In contrast, only six infected herds were discovered in FY2004. Although slaughter surveillance for TB continued to improve through FY2004, four of the six newly discovered herds were the result of active surveillance programs in Michigan and Texas (i.e. not because of infection first detected at slaughter). One of these six newly discovered herds was disclosed via interstate testing requirements imposed by a State, while the remaining infected herd was disclosed as a result of epidemiologic tracing from the herd detected via interstate testing. Therefore, surveillance systems other than slaughter inspection were responsible for all infected herds detected during FY2004.

At the end of FY2004, 46 states, Puerto Rico and the U.S. Virgin Islands were TB Free. Texas, New Mexico and California are currently classified as Modified Accredited Advanced. During FY2004, Michigan was granted split state status. Therefore, Michigan is now divided into two zones; 11 counties and portions of two other counties in northeastern Lower Michigan continue to be Modified Accredited while the remaining counties in Michigan have been classified as Modified Accredited Advanced.

Three of the six infected cattle herds discovered in FY2004 were in Michigan. One beef herd and two dairy herds were identified in northeastern Lower Michigan. The most probable source of these infections is spill-over to the cattle from the endemic infection in free ranging white tail deer in that area of Michigan. One newly affected dairy was found in Texas during that State’s massive active surveillance project during FY2004. One consequence of that detection is Texas’ countdown until application for Accredited Free status is now delayed until latter 2006.

During FY2004 two newly affected premises were dairy calf growing operations in Arizona and New Mexico. Such premises pose substantial problems for the national TB program. Identification systems...
TUBERCULOSIS

for young dairy heifers and steers have not supported epidemiologic tracing of infected and exposed cattle in these investigations. Nevertheless, both of these dairy calf operations are responsible for supplying commercial dairies throughout the United States with large numbers of replacement heifers. Completing the epidemiologic trace-outs from these affected premises, in a timely manner, is critical to identifying potentially exposed commercial dairies and preventing subsequent infection in those dairies, as well as other dairies that receive cattle from these dairies.

These two calf raising operations also supply large numbers of Holstein steers to feedlots throughout the United States. During FY2004 there were 11 Holstein steer cases identified on slaughter surveillance (via VS Form 6-35 investigations) as TB-infected. Many of these cases likely trace-back to these, or other similar, calf-raising operations. Therefore, the role that growing facilities might play in transmitting infection within their cattle populations, and subsequently disseminating TB infection to other herds in the United States, must be evaluated. Notably, the detection of this many Holstein steer cases is reminiscent of a period in the early 1990’s in the United States when a large share of the TB cases detected at slaughter were Holstein steers imported from Mexico. In response to these cases, the United States placed an embargo on Holstein cattle from Mexico. As a result of this regulatory action in the mid-1990’s, TB cases among Holstein steers were essentially eliminated in the United States until this year.

Discovery of TB in these dairy calf growing operations raises multiple hypotheses concerning the source of their infection. One possibility is that these growing operations purchased calves from infected U.S. dairies that have not been detected through our various surveillance systems. This hypothesis seems less plausible given the large number of dairies that have recently been tested in California, Texas and New Mexico without detection of any heavily infected herds. Such surveillance evidence does not rule out the possibility that one or more heavily infected dairies might exist in the States that primarily supply the calves to these operations, but it certainly lowers the likelihood of that hypothesis being true. The plausibility of this hypothesis is further diminished when we consider that most dairy calves in the western United States spend a very small amount of time in their birth herds before they move into calf raising/grower marketing channels. This consideration suggests that these calves seemingly have a low likelihood of substantial exposure to TB while in their birth herds. If these calves are not entering the calf grower operation infected, then they must become infected while in residence there. This possibility raises questions about the potential exposure of dairy calves to feeder animals housed in the same operation. Mixing of dairy calves with feeder cattle might explain how these dairy calves become infected. If this
hypothesis were true, then the source of infection for the feeder cattle would need to be determined. Other possible hypotheses include the entry into these calf-raising operations of calves moved illegally from known-infected herds or areas; a persistent environmental reservoir; or exposure of calves to infected cattle prior to their entering the calf-raising operation.

To sort out these hypotheses, VS will provide more epidemiologic resources to investigate these occurrences in New Mexico and Arizona. These resources include assembling teams to complete the massive amount of trace-in and trace-out testing generated from these premises. Nevertheless, the potential for successfully concluding these investigations is hindered by our inability to trace younger cattle and account for their movements throughout their lifetimes. The shortcomings of our investigations may highlight the importance of good identification and traceability for U.S. cattle. However, VS is committed to investigating these operations to the greatest extent possible with the goal of uncovering how these dairy calves became infected.

Depopulation of the two dairy calf growing operations, the Texas dairy herd and the Michigan beef herd was accomplished in FY2004. There remain four affected dairy herds (2 large herds in New Mexico and 2 small herds in Michigan) under test and removal herd plans. The New Mexico dairies are carryover herds from FY2003 while the Michigan dairies were detected this year. In FY2004 two other dairies in Michigan that were detected in FY2003 qualified for quarantine release following a test and removal herd plan. Affected herds in Michigan will no longer be able to qualify for release of quarantine without meeting the requirements of the revised UM&R which are generally six or more tests without infection over a 4-5 year time frame.

The FY2004 depopulations were accomplished at the cost of $6,547,971. Indemnity costs for caudal fold tuberculin test positive animals in affected herds, comparative cervical tuberculin test- or gamma interferon-positive and suspect animals in non affected herds and for certain other situations were $903,245 for the fiscal year. These funds were paid out to 262 different producers. Total indemnity costs for all purposes were $7,478,217.

In FY2004, a process for transferring indemnity funds from staff to the regions in $50,000 increments was implemented with good results. This process has improved the government's service to affected producers by shortening the time it takes to indemnify them. The availability of these funds has improved the efficiency of our diagnostic capabilities in the TB program – it has expedited diagnostic investigations by enabling suspect cattle to be slaughtered and examined for evidence of TB instead of waiting for 60-day retests of suspicious animals (during which time the entire herd is quarantined pending classification of the suspect).
TUBERCULOSIS

There were no TB infected captive or farmed cervid herds found in FY's 2000 and 2001; three were found in FY2002, none were found in FY2003, but one was found in FY2004. These numbers continue to be encouraging, considering that a total of 41 infected cervid herds have been disclosed in the U.S. since 1991, but only four affected herds have been found in this century. Of those affected herds, 30 were depopulated (including the herd found this year) and 11 were tested out and qualified for release from quarantine. One of these 11 herds was a recrudescence and was again found to be affected this fiscal year, and was depopulated as noted above.

Nevertheless, there is continuing concern that the level of surveillance for TB in captive cervids may be inadequate. During FY2004, a working group of State-Federal personnel developed a surveillance plan for captive cervids that was presented to, and conditionally approved by, cervid industry leadership. This surveillance plan is integral to the TB eradication program's designation of individual State's TB status. This surveillance plan outlines necessary procedures for achieving and advancing through the different TB status levels (e.g. Modified Accredited to Accredited Free). Given the evolution of this plan, an interim rule that would reclassify the status of 23 states has not been published. The current captive cervid status of all States, therefore, remains at Modified Accredited. During this meeting of the USAHA Committee on TB, the surveillance plan for captive cervids will be presented for discussion and input. In addition, work has begun on drafting a Uniform Methods and Rules (UMR) document specifically for captive Cervidae. If the surveillance issue can be resolved, we expect that a revised UM&R will be available sometime during FY2005.

Currently there are 14 states and the U.S. Virgin Islands that have achieved and maintained their TB Free status for over 25 years; 16 states that have been TB Free for 15 or more years; 8 states that have been TB Free for 10 or more years; and 8 states and Puerto Rico have been TB Free for 5 or more years. Given the six herds discovered this year and the four herds that remain under quarantine from last year, there are 10 infected herds among the estimated 1,086,210 cattle herds in the United States for FY2004. Therefore, the national prevalence for FY2004 is estimated to be 0.0009%, or one affected herd per 108,621 U.S. herds. Though TB does exist in the United States, this extremely low level of prevalence should certainly be a significant factor in convincing international trading partners of the very low level of risk with TB in our cattle; and especially so for cattle originating in states with no disease for 5 or more years, of which there are 46 (and two territories).

Additional evidence for the low incidence of TB in the US is provided by the low prevalence of infection detected during the extensive active surveillance activities in California, Texas, Michigan, and New Mexico during FY2003 and FY2004.
VS is overseeing the implementation of the agreements to remove all dairy operations from the El Paso, Texas milk shed. The process is progressing as anticipated and is on track to be completed during FY 2006. There are a total of 9 dairy operations, some with multiple production units, being removed to create a buffer zone between the U.S. and the TB affected dairy operations immediately across the border in Juarez, Mexico. Five of the 9 operations have completed the depopulation of their livestock. Cleaning and disinfection is complete for three of these depopulated dairies. Currently, VS has two personnel, and Texas Animal Health Commission (TAHC) has one person, who are responsible for ensuring that every animal leaving any of the premises is identified and permitted to slaughter or a quarantined feedlot for eventual slaughter. This oversight will continue until all the herds are completely depopulated within the next two years. With one exception, the remaining premises with cattle have removed substantial numbers of their dairy cows. These cows were inspected at slaughter and, to date, have not had TB lesions detected. The rather complicated legal details for ensuring that each depopulated dairy will remain out of operation, in the El Paso area, for at least the next 20 years are nearly finalized for one of the depopulated herds and will be finalized for the others in due course.

Also, during this fiscal year, the TB reviews in Mexico have been ongoing under the umbrella of the U.S./Mexico Bi-National Tuberculosis Committee. Thirteen States or Regions in Mexico have had status either suspended or granted or continued as a result of this activity. One of the milestones in the phased transition of Mexican States or Regions to equivalence with the U.S. program was to reach a prevalence level of .25% by June of 2003. The second milestone is to achieve 0.1% prevalence and qualify as equivalent to the U.S. Modified Accredited status by June of 2005. These milestones have been and will be a focal point for the Review Teams. For this fiscal year there have been 16 review trips completed during which time the teams review the TB program integrity, progress and the level of prevalence. These efforts have covered 13 states in Mexico. The travel, salary and related costs covered by Veterinary Services (VS) were $242,067. There were 5 reviewers working under contract, 5 that were VS or IS employees, and 7 that were employed with and paid by state or industry from Texas, Oklahoma, Missouri, New Mexico and Arizona. The financial contributions of those states and industry groups are recognized.

Though remarkable progress has been made in the National TB Program, much work remains. Eradication is a daunting goal and it is the nature of eradication campaigns that the difficulty of the work increases as the goal gets closer. During FY2004, progress was made in bolstering the foundations of the National TB program to enable us to achieve our goal. A revised UM&R for cattle and bison was com-
TUBERCULOSIS

pleted by a State-Federal working group. It is intended that this UM&R be finalized at this USAHA meeting. Nearly all of the VS memoranda that serve to standardize our program have been re-written and finalized. State/Industry personnel can now access these memoranda through the Area Veterinarian-In-Charge (AVIC) in their State. Also, accredited herd requirements for goats are now in a separate VS memorandum, instead of part of the UM&R. The Annual State Report (Form 6-38) has been expanded via a memorandum and its importance will increase once the revised UM&R is finalized. These State reports are essential for documenting and scrutinizing the progress of the National TB program. The monthly State reports (Form 6-2) are also crucial to monitoring progress in our program. In FY2005, an automated process for submitting Form 6-2 will be implemented. That process will include a crucial component previously missing from the manual submission process; all Form 6-2’s will be audited by one or more responsible individuals in each submitting State prior to the transmission of the form to the National database. It is expected that data quality will be improved by the incorporation of this auditing step.

In our view, one of the major responsibilities and expectations of VS is to monitor and provide oversight and coordination for the National TB Program and, in so doing, establish and maintain assurance that the program is sound in all its facets and administered uniformly across the nation. Rulemaking and maintenance of the TB sections (parts 50 and 77) of Title 9 of the Code of Federal Regulations (9 CFR) are critical VS responsibilities. During FY2004 regulations were finalized to grant split state status to Michigan and prohibit the entry of Holstein-cross steers and spayed heifers into the United States from Mexico. Work also began on several other regulations during FY2004. A major rule that should be proposed soon deals with movement requirements for feeder cattle that originate in Modified Accredited Advanced States. This rule intends to address the lower-risk status of such cattle and facilitate their interstate movement into feedlots for eventual slaughter. The same rule also addresses the need for some herds to attain commuter status so that interstate movement can occur when an operation extends into more than one State. Further this rule will propose a provisional TB Accredited Free status as an alternative, under certain conditions, for States that have 2 or more epidemiologically unrelated herds disclosed in a 24 month period.

During FY2005, a rule will be developed to enable producers to move cattle interstate through one livestock market and then to slaughter without meeting the testing requirements applicable to their State of origin. This rule is most important for producers in States that are not Accredited Free and have limited opportunities to market their slaughter cattle within their State. Another pending rule intends to strengthen the import requirements for so-called “roping steers” that originate in
REPORT OF THE COMMITTEE

Mexico. This rule depends on a credible method for determining the ultimate purpose of a steer offered for importation at the U.S. border. Another rule in the drafting stage will propose to eliminate the provision for individual animals in Modified Accredited zones with wildlife reservoirs to move for 6 months following a whole herd test. It is also the intent of VS to finally remove its requirement for TB testing for the purposes of export from the United States. This requirement is either unnecessary or redundant for the purposes of international trade.

The program to control and eradicate Bovine TB came into being in 1917. After 60 years of reasonable progress the effort began to languish from the mid 1980’s through the 1990’s. To remedy this, a strategic plan was finished in 2000 in concert with the declaration of an emergency on the final eradication of TB from cattle, bison, and captive cervids. There were a total of 25 action items listed under 4 major strategies designed to improve the program and provide the best opportunity to realize a goal of eradication by year’s end 2003. That plan resulted in many of the action items being fully or largely completed. There was a significant increase in the appropriated and emergency Commodity Credit Corporation (CCC) funding available for TB and the level of complacency in the United States was lowered with better case finding a result. Nevertheless, as 2003 ended and 2004 came, there were a number of factors that were disconcerting for State-Federal livestock health officials and industry stakeholders. The major factors were 1) in 2000 all states were TB Free except Michigan and the El Paso milk shed of Texas but in 2002 Texas lost the Free status with California and New Mexico following in 2003; 2) the situation in Michigan with the wildlife reservoir of TB did not seem to be responding positively to increased manpower and funding but only maintaining the status quo; 3) a new case was discovered in a large dairy replacement operation in Arizona which also implicated a dairy calf operation in New Mexico, a development that seemed to support the hypothesis of some that the dairy female replacement pipeline was being infected at a continuously low level posing a risk to dairies and states that rely upon these sources for large numbers of replacements; 4) another large TB affected dairy was detected in Texas in FY2004; 5) a previously infected elk herd was again confirmed with infection in Kansas; 6) there were still 19 of some 40 major adult slaughter plants that were not sampling animals with TB suspicious lesions at or above the 1 per 2000 rate; 7) states were beginning to put entry test requirements on dairy cattle entering; 8) Mexican origin feeder cattle with TB continued to be discovered in U.S. slaughter plants, though at a much lower rate; 9) the goal of TB eradication by the end of 2003 had been missed; and 10) substantial numbers of newly affected herds continued to be disclosed annually.

In response to these concerns, the leadership of USAHA, National
Assembly of State Animal Health Officials and the Animal Agriculture Coalition met with Dr. John Clifford and staff members in late January of 2004 and discussed the concerns detailed above. It was decided that a subcommittee of the Committee on Tuberculosis would be named to review, revise, update and expand the existing strategic plan in light of newer information, recent developments and trends and the apparent need to reassess the situation and make conscious, considered and informed decisions as to how to proceed to finalize control and eradication of TB. The new strategic plan has been prepared and Dr. Billy Johnson presented the plan to the Committee at this meeting. The outcomes of those deliberations are outlined below by the six strategies with estimates of requests for new funding. The 2004 Strategic Plan is included in these Proceedings.

1. **Eradication** ($10.4 million)
   a. Anticipate more false positives, pay depopulation expenses
   b. Change from fair market to replacement value mandatory depopulation

2. **Wildlife management** ($2.55 million)

3. **Laboratory and diagnostic support** ($5.3 million)

4. **TB surveillance** ($5.6 million)
   a. Improve granuloma submission frequency (AHT’s in plants)
   b. Increase # of accredited herds
   c. Enhance reporting system

5. **Information and education** ($2.04 million)
   a. CE for accredited veterinarians

6. **Risk mitigation** ($7.45 million)
   a. Increase control of dairy collection premises (heifer raisers, backgrounders, feedlots, dealers). Test requirement on all non-slaughter dairy cattle moving interstate

In summary, the National TB program continues to face and overcome challenges as it progresses towards the goal of eradication. Our successes of the past should give us confidence for success in the future. One success has been the improvement in our slaughter surveillance system. The status of this system is discussed in Part III of this report.

**Part II: Updates on States with Recent Infection**

**Michigan update:**
Split State Status was granted to Michigan in April of 2004 and created two TB program status zones in Michigan: the TB endemic area remained at Modified Accredited (MA) status and the remainder of the state was upgraded to Modified Accredited Advanced (MAA) status. The MA zone includes the eleven counties in the NE portion of Michigan’s Lower Peninsula plus the northern-most portions of two counties (Ogemaw and Iosco). The state’s amended zoning order (rec-
ognizing this change in status) was effective on June 1, 2004 and detailed testing requirements for both intra- and inter-zone cattle movements. The MA zone includes all cattle herds affected with TB to date as well as all positive wildlife identified with the exception of three wild deer (one deer located in Osceola, Mecosta and Roscommon counties each). To date, a total of 33 cattle herds (and one captive cervid herd) in MI have been determined to be TB infected; this includes three premises that were found to be re-infected following depopulation (and subsequent repopulation of the two beef herds) or completion of a test-and-remove program (one dairy herd). Annual surveillance (and movement) testing is conducted on the 1,100 herds located in the MA zone; a random surveillance plan currently tests approximately 900 herds in the MAA zone annually. Future MAA zone surveillance will be risk-based (targeted) program and focus on herds in closer proximity to the TB endemic area.

Wild deer numbers have been reduced in the MA zone with the apparent prevalence of TB decreasing in recent years (hunter-killed surveillance). Feeding/baiting in seven counties in the NE portion of Michigan's LP is banned to help reduce the spread of TB in deer. Several additional species of wildlife have been found to be TB infected in Michigan although the role these animals may play in disease transmission still remains unclear. APHIS, Wildlife Services has constructed fences surrounding feed storage areas on farms in the MA zone in order to mitigate risk of TB transmission from deer to cattle. Movement restrictions (and subsequent testing) should diminish the risk of TB spreading from the TB endemic area (MA zone) of Michigan to other parts of the state. Michigan will soon require official (state) identification for all cattle movement (including to slaughter) and the state has recently applied for TB Free status for the Upper Peninsula of Michigan.

California Update:

As previously reported to this Committee, California’s TB status was downgraded to modified accredited advanced in April of 2003 as a result of 3 newly affected TB herds disclosed in 2002, all of which were dairies. Two of the herds were found as a result of slaughter surveillance and one resulted from epidemiological testing related to the first affected herd disclosed. California has been proactive in establishing and sustaining enhanced slaughter surveillance and credits that initiative for the early detection of TB in the State. Following initial discussions on the epidemiology of the new cases and the possibilities of regionalization of the small area, within which the 3 herds were located, it was decided to embark on a comprehensive area testing program of all the herds in the tricounty area of Kings, Tulare and Fresno counties. In addition, there were epidemiologically linked herds in 10 additional counties that were tested with a small but effective and effi-
cient “TB Task Force” that operated in the face of the END episode in California. At the time of completion of this effort 691 herds comprising 886,504 individual animals had been tested. More than 13,000 head of cattle were destroyed in the course of depopulation of the affected herds, and for diagnostic post mortems conducted on skin test suspects and/or reactors in non-affected herds. Early on, the State imposed entry testing requirements for TB on dairy replacement/breeding animals; an action that other States followed in the ensuing months and years. The epidemiological evidence collected during and since 2002 within California continues to point to imported cattle as the most likely source of the disease. The rapid and long distance movements of cattle intermingled from all areas of the U.S. and into California will remain a concern in the future. California will be eligible to apply for reinstatement into Accredited TB Free status in April of 2005.

New Mexico Update:
Also, as previously reported to this Committee 2 newly affected TB herds were disclosed in New Mexico during fiscal year (FY) 2003 resulting in the downgrade of TB status to Modified Accredited Advanced in July of 2003. Both herds were dairies and were disclosed as a result of slaughter surveillance. A significant component of adult slaughter animals from New Mexico are slaughtered in Texas and Arizona plants under good slaughter surveillance. These herds opted for a test and removal herd plan rather than depopulation extending any chance for reinstatement to Accredited Free status for New Mexico to at least 4-6 years in the future or to the 2006-2007 timeframe. For this reason New Mexico has submitted a request for split State status which, if approved, would result in a limited area of northeast New Mexico, where the two affected dairies are located, remaining in Modified Accredited Advanced status and the remainder of the State regaining accredited TB free status. In early 2004 a TB infected Holstein heifer was discovered in Arizona and a TB infected Holstein steer was traced from slaughter back to a small feedlot in Iowa. The epidemiology on both cases implicated a large dairy calf raising facility in the eastern part of the State. This facility was depopulated. A plan to test all dairies in eastern New Mexico, beef herds within a 3 mile radius of the affected premises, dairies with epidemiological links to the affected premises, and dairies that supplied a significant number of calves or that received any calves from the dairy calf raising facility was formulated and implemented in 2003 and 2004. By mid September of 2004, 65 dairies and all the targeted beef herds had been tested with approximately 110,000 head without disclosing additional affected herds. A goal to complete all the planned testing and pending epidemiological tracing and follow-up has been established at year’s end [2004]. A mini task force approach to assist the New Mexico infrastructure is planned and staffed and working at this time.
Texas Update:

Texas was downgraded to Modified Accredited Free status for TB in June of 2002. The loss of TB Accredited Free status for Texas, as well as for New Mexico and California, requires breeding cattle moving interstate, other than for slaughter, to have a negative TB test within 60 days of movement, a significant economic consideration for the cattle industries in the 3 States. As previously reported to this Committee, Texas adopted a TB eradication strategy in late 2002 that included 5 critical elements designed to enhance case finding surveillance and to mitigate the risk of continuing exposure from outside sources. By early October of 2004 Texas had tested all of their dairies; a total of 772 herds with 334,947 animals and 330 purebred beef herds with 31,852 animals for a total of 1102 herds and 366,799 cattle. The majority of this testing was accomplished by accredited veterinarians working on fee basis agreements after special training sessions on the TB program, application of the test and expected response rates. After a period of conducting the comparative cervical tuberculin test side by side with the interferon gamma test Texas relied to a great degree on the interferon gamma test for follow-up on caudal fold tuberculin test positive animals. The number of interferon gamma tests conducted totaled 8614 and the experience gained with logistics and day to day use of the technology was valuable. This testing disclosed one affected dairy herd of 1500 head, with a singleton infected animal, which has been depopulated. Slaughter surveillance continues to be a high priority in Texas where 7 of the major adult cattle slaughter facilities are located. Six of the seven are submitting granulomas for TB surveillance at or above the targeted level. If no additional infection is detected the State may apply for Accredited Free status in late 2006.

Part III: Surveillance in U.S. Livestock

Slaughter surveillance for bovine tuberculosis in the United States during Fiscal Year 2004 continued to identify new cases of TB in both adult and fed cattle. Thirty-five new cases of TB were found in cattle in U.S. slaughter plants during the year. Thirty-nine cases were reported last year. No cases of TB were detected in bison slaughtered under state or federal inspection either this year or last.

One of 35 TB cases (2.9%) involved an older, adult beef cow. Thirty-four cases (97.1%) were detected in fed steers or heifers.

Epidemiologic investigations related to the adult beef cow case resulted in tuberculin testing of possible source herds located in New Mexico and Arkansas. No likely herd of origin for this infection has been identified to date. An official eartag was collected from the cow at the time of slaughter; however, insufficient record-keeping by previous owners hindered further tracing efforts.

Investigations of 21 fed cattle cases completed to date showed that
TUBERCULOSIS

15 cases were identified with official Mexican ear tags. Four of these tags originated from the Mexican state of Durango, 2 tags each came from Chihuahua, Coahuila, and Aguascalientes, and one tag each came from Nuevo Leon, Sonora, Tamaulipas, Colima, and Veracruz. Field investigations completed for 6 other cases without official identification clearly showed the origin of these cattle to be from Mexico also.

The case rate for TB cases found in Mexican-origin cattle imported into the United States for feeding and grazing continues to decline from previous years. During FY 2004, 0.22 cases of TB were detected for every 10,000 head of feeder cattle imported from Mexico. Case rates reported for the previous two years were 0.54 and 0.34 respectively.

The following table provides TB case rates for each Mexican state based on the numbers of cattle exported from that state. Individual state rates during FY 2004 ranged from 10.5 cases per 10,000 feeder cattle imported from Colima to 0.03 imported from Sonora.

<table>
<thead>
<tr>
<th></th>
<th>COL</th>
<th>NL</th>
<th>AGS</th>
<th>DUR</th>
<th>COAH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rate</td>
<td>10.5</td>
<td>3.07</td>
<td>2.07</td>
<td>0.91</td>
<td>0.43</td>
</tr>
<tr>
<td>Imported</td>
<td>949</td>
<td>3,260</td>
<td>9,660</td>
<td>44,099</td>
<td>46,648</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>VER</th>
<th>TAM</th>
<th>CHI</th>
<th>SON</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rate</td>
<td>0.28</td>
<td>0.12</td>
<td>0.05</td>
<td>0.03</td>
</tr>
<tr>
<td>Imported</td>
<td>35,723</td>
<td>82,419</td>
<td>414,327</td>
<td>305,251</td>
</tr>
</tbody>
</table>

USDA is expecting that total numbers of TB cases and rates of TB in imported Mexican cattle will continue to decrease for all Mexican states in light of increased imports of feeder cattle now coming into the United States.

Investigations are in progress for the 13 remaining fed cattle TB cases. Two of these cases involve beef-type cattle, and 11 cases were detected in Holstein steers. In addition, tuberculin skin testing in a group of Holstein replacement heifers during December, 2003, disclosed active, pulmonary infection in a 10 month-old Holstein replacement heifer. This heifer was located in a large, calf growing facility in Arizona, and had previously resided at another large, calf raising facility in eastern New Mexico when it was a young calf.

Information developed to date regarding possible origins for these 12 Holstein TB cases can be summarized as follows:

1. Nine of the 12 Holstein cases circulated through one of two large calf raising facilities. Four cases (3 steers and 1 heifer) were grown as young calves in a facility (Facility 1) in eastern
REPORT OF THE COMMITTEE

New Mexico prior to their being sold for further growing or feeding, and 5 other cases were grown in a facility (Facility 2) in west Texas. The remaining 3 cases are still being investigated as to their whereabouts when they were young calves.

2. Movement papers and other records suggest that the 9 Holstein cases investigated to date would have entered Facility 1 or Facility 2 as young calves in the time period December, 2002 thru April, 2003. This clustering in time might suggest that they may have been purchased at or about the same time from a common source.

3. Both Facility 1 and Facility 2 purchase thousands of Holstein bull and heifer calves from multiple sources annually. During the 5 month period that Facility 1 most likely received their 4 cases, 21,155 Holstein bull calves and 4,603 Holstein heifer calves were purchased from at least 27 large dairies, 83 smaller calf raisers and dealers, and 2 sale yards in New Mexico and Texas. Facility 1 had not implemented an identification system which would permit further tracing to a specific origin. At least 5 sources of calves were common to both facilities. Unfortunately, all 5 common sources were calf raisers or dealers themselves that do not use any type of identification or record-keeping system capable of trace back.

4. Testing of all possible source dairies in New Mexico is now in progress. Since January, 2004 more than 70,000 cows in 30 dairies located in eastern New Mexico have been evaluated. Testing of possible source dairies in Texas has largely been completed as part of the Texas-wide area test of all dairies in the state. No evidence of infection has been found in dairies located in Texas or New Mexico to date that would explain the origin for these 12 cases.

5. DNA fingerprinting of all 12 cases is now being conducted and compared to past TB cases to address questions as to possible origins for these infections. Do the individual case fingerprints suggest a common source, or do these cases possibly represent multiple origins?

6. At least 6,042 Holstein replacement heifers left Facility #1 during the period of greatest potential exposure. These heifers were sold to dairies, feed yards, and other calf growers and sale yards in other states, and have now dispersed. Fortunately, over 3,600 of these heifers were located and depopulated with federal indemnity paid. No further evidence of disease was detected.

Three hypotheses that may explain possible origins for these 12 Holstein cases should be further examined.

1. **Hypothesis 1: Are young Holstein calves being exposed**
on U.S. dairies yet to be identified as TB-infected? Until all possible source dairies are tested, this hypothesis can not be discounted. However, over 400,000 dairy cows located in at least 800 dairies in Texas and eastern New Mexico have been tested over the past year. One infected herd was detected in Texas. However, the extremely low prevalence (< 0.05%) in adult cattle in this dairy and the lack of any evidence of TB in the herd's replacement heifers at the time of whole herd depopulation does not support this herd as the source for infection in any of the recent Holstein cases. Also, as more herds continue to be tested with negative results, this hypothesis becomes less likely.

2. Hypothesis 2: Were these particular Holstein cattle exposed to potentially higher risk cattle (i.e. Mexican steers) as they moved through feeding channels? The nine cases that have been investigated in more detail to date do not indicate that any exposure to higher risk cattle occurred as they were being grown.

3. Hypothesis 3: Could these Holsteins have come from areas that historically have had TB (i.e. El Paso milkshed)? Initial interviews with calf raisers and dealers who supplied Holstein calves to both Facility 1 and Facility 2 indicate that calves were acquired from other calf dealers in the El Paso, Texas area. A few health papers documenting movements of Holstein calves have also been identified in the records. More interviews and investigations are now in progress to confirm this information, and to better clarify possible origins for these movements.

In summary, investigation of these cases continues. However, identification of a definitive source is problematic and unlikely because of multiple movements of large numbers of unidentified Holstein bull and heifer calves throughout the dairy calf raising industry.

Results of efforts to enhance slaughter surveillance for bovine TB continued to show improvements during FY 2004. USDA's Food Safety Inspection Service (FSIS) reported a total of 36.1 million cattle under FSIS inspection during the year. Nearly 5.8 million of these cattle were adult cows or bulls. A total of 6,367 suspicious tissues from all classes of cattle were submitted for diagnosis during the past year which is a record high for total numbers of granulomas submitted, and represents a 519% increase in sample submissions since adopting the Comprehensive Strategic Plan for the Eradication of Bovine Tuberculosis in 2000. Of the 6,367 total samples, 5,326 (83.7%) came from 5.73 million adult cattle killed in 100 plants. These plants account for 99% of all adult cattle killed this past fiscal year. The national granuloma submission rate for adult cattle at the end of this year was 9.29
REPORT OF THE COMMITTEE

Submissions per 10,000 adult cattle killed. Once again, this represents a continued, significant improvement in submission rates from adult cattle over past years, and documents the good effort and commitment that most of our state and federal meat inspection professionals are making to improve TB surveillance.

However, a closer analysis of the adult granuloma submission rates by individual slaughter plant indicates that consistency and uniformity of sampling may still be "out of balance" in the sense that some adult cattle slaughter plants may be looking harder than others to find the last cases of TB.

During FY 2004, 40 plants located in only 19 states slaughtered 93.6% of all adult cattle. These plants play a critical role in all our national animal disease surveillance programs. TB granuloma submission rates per 10,000 adult cattle killed ranged from 24.71 to 0.05 among these 40 plants.

Twenty-one (53%) of these 40 plants were outstanding in their efforts to support the National Bovine TB Eradication Program by contributing 84.9% of all the granulomas submitted from adult cattle last year (4,525 submissions). Their combined granuloma submission rate was 14.1 submissions per 10,000 adult cattle killed or almost 3 times the target of 5 submissions per 10,000 adult cattle killed. Fifty-five percent of the total adult cattle killed last year were from these 21 plants.

Five (13%) of these 40 large plants made significant progress toward achieving the goal of 5.0 submissions for every 10,000 head of adult cattle killed by submitting at a combined rate of 4 per 10,000. These plants together submitted 2.5% of the total adult submissions (133 submissions), and killed only 5.8% of the adult cattle slaughter population.

Unfortunately, 14 (34%) of these large, adult cattle slaughter plants submitted at a combined rate of only 1.49 submissions per 10,000 adult cattle killed. These plants inspect 32.3% of the adult cattle killed annually, but submitted only 5.2% of the total adult submissions. Two of these 14 plants made only 1 submission each, but killed 347,388 adult cattle between them. Meat inspection personnel located in both plants have been visited repeatedly in the past, but these plants have yet to cooperate with the enhanced TB surveillance effort. It is recommended that more aggressive approaches be taken to resolve the sampling problem in these two plants.

Considering that 12 of the 14 lower-submitting plants are located in 12 Accredited-Free states, concerns continue to build regarding the adequacy of slaughter surveillance to effectively identify infection in these states. During FY05, the State-Federal Bovine Tuberculosis Eradication Program must work to enlist the support of management at all levels to correct the deficiencies represented most profoundly by the 14 slaughter plants. The revised TB Uniform Methods & Rules incor-
porates performance standards for slaughter plants. A revised Memo-
randum of Understanding between Veterinary Services and FSIS rein-
forces these standards. We expect that these changes will provide
and sustain the focus and resources needed to improve and correct
the deficiencies.

On farm testing continues to be an important part of our national
TB surveillance system. To assess the amount of testing for a full year,
we examined the National Database for the interval between June 1,
2003 and June 30, 2004. Such a time interval was necessary because
of delays in monthly status reports during FY2004, but this time inter-
val also represented a substantial number of tests for cattle because it
included substantial portions of the area tests in California, New Mexico
and Texas.

During the annual period examined, there were 2,013,420 caudal
fold tests reportedly conducted on cattle and bison. There were 27,037
responses (1.3%) reported among these caudal fold tests. On a re-
regional basis, most (84%) caudal fold testing was conducted in the
Western region during this time period (Table 1). The purpose of test-
ing was also somewhat different between the regions. The most com-
mon purpose of testing in the Western region was noted as area test-
ing while in the Eastern region the most commonly reported purpose
was Accreditation. Given the large amount of area testing conducted
in Texas, California and New Mexico the Western region results are not
unexpected. The Eastern region results are partially explained by the
large number of accredited herds in Pennsylvania and by the fact that
the reasons given for Michigan’s testing – which are substantial – are
divided into area testing and an “other” category in the database. Epi-
demiology was another important reason for testing in the Western
region and was likely a result of tracing activities in the States previ-
ously mentioned. Both regions had similar proportions of tests con-
ducted for movement purposes. A smaller proportion of tests were con-
ducted for milk ordinance reasons in both regions as well.

The fraction of responders reported by test reason and region were
assessed (Figure 1). Substantial differences in these fractions between
Eastern and Western regions are evident when the reason for testing
was area or “other”. These differences, to a large extent, are the result
of the large number of dairy cattle in Michigan that respond on the
caudal fold tuberculin test. When we examine testing done by regula-
tory veterinarians in Michigan we see a similar fraction of caudal fold
responses. Despite the presence of TB in Michigan, most of these
caudal fold responses in dairy cattle are false responses (based on
subsequent diagnostic work-ups). In both regions, the fraction of re-
sponses reported on testing done for accreditation and movement
purposes are similar and low. Such testing is typically conducted by
accredited veterinarians. In contrast, the epidemiologically related cau-
dal fold testing is typically done by regulatory veterinarians and the response fraction for these tests is similar between regions and much higher. These results suggest the importance of the caudal fold tuberculin testing performance standard that is part of the revised UM&R for adult cattle and bison.

Comparative cervical tests are conducted by regulatory personnel on cattle that respond to the caudal fold tuberculin test. The intent of these tests is to rule out cattle as suspicious for TB. Of 26,130 comparative cervical tuberculin (CCT) tests reported (June 2003 – June 2004), there were 494 (1.9%) suspects or reactors found. In the Eastern region there were 4938 CCT tests run with 83 suspects or reactors.

### Table 1. Summary of caudal fold tuberculin testing of cattle and bison in the United States; June 01 2003 to June 30 2004.

<table>
<thead>
<tr>
<th>Region</th>
<th>Total tested</th>
<th>Responders</th>
<th>Fraction</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. Total</td>
<td>2,013,420</td>
<td>27,037</td>
<td>1.3%</td>
</tr>
<tr>
<td>Eastern Region</td>
<td>321,590</td>
<td>4,797</td>
<td>1.5%</td>
</tr>
<tr>
<td>Testing Reasons</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Area</td>
<td>32,719</td>
<td>1,140</td>
<td>3.5%</td>
</tr>
<tr>
<td>Accreditation</td>
<td>90,013</td>
<td>421</td>
<td>0.5%</td>
</tr>
<tr>
<td>Movement</td>
<td>88,871</td>
<td>262</td>
<td>0.3%</td>
</tr>
<tr>
<td>Milk ordinance</td>
<td>26,978</td>
<td>612</td>
<td>2.3%</td>
</tr>
<tr>
<td>Import</td>
<td>2,193</td>
<td>37</td>
<td>1.7%</td>
</tr>
<tr>
<td>Epidemiology</td>
<td>56</td>
<td>1</td>
<td>1.8%</td>
</tr>
<tr>
<td>Other</td>
<td>80,055</td>
<td>2,322</td>
<td>2.9%</td>
</tr>
<tr>
<td>Western Region</td>
<td>1,691,830</td>
<td>22,240</td>
<td>1.3%</td>
</tr>
<tr>
<td>Testing Reasons</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Area</td>
<td>648,797</td>
<td>13,495</td>
<td>2.1%</td>
</tr>
<tr>
<td>Accreditation</td>
<td>40,006</td>
<td>182</td>
<td>0.5%</td>
</tr>
<tr>
<td>Movement</td>
<td>457,072</td>
<td>706</td>
<td>0.2%</td>
</tr>
<tr>
<td>Milk ordinance</td>
<td>79,600</td>
<td>422</td>
<td>0.5%</td>
</tr>
<tr>
<td>Import</td>
<td>7,853</td>
<td>19</td>
<td>0.2%</td>
</tr>
<tr>
<td>Epidemiology</td>
<td>311,250</td>
<td>5,988</td>
<td>1.9%</td>
</tr>
<tr>
<td>Other</td>
<td>108,192</td>
<td>907</td>
<td>0.8%</td>
</tr>
</tbody>
</table>
TUBERCULOSIS

(1.7%) found. In the Western region there were 21,192 CCT tests run with 411 suspects or reactors (1.9%) found.

Surveillance of Cervidae is primarily a result of animal testing in the United States. For the same time period (June 2003 – June 2004), we examined the National Database to assess an annual amount of cervid testing. There were 29,230 single cervical tuberculin (SCT) tests reportedly conducted on Cervidae during this time period. There were 501 (1.7%) responses among these SCT tests. Testing was more common in the Eastern (69%) than Western (31%) region, but both regions reported similar fractions of responses. CCT testing for Cervidae totaled 634 tests with 93 (15%) suspects or reactors. A dramatic difference in the fraction of suspects or reactors in the Eastern region (20%) – compared to the Western region (6%) – was primarily a result of fallow deer testing in a Michigan zoological park. These results may suggest the need to examine the appropriateness of the comparative cervical scattergram for Cervidae when applied to fallow deer and possibly other species of Cervidae.

Figure 1. Summary of caudal fold response fractions by reason for test and U.S. region.
CATTLE AND FARmed BISON

Eradication:

Canada continues to near complete eradication of bovine TB from cattle and farmed bison. During the 6-year period from January 1998 through September 2004, *Mycobacterium bovis* was confirmed in 8 herds of cattle and farmed bison. Five of these 8 herds were in Manitoba: 1 in 2001; 3 in 2003 (first year of area testing); and 1 in 2004. The 5 infected herds in Manitoba are believed to have acquired TB from contact with diseased wild elk or deer in or around Riding Mountain National Park (RMNP). The other 3 infected herds were in: Saskatchewan (cattle-1999), Alberta (bison-2001), and Ontario (cattle-2002).

All 8 infected herds were depopulated; and 2 exposed herds were partially depopulated to remove exposed animals. All exposed susceptible animals were traced from the infected herds, investigated, tested, destroyed, and tissues collected for laboratory tests. Federal compensation is paid for all animals ordered destroyed up to maximum prescribed amounts. All potential sources of infection were investigated and tested. Other contact herds and all herds in a 10-kilometre perimeter zone were investigated and tested.

Surveillance:

General surveillance of cattle and farmed bison herds is based on routine inspection at slaughter and submission of granulomatous lesions for laboratory examination, with trace-back investigation of all histopathological diagnoses of mycobacteriosis. In 2003, 292 lesions were submitted from slaughter cattle and farmed bison, resulting in 10 diagnoses of mycobacteriosis. Culture of these lesions found: 3 due to *M. avium* complex; 1 due to *M. paratuberculosis*; and 6 lesions, of which 5 were mesenteric, were culture negative. In 2004 to date, one *M. bovis* infected cattle herd in Manitoba was detected as a result of routine slaughter surveillance submissions.

Targeted on-farm area testing is used to supplement slaughter surveillance. Area surveillance testing of cattle and farmed bison continued around Riding Mountain National Park in Manitoba in 2003/04, an area where 29 TB-infected wild cervids (25 elk & 4 white-tailed deer) have been found since 1997. The Riding Mountain TB Eradication Area (RMEA) consists of 2 provincial game hunting areas; encompasses approximately 50,000 breeding cattle on 650 farms; and represents approximately 10% of Manitoba’s cattle herds and 1% of Ca-
TUBERCULOSIS

Canadian cattle herds. Since 2002, all cattle and farmed bison herds in the RMEA are tested at 12 to 36 month intervals, with the interval based on an assessment of the risk of contact with infected wild cervids. Periodic testing in the RMEA will continue for as long as the risk of TB continues to exist in the area.

The test protocol involves screening all animals 12 months of age and older with the caudal fold tuberculin test, and testing all responders using the Bovigam assay and/or comparative cervical tuberculin (CCT) test. Any animal classified as positive on either ancillary test is ordered slaughtered and tissues are submitted for confirmatory lab tests. Animals classified as suspect on either ancillary test may be retested or slaughtered. If the owner elects to retest the animal and it retests negative, the herd is automatically scheduled for a herd test for the following year.

In 2003, approximately 57,000 cattle and farmed bison were tuberculin tested by federal inspectors across Canada as part of area surveillance testing, resulting in the detection of 3 infected beef cattle herds, all located in the RMEA. To date in 2004, no infected cattle or farmed bison herds have been detected through on-farm area surveillance testing.

FARMED CERVIDS

Eradication:

Canada continues to near complete eradication of bovine TB from farmed cervids, which consist mainly of elk, red deer, elk/red hybrids, fallow deer, and white-tailed deer. During the first 10 years (1989 - 1998) following extension of the National Bovine TB Eradication Program to farmed cervids, 35 infected herds were found in 5 provinces. During the last 6 years (1999 to September 2004), 2 infected herds were found in 1999 - one in Ontario and one in Quebec.

All 37 infected farmed cervid herds, except one, were completely depopulated of all exposed susceptible animal species. Compensation, quarantine, investigation, trace-outs, trace-ins, contacts, perimeter premises, cleaning and disinfection, and restocking were all carried out in the same manner as for infected cattle and farmed bison herds.

In the one exception, the primates and several endangered species in a zoological collection were quarantined indefinitely following the destruction of infected and exposed hoof stock, carnivores and other species. This quarantine was released 10 years later, in 2003, after a comprehensive review concluded that the risk of bovine TB in the collection was negligible. A 5-year management plan of on-going surveillance has been implemented.

Surveillance:

Because relatively few mature cervids are routinely slaughtered,
surveillance for bovine TB in this sector is based on triennial testing of all cervid herds involved in the commercial trade of these species. In 2003, approximately 27,500 farmed cervids were tuberculin tested by federal inspectors under this program, and no infected herds were found. In 2004 to date, no infected herds have been detected through on-farm surveillance testing.

In 2003, lesions were submitted from 38 farmed cervids during routine slaughter surveillance, including 6 lesions associated with chronic wasting disease (CWD) surveillance programs. Four lesions were found to be histo-compatible with culture results: 1 due to *M. paratuberculosis* and 3 lesions, of which 2 were mesenteric, were culture negative. In 2004 to date, no infected farmed cervid herd has been detected through routine slaughter surveillance.

**RESERVOIRS OF *M. bovis***

**Wood Buffalo National Park Area:**

Bovine TB and bovine brucellosis are endemic in a free-roaming herd of approximately 2,000 wood bison in and around Wood Buffalo National Park, which straddles the northern boundary between Alberta and the Northwest Territories. This herd poses its greatest threat to adjacent disease-free wild bison herds. A bison management plan is in place that includes no-bison buffer zones, the killing of stray bison, and other measures to minimize the risk of disease spreading to wild bison, farmed bison, or cattle.

**Riding Mountain National Park Area:**

Diseased wild cervids in and around Riding Mountain National Park (RMNP) in Manitoba are believed to be the source of bovine TB for the 5 infected cattle herds found in Manitoba in 2001, 2003 and 2004. The source of infection in these wild cervids was almost certainly contact with infected cattle at some time in the past. There are approximately 2,500 wild elk in the area.

Bovine TB has been confirmed in 13 wild cervids (9 elk and 4 white-tailed deer) outside RMNP through a hunter-harvest surveillance program that began in 1997.

Since early 2003, 16 wild elk inside RMNP have been confirmed with bovine TB: 14 through a capture, test and removal program; and 2 that were found dead in the park. Under the capture, test and removal program, adult wild elk are captured, blood samples are collected, and a radio-tracking collar is attached before the animal is released. Blood samples are tested by the lymphocyte stimulation test (LST) to detect a cell-mediated immune response, a fluorescent polarization assay (FPA) to detect a humoral (antibody) immune response, and a polymerase chain reaction (PCR) assay on the buffy coat to detect antigen. Any elk that is positive on one or more these tests is tracked using the radio-collar, humanely destroyed and necropsied,
TUBERCULOSIS

and tissues are collected for confirmatory testing.

To date, 63 of the 266 elk captured and tested under this program were positive on one or more of the blood tests, and were recaptured and destroyed. M. bovis was confirmed in 12 of these elk, all of which were located in the western part of the park.

To assess the sensitivity of the blood tests, 50 elk which had been negative on blood tests conducted in the spring of 2003, were re-captured, re-bled, destroyed and necropsied in December 2003, and tissues were collected. M. bovis was isolated from 2 of these 50 elk - one was now positive on the LST and one was still negative on all blood three blood tests. To assess the specificity of these blood tests, 150 elk from a known negative population in Elk Island National Park in Alberta were tested, all with negative results.

The 5 cattle herds in Manitoba in which bovine TB has occurred during the past 6 years (2001, 2003, 2004) were all located close to the park boundary, and 3 were located in areas where M. bovis has been confirmed in wild elk and deer.

A multi-agency Manitoba Bovine TB Management Program was developed and implemented to further define the disease problem, prevent spread of the infection to cattle and other farmed livestock, and eliminate the infection in the wild cervids. Encompassing the surveillance and eradication efforts of the CFIA in the livestock sector and those of Parks Canada (wildlife inside the park) and the government of Manitoba (wildlife outside the park), the major elements of the Program include:

- Routine area testing of cattle and farmed bison herds around the park as described above;
- On-going surveillance of wild cervids within and outside the park to determine the spatial and species distribution of the infection, and to further define prevalence;
- Separation of wild cervids from livestock through barrier fencing of forage/feed and cattle feeding yards. In 2003, 21 feed/forage yards were fenced bringing the total to date to 57 cattle producers with fenced forage/feed yards:
  - 29 of 39 farms located in the first mile from the park;
  - 22 of 78 farms located in the second mile from the park;
  - 5 of 89 farms located in the third mile from the park;
  - In 2004 to date, another 18 producers have receiving fencing, bring the total to 75.
- Separation of wild cervids from livestock through a prohibition on elk feeding, encouraging producers to remove hay from fields into fenced areas, and public awareness and education;
- Elk population management through increased hunting opportunities outside the park and habitat improvement inside
REPORT OF THE COMMITTEE

the park (elk population reduced from over 3,000 animals to approximately 2,500);

- Research and field studies, including radio-collar studies of elk movements, improved population survey methods, and investigation of other possible TB vectors/reservoirs.

TB ACCREDITATION STATUS

Cattle & Farmed Bison:

All provinces in Canada except Manitoba are classified as TB-Free according to current Canadian standards for farmed bovines. Manitoba has a split status for bovine TB: the RMEA is classified as TB-accredited-advanced according to current Canadian standards; and the rest of Manitoba is classified as TB-free.

In conjunction with the Manitoba’s split status, a movement permit, based on a negative herd test and/or individual animal testing, is required to remove farmed bovines from the RMEA into the rest of the province or other provinces.

Farmed Cervids:

All Canadian provinces except Ontario and Quebec are classified as TB-free areas according to current Canadian standards for farmed cervids. Ontario and Quebec are currently classified as TB-accredited-advanced areas.
TUBERCULOSIS

REPORT OF THE SCIENTIFIC ADVISORY SUBCOMMITTEE

Diana L. Whipple, National Animal Disease Center, Ames, IA

The Scientific Advisory Subcommittee (SAS) of the Committee on Tuberculosis met on Saturday, October 23, 2005. Because the SAS was not asked to review data or make recommendations to the Committee, the regularly scheduled meeting of the SAS at the USAHA Annual Meeting was used for scientific presentations and discussion, with approximately 50 attendees. A summary of the presentations follows.

Dr. Mitchell Palmer’s gave a presentation entitled “Experimental Infection of Reindeer (Rangifer tarandus) with Mycobacterium bovis: Pathological and Immunological Findings.” The objectives of the study were to describe the pathologic changes associated with M. bovis infection in reindeer and evaluate the effectiveness of intradermal tuberculin testing and an in vitro blood based assay for interferon-α (IFN-α) as means of diagnosis of TB in reindeer. Dr. Palmer’s paper was presented in an American Association of Veterinary Laboratory Diagnosticians (AAVLD) Scientific Session and his complete paper is published in its entirety elsewhere in these proceedings. Discussion about the scattergram used for interpretation of the CCT for reindeer followed and resulted in a recommendation that United States Department of Agriculture (USDA) Animal Plant Health Inspection Service (APHIS) Veterinary Service (VS) to compile, analyze and present data on all skin testing done on reindeer in the United States. Data are to be presented to the SAS before the 2005 USAHA meeting to determine if the scattergram should be further modified to improve specificity of the CCT.

Chembio Diagnostic Systems, Inc. Dr. Konstantin Lyaschenko made a presentation entitled “Serological Based Assay for Detection of Tuberculosis in Multiple Species."

Dr. Larry Judge, USDA-APHIS-VS, gave a presentation entitled “Gamma Interferon Testing Experiences in Michigan.” Dr. Judge described testing in the Modified Accredited and Modified Accredited Advanced zones.

Dr. Dan Baca, USDA-APHIS-VS, gave a report on the use of the Bovigam™ assay in Texas. The Texas Animal Health Commission (TAHC) implemented the Bovigam™ assay in Fiscal Year 2004 to support an aggressive TB surveillance initiative targeting the state’s 815 dairy herds and 2,400 purebred and seedstock herds. Accredited veterinarians were required to attend an educational seminar in order to contract with TAHC to conduct fee-basis work at these operations.

Mr. Ed Corrigan, Diachemix LLC, gave an update on the Fluorescence Polarization Assay (FPA) for diagnosis of bovine TB. Several
trials are underway to determine sensitivity and specificity of the FPA and results will be presented at a future date.

The SAS meeting concluded with a report from Dr. Bob Meyer, Western Region Tuberculosis and Brucellosis Epidemiologist, USDA-APHIS-VS, Ft. Collins, CO. He reported that an evaluation of the FPA is being conducted with collaborators in Mexico. Results from that study are still being collected and analyzed.
EXECUTIVE SUMMARY

Background:
The program to control and eradicate Bovine Tuberculosis (TB) came into being in 1917. After 60 years of reasonable progress the effort began to languish from the mid 1980's thru the 1990's. As a result the initial strategic plan was finished in 2000 in concert with the declaration of an emergency (by the Secretary of Agriculture) on the final eradication of M. bovis from cattle, bison, and captive cervids. There were a total of 25 action items listed under 4 major strategies designed to improve the program and provide the best opportunity to realize a goal of year's end 2003 for eradication. The outcome of the initial plan was very positive with many of the action items being fully or largely completed, significant appropriated and emergency Commodity Credit Corporation funding increases resulted and the level of complacency was lowered with better case finding and resultant new cases. However, as 2003 ended and 2004 came, and looking back over the 3-4 years under the initial plan, there were a number of factors that were disconcerting for State-Federal livestock health officials and industry stakeholders.

The major factors were 1) In 2000 all states were TB Free except Michigan and the El Paso milk shed of Texas but in 2002 Texas lost the Free status with California and New Mexico following in 2003; 2) The situation in Michigan with the wildlife reservoir of TB did not seem to be responding positively to increased manpower and funding but only maintaining the status quo; 3) A new case was discovered in a large dairy replacement operation in Arizona and a small farmer feedlot in Iowa, both tied back to a dairy calf operation in New Mexico, that seemed to support the hypothesis of some that the dairy female replacement pipeline was being infected at a continuously low level posing a risk to dairies and states that rely upon these sources for large numbers of replacements; 4) A new case was detected in Texas involving an ~1800 head dairy; 5) A previously infected elk herd was again confirmed with infection in Kansas; 6) There were still 19 of some 40 major adult slaughter plants that were not sampling animals with TB suspicious lesions at or above the 1 per 2000 rate; 7) States were beginning to put entry test requirements on dairy cattle entering; 8) Mexican origin feeder cattle with TB continued to be discovered in U.S. slaughter plants, though at a much lower rate; 9) The goal of TB eradication by years end 2003 had been missed; and 10) Double digit numbers of newly affected herds continued to be disclosed annually.
Response:

The leadership of USAHA, National Assembly of Chief Livestock Health Officials and the Animal Agriculture Coalition met with Dr. John Clifford and staff members in late January of 2004 and discussed the concerns detailed above. It was decided that a Subcommittee (SC) of the USAHA Committee on Tuberculosis would be named to review, revise, update and expand the existing strategic plan in light of newer information, recent developments and trends and the apparent need to reassess the situation and make conscious, considered and informed decisions as to how to proceed to finalize control and eradication of TB.

The Comprehensive Strategic Plan for the Eradication of Bovine Tuberculosis
May 2004

Prepared by the Strategic Plan Subcommittee

Introduction:

The Strategic Plan for the Eradication of Bovine Tuberculosis – May 2004 contains six categories of Action Steps. They are: (A) Eradication Strategies; (B) Wildlife Management; (C) Laboratory and Diagnostic Support; (D) Surveillance; (E) Information and Education; and (F) Risk Mitigation. The latter two Action Steps (E and F) were added to the four Action Steps previously identified in the October 2000 Strategic Plan. Each Action Step contains a number of Action Items. Costs identified for each Action Item are for funding over and above current funding for the Tuberculosis Eradication Program.

Action Step – Eradication Strategies (A)

Action Item (A1):

Pay indemnity for reactors, suspects, and exposed livestock up to fair market value, less salvage.

Background:

The Bovine Tuberculosis Eradication Program has traditionally paid an indemnity for reactors and exposed animals. This indemnity compensated herd owners for the losses incurred by program activities. Initially, the indemnity limits were consistent with the relative market value of the animals.

Livestock entities also specialize in high value stock that far exceeds the limits of federal indemnity.

Action Required:

To keep up with the ever-changing livestock industry and to increase the speed at which high-risk animals are removed from the general livestock population, indemnity rates need to be flexible and compen-
sate the owner for the appraised value of the reactor, suspect, or exposed animal. Indemnity should be granted at fair market value for all infected or exposed livestock and not just cattle, bison, and captive cervids.

The appraisal and indemnification process needs to be stream-lined so that reactors can be sacrificed within 15 days as required by the UM&R.

<table>
<thead>
<tr>
<th>Cost Item</th>
<th>Calculations</th>
<th>Additional Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indemnity for FY 03</td>
<td>FY03 (1,943,827.00) * 20%</td>
<td>$388,765.40</td>
</tr>
<tr>
<td>Number of CCT reactors or suspects from tests on dairy</td>
<td>Estimate testing 2 million cattle, 2% CFT responders, 2% taken as CCT suspect or reactors</td>
<td>1200</td>
</tr>
<tr>
<td>reactors/ suspects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost for Dairy replacement</td>
<td>Indemnity + transportation + destruction = 3,000/animal</td>
<td>$3,600,000.00</td>
</tr>
<tr>
<td>Accreditation Testing- Bovine</td>
<td>5,000 herds * .40 head * .02 (CFT response rate) * .02 (CCT Reactors/Suspects * 3,000)</td>
<td>$240,000.00</td>
</tr>
<tr>
<td>Accreditation Testing- Cervids</td>
<td>2050 herds * .20 head * .05 CCT suspects * 2,000</td>
<td>$205,000.00</td>
</tr>
<tr>
<td>All CCT Testing Associated Costs</td>
<td>8Hr VMO time, mileage, shipping to NVSL = 350.00/ head (Movement testing 1200 + Accreditation Testing 80 Bovine and 103 cervids)</td>
<td>$484,050.00</td>
</tr>
</tbody>
</table>

**Estimated Costs (additional)** $4,917,815.40

**Action Item (A2):**

Provide for depopulation of all currently known and newly affected cattle, bison, and captive cervid herds according to Uniform Methods and at replacement value plus costs associated with depopulation.

**Background:**

Currently in our national Bovine Tuberculosis Eradication Program, the producer has the option of herd depopulation with exposed animal indemnity or herd quarantine with a test and removal scheme. Experience over the past 15 years in herds electing a test and removal program has demonstrated the effectiveness of this option to be no more than 15% successful in eliminating infection. This low success rate is largely a result of persistent and recurrent infection in large dairies.
Depopulation of *M. bovis*-infected herds is the most dependable method of eliminating the disease. However, herd depopulation for large dairies has not always been achievable. In some cases, owners’ are not willing to depopulate because of concerns regarding loss of irre-placeable genetics often acquired over several generations of breeding management. But in other cases, the decision is made because of economic considerations such as when substantial differences occur between appraisals based on fair-market value of inventory and replacement value necessary to obtain equitable production levels. Other economic considerations related to depopulation include producer costs associated with required cleaning and disinfection of premises, downtime between liquidation and restocking, and ability to compensate and retain employees during the transition period.

Testing in these herds has been sufficient to remove infected dairy herds from quarantine, however, it has been unable to prevent these herds from becoming re-infected. In the past, this problem was evident in the El Paso milk shed of Texas. However, the inability to depopulate affected dairy herds in Michigan and New Mexico is currently of high concern. Herd depopulation gives a virtual certainty that a herd will not be a continued source of infection to the nation’s livestock populations.

**Action Required:**

Depopulation of all known infected and high-risk herds (as determined by the Designated Tuberculosis Epidemiologist), would advance program goals faster than any other action. Continued mandatory depopulation of all currently known and newly infected herds would ensure that program timelines are met and that the risk of re-infesting the nation’s livestock populations is minimized. Therefore, approval of state animal health authorities will be sought in order to change the Uniform Methods & Rules and start mandatory depopulation of tuberculosis-infected cattle, captive bison, and captive cervid herds.

Current methods for determining compensation for herd depopulation must be revised to include replacement value of livestock (to maintain current production levels) and other justifiable expenses related to depopulation and restocking.

Depopulated herds will be required to institute sound biosecurity and management practices designed to prevent re-infection before they can repopulate. Premises containing repopulated herds that become re-infected with tuberculosis (and therefore need to be depopulated again) will be placed under extended quarantine and repopulation with susceptible animals will not be allowed until tuberculosis risk level is determined to be minimal.
TUBERCULOSIS

**Costs (additional) for A2 (Depopulation)**

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indemnity for FY 03 (FY03 (19,967,670.00) * 20% (inc final number by another 20% for change to replacement value and associated costs.)</td>
<td>$4,792,240.80</td>
</tr>
<tr>
<td>Estimated Costs (additional)</td>
<td>$4,792,240.80</td>
</tr>
</tbody>
</table>

**Action Item (A3):**

see Action Item (F3) under Action Step Risk Mitigation (F)

**Action Item (A4):**

Finalize the new status levels for cattle, bison, and captive cervids.

**Background:**

APHIS is committed to enhancing program standards and has developed new program status levels that more accurately reflect the relative risks of bovine tuberculosis infection.

**Action Required:**

Provide a tuberculosis staff position to finalize the new status levels to better understand the risks associated with tuberculosis transmission at each level of status.

Incorporate the new levels into the National Bovine Tuberculosis Eradication Program to aid in mitigating the risks of tuberculosis exposure from animals imported from foreign trading partners or from animals moved from domestic areas of high risk.

International trading partners will be able to apply for equivalency to our program based on valid risk levels.

Include the level of slaughterhouse surveillance as a factor when determining state status.

Monitor the tuberculin test response rates from accredited veterinarians.

**Costs (additional) for A4 (TB Status Levels)**

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>One Staff GS 13 Position Terry Beals Figure which includes salary benefits, support costs= 124,218.96</td>
<td>$124,218.96</td>
</tr>
<tr>
<td>Estimated Costs (additional)</td>
<td>$124,218.96</td>
</tr>
</tbody>
</table>
REPORT OF THE COMMITTEE

Action Item (A5):
Conduct reviews and risk assessments for domestic and international regionalization requests.

Background:
The USDA-APHIS-VS Deputy Administrator approves domestic and international regionalization requests. Annual reviews are required.

Action Required:
Review regionalization requests annually to reflect progress toward eradication goals and ensure minimum program requirements. The review will also outline new goals and objectives that will be met during the next fiscal year. This review must document the performance measures that are included in the zoning agreement to maintain status.

Reviews may be performed more often as risk indicates. Exported cattle later found infected with tuberculosis might cause more frequent status reviews.

If bovine tuberculosis has been disclosed in free-ranging animals within a zone or region, then a tuberculosis management plan for wildlife must be approved to maintain status within the zone or region. The management plan is a separate document generated by the entity requesting zoning. It is aimed at showing the steps that will be taken to prevent transmission of disease from the endemic source to domestic livestock.

In many cases, where entire countries are requesting equivalency, an annual paperwork review may be all that is necessary for that country to maintain status. However, when a country wishes to regionalize or zone areas of differential disease status, then a site visit would be required to document the movement control and disease surveillance measures within that zone or region.

<table>
<thead>
<tr>
<th>Costs (additional) for A5 (Conduct reviews for regionalization)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Review Costs for FY 03</td>
</tr>
<tr>
<td>Estimated Costs (additional)</td>
</tr>
</tbody>
</table>

Action Item (A6):
Institute a standard providing that over 75 percent of all feedlot cases must be traced beyond the feedlot to maintain status.

Background:
The majority of tuberculosis cases seen at slaughter originate from feedlots. In the past, a majority of these cases originated in Mexico. When Mexico instituted a national tuberculosis eradication program, and when the United States began restricting the importation of dairy...
TUBERCULOSIS

animals from Mexico, the numbers and proportion of Mexican-origin feedlot cases declined. The majority of cases that are not attributable to Mexican origin are not usually traced beyond the feedlot due to lack of proper identification records.

**Action Required:**
Approximately 20 percent of feedlot-origin tuberculosis cases have an unknown origin due to lack of proper identification. The feedlot and the state need to be held accountable for these unknown cases in terms of feedlot certification and tuberculosis state status. A 75 percent success rate of tracing a case beyond the feedlot is a reasonable goal.

Because tuberculosis is a slow moving disease that may not be discovered until years after transactions have taken place that disseminated the disease, require cattle dealers and feedlots to maintain records for a minimum of 5 years to facilitate tracing.

Require annual inspection of records to maintain certification.

Require cattle entering and leaving a feedlot to have permanent individual identification allowing tracing to herd of origin. Missing identification will be promptly replaced upon discovery of loss. Adoption of a national cattle identification system will assist with meeting this goal.

**No Known Additional Costs**

**Action Item (A7):**
Enhance use and collection of identification from dairy animals.

**Background:**
Ability to trace infected dairy cattle back to herds of origin is adversely affected by lack of a modern identification system. This is a serious drawback to conducting proper epidemiological investigations and impedes efforts to eliminate foci of infection. Official identification is not replaced when lost. Furthermore, easily accessible computerized records linking ID to farms of origin are not available. Also, it is often not possible to link ID to sequential premises of ownership, even if the ID is retained in the animal. Finally, proper collection of ID in association with the correct carcass and samples at time of slaughter is not always achieved. Enhanced utilization of ID and its proper collection would improve traceability and aid in epidemiological investigations.

**Action Required:**
Implement a national animal and premises identification system as soon as possible. All cattle will be required to have permanent individual identification allowing tracing to herd of origin within 48 hours.

 Costs (additional) Associated with A6 (Feedlot Tracing)
REPORT OF THE COMMITTEE

Records linking each bovine to all premises where it has resided should be computerized and easily accessible to the proper authorities. Identification, including its links to all pertinent information, will be promptly replaced when it is lost.

As an interim procedure until the national animal identification system is in place, all cattle will be required to bear permanent individual eartag identification, allowing for tracing to herd of origin, before leaving the premises where they reside.

Facilitate animal tracking by providing funding for all 50 states to participate in an electronic permit/health certificate program.

Require collection of all individual identification at slaughter. Ensure that it is correlated to the appropriate carcass and samples.

| Costs (additional) Associated with A7 (Use and Collection of Identification) |
|-------------------------------|---------------------------------------------------------------|
| Cost for Identification of all Dairy Animals | 9 Million dairy cows have one calf per year to tag, Tag Cost $0.03, Add Administrative costs $0.02 | $450,000.00 |
| Fund electronic permits and CVIs in 50 states | Estimate provided to USDA on 4/12/04 by Global VetLink | $7.5 million |
| Estimated Costs (additional) | | $7,950,000.00 |

Action Item (A8):

Monitor human cases of *M. bovis* in the United States.

Background:

While it is probable that most human cases of *Mycobacterium bovis* in the United States are imported or date back to infection occurring decades ago, it is, nevertheless, important to gain an understanding of the nature and epidemiology of these infections when they are identified. On the rare occasion, a confirmed human case of *M. bovis* could be the sentinel drawing attention to a previously unidentified focus of livestock infection. Conversely, a human case of *M. bovis* could potentially be of risk to livestock under the right circumstances. Therefore, we should take advantage of all the epidemiological information we are fortunate to have.

Action Required:

Confirmed human cases of *Mycobacterium bovis* documented by
state public health officials should be provided annually to the state veterinarian. This report should include age and geographic location of each case, as well as epidemiological findings that indicate probable mode of infection and whether the case is likely to have been imported. This information should be included as part of the each state’s annual TB program report.

The state veterinarian will notify appropriate state public health officials of the location and occurrence of laboratory-confirmed cases of *Mycobacterium bovis* in livestock.

**TUBERCULOSIS**

No Costs Associated

**Action Step: Wildlife Management and Tuberculosis in Non-regulated Species (B)**

**Action Item (B1): Assist state wildlife agencies in the eradication of tuberculosis from wildlife**

**Background:**

Eradicating tuberculosis among free-ranging wildlife is more problematic than among domestic animals because management tools are fewer in number, labor-intensive, expensive, and unproven. Consequently, prevention of the introduction, establishment, and maintenance of tuberculosis is the most efficient technique for dealing with tuberculosis in wildlife.

Tuberculosis eradication from wildlife requires a cooperative effort minimally involving state and federal wildlife management and animal health agencies, public health agencies, and multiple interest groups. The state wildlife management agency has authority and responsibility for free-ranging wild animals and must play a central role in tuberculosis eradication efforts directed at wildlife.

Disease eradication strategies should be initiated when tuberculosis is identified among wildlife in order to protect domestic animals, wildlife resources, and humans. An adaptive management strategy should be employed that is modified as new techniques and information become available regarding tuberculosis epidemiology and management.

**Action Required (B1.1):**

Promotion of measures to prevent introduction, establishment, and maintenance of tuberculosis in wildlife.

Transmission of tuberculosis between wildlife and livestock is a two-way street and barriers should be erected or enhanced to preclude transmission.
transmission. Wild animals, due to natural dispersion, are less likely to maintain diseases such as tuberculosis and activities that unnaturally inflate populations or artificially congregate wildlife, especially supplemental feeding and baiting of cervids, should be prohibited or minimized to reduce the likelihood of disease transmission and maintenance among wild animals. (see Action Item (E6) for activities to enhance)

**Action Required (B1.2):**

Surveillance to enhance early detection and eradication of tuberculosis in wildlife:

Early detection increases the likelihood of success in eradicating tuberculosis from wildlife. Passive surveillance for tuberculosis should be enhanced by providing informational material, including publication of lesion photos, in brochures provided to hunters. Active tuberculosis surveillance should be incorporated into chronic wasting disease surveillance activities being conducted by state wildlife management agencies under annual Cooperative Agreements with APHIS-Veterinary Services. Tuberculosis surveillance should be prioritized by state and region according to risk factors including cervid population densities, artificial management activities that promote disease transmission, historical incidence of tuberculosis among traditional and alternative livestock, etc. (see Action Items E6 for activities to enhance passive surveillance for TB by developing and disseminating educational materials to hunters, wildlife managers, deer and elk processors and others working with hunter-killed cervids).

**Action Required (B1.3):**

Early, aggressive, and sustained management intervention to eradicate tuberculosis in wildlife:

Expanded wildlife and livestock surveillance is warranted to define the scope of the problem when tuberculosis or suspect lesions are found in one or more wild animals, as well as to monitor progress of eradication efforts. When a focus of tuberculosis is found in wild animals, control measures minimally should include immediate cessation of activities that increase disease risks, particularly supplemental feeding and baiting, as well as population density reduction to the level at which tuberculosis is no longer maintained. The goal of population reduction and the area in which this is to occur must be based on surveillance results and the local biology of the affected wildlife species. State wildlife management and collaborating agencies must identify, promote, evaluate, and appropriately modify the methods under which population reduction is to be effected. Funding and other assistance from APHIS should be provided under Cooperative Agreements that clearly define agency responsibilities, as well as management strategies, methods, and goals.
TUBERCULOSIS

Action Item (B2): Promote measures to prevent tuberculosis transmission between wildlife and livestock.

Background:
Eradication of tuberculosis that has become established in free-ranging wildlife is difficult and likely will require a sustained effort over a long period of time. However, measures can be taken to prevent infection of livestock, as well as other wildlife, as eradication activities continue. Mitigation of the risks of transmission from wildlife to domestic animals may allow "compartmentalization" of tuberculosis to only the wildlife population currently infected.

Action Required (B2.1):
Develop and disseminate information, as well as educate producers, veterinarians and agriculture extension agents, regarding risk factors associated with transmission of tuberculosis between wildlife and livestock. (see Action Item E6)

Action Required (B2.2):
Wildlife damage management agents should conduct field visits and consultations to producers providing biosecurity recommendations to reduce exposure of livestock to infected wildlife or to materials contaminated by infected wildlife.

Financial assistance, provision of materials and/or labor should be made available to producers in affected areas to enhance on-farm biosecurity.

Herd management plans must include adequate biosecurity measures for repopulated premises on which herds have been depopulated and for which the owner has received indemnity. Note: full indemnification for repopulated herds may not provide sufficient incentive to practice appropriate biosecurity.

Cost $1.00 million

Action Item (B3): Promote research into the epidemiology and management of tuberculosis among wildlife

Background:
Limited numbers of tools are available for eradicating tuberculosis from free-ranging wildlife. Methods currently available primarily comprise population density reduction and prohibition of activities that enhance tuberculosis transmission. Unfortunately, there is no guarantee that these strategies will be successful. Thorough knowledge of the epidemiology of tuberculosis in wildlife and livestock may identify additional or alternative eradication methods. Additionally, the efficacy of current and future management actions must be continuously evaluated to identify the best strategies and methods for tuberculosis eradication.
REPORT OF THE COMMITTEE

Action Required (B3.1):
Research should continue into the epidemiology of tuberculosis in wildlife and livestock in order to identify key control points at which transmission among wild animals and transmission between wildlife and livestock can be precluded. (Funding for disease aspects of this research should be contained with the budget for ARS-NADC, which conducts most of this work. Estimate - $500,000.

Action Required (B3.2):
Thorough understanding of the epidemiology requires complete information regarding the behavior and other biological aspects of the affected wildlife species. Research also should be directed at the effects of eradication measures on the biology of the wild animals, as well as on the prevalence of tuberculosis in wildlife. (Funding should be provided through a Cooperative Agreement, as described under Action Item B1, between APHIS and the state wildlife management agency.)

Action Required (B3.3):
Additional research is necessary to identify techniques to enhance livestock biosecurity, including physical or other barriers between wildlife and livestock, to prevent tuberculosis transmission. (Funding should be provided to APHIS-Wildlife Services for this research -$200,000 .)

Action Required (B3.4):
Research should be directed toward additional eradication measures including vaccination of wildlife and/or domestic livestock, diagnostic techniques including blood tests for deer and elk, removal of infected and exposed wild animals from infected populations, and other techniques. (Funding should be provided to the state wildlife management agency through a Cooperative Agreement with APHIS, as described in Action Item B1, for development and evaluation of eradication techniques, and to ARS-NADC for vaccine research. ARS estimates for vaccine research are $500,000)

Action Item (B4):
Establish task force against TB that combines zoo and non-program species groups, as well as state and federal animal health officials.

Action Item (B5):
Develop TB testing protocols for zoo and non-program species. Provide comparative cervical test training to zoo vets and provide for procedural and test data collection, analysis, and information dissemination.
TUBERCULOSIS

Action Item (B6):
Implement an exotic animal facility and herd classification system for TB.

Action Step - Laboratory and Diagnostic Support (C)

Action Item (C1):
Revise policy concerning laboratory submission procedures (whole herd, zoos, wildlife, captive cervids).

In order to support the revised Strategic Plan, the TB submission policy table must be revised. Revision will depend on the new NVSL laboratory including size, personnel, equipment and desired turnaround time.

Action Required:
Remove the TB submission table in the year 2000 Strategic Plan.
Expand the histopathology service for slaughter cattle. Use the expanded service of NVSL pathology service and the California Lab service as a model to place other State Laboratories into service required to give 24 to 48 hour service.

Figure the fee for service to Program at $25 per specimen read by a pathologist at a State Laboratory (24-48 hr turn around time). Shipping costs are estimated at $40 per sample for overnight delivery.

<table>
<thead>
<tr>
<th>Costs (additional) Associated with C1 (Expanded sample handling to other laboratories)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Histopathology</td>
</tr>
<tr>
<td>10,000 additional samples per year performed at other laboratories</td>
</tr>
<tr>
<td>Shipping costs</td>
</tr>
<tr>
<td>10,000 additional samples</td>
</tr>
<tr>
<td>Estimated Costs (additional)</td>
</tr>
</tbody>
</table>

Action Item (C2):
Evaluate new technologies for the detection of the organism or disease.
Continue new test evaluation when new tests become available.
Provide Bovigam test for widespread use in infected herds. This will require the use of State laboratories to give over night access to the field staff to submit samples. This will require the NVSL or manufacturer to provide training, funding for kits and increased personnel in state laboratories for running the test.

Action Required:
It is estimated that a total of 10,000 samples per year for Bovigam
testing will be required if interstate testing of all dairy animals is instituted along with infected herds and suspect cattle on tracebacks. Each test would cost $30 for kit, tech and data processing plus $40 per sample to ship.

**Action Item (C3):**
Transfer Polymerase Chain Reaction (PCR) technology to NVSL.
PCR has been transferred to the NVSL from the NADC. Personnel have been hired to perform the test, but need funding for personnel, supplies and equipment to continue to support technology transfer now that the NADC no longer provides the service to APHIS. NVSL has hired a GS-13 Pathologist and a GS-8 lab tech to perform the tests.

**Action Required:**
PCR is currently being performed on all compatible Mycobacteriosis cases. Specific funding support for personnel in the NVSL Pathobiology Lab (PL) should be provided. Current personnel supporting the PCR testing includes 1 GS 13 Pathologist and 1 GS 8 Lab tech.

**Action Item (C4):**
Transfer DNA fingerprinting technology to NVSL
Restriction Fragment Length Polymorphism (RFLP) technology has been transferred from the NADC to the NVSL. Personnel have been hired to perform the test, but need funding for personnel, supplies and equipment to continue to support technology transfer now that the NADC no longer provides the service to APHIS. RFLP has been requested on all *M. bovis* cases and has increased with the newly diagnosed herds in NM, AZ, CA, TX and MI. The NVSL has hired 1 GS-13 molecular microbiologist, 1 GS-8 lab tech and 1 GS-7 lab tech to perform the necessary tests.

**Action Required:**
DNA fingerprinting techniques need to be harmonized with Canada and Mexico so that new isolates can be compared properly. New molecular diagnostic techniques (AFLP & spoligotyping) need to be validated for *M. bovis* isolates and implemented into the NVSL.
Personnel for the NVSL DBL-Mycobacteria Lab includes 1 GS 13 Microbiologist and 1 GS 8 lab tech and 1 GS 7 lab tech – Salary, benefits and support costs = $248,466 per year; supplies and equipment = $200,000.
TUBERCULOSIS

**Action Item (C5):**

Increase laboratory capacity at NVSL for testing 10,000 samples. Capacity at the NVSL has increased while funding has decreased. Current TB budget at the NVSL for FY04 is $363,147. It was $365,809 in FY03 and $394,216 in FY02.

The NVSL has hired the necessary personnel to handle 5,000 samples per year at the Pathobiology Lab. This consists of 2 GS-13 full-time pathologists and 2 full-time GS-7 lab techs.

The salary, benefits and support costs = $366,214 per year; supplies and equipment = $100,000 per year. Shipping costs are estimated at $40 per sample. 5000 samples = $200,000. TB kit includes sample for histopathology and culture.

Total funds needed = $666,214.

The NVSL has hired the necessary personnel to process 3600 samples per year. Samples are first screened using histopathology and those samples with definitive diagnoses such as tumors and systemic fungus are not processed which is approximately one third of the samples submitted. This consists of 3 GS-12 microbiologists and 3 GS-7 lab techs. The salary, benefits and support costs = $490,036; supplies and equipment = $200,000 per year.

Total funds needed = $690,036

Total funds needed for processing 5,000 samples per year (histopathology and culture) = $1,356,250 per year.

---

**Costs (additional) Associated with C2 (Increased use of Bovigam and evaluation of new technologies), C3 (PCR testing), and C4 (DNA fingerprinting)**

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost Details</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expansion of use of Bovigam</td>
<td>10,000 samples at $30 for each kit, tech time and data processing plus $40 for shipping costs</td>
<td>$700,000.00</td>
</tr>
<tr>
<td>Cost for PCR testing</td>
<td>Personnel plus support costs (1-GS 13 and 1 GS 8)</td>
<td>$188,578.00</td>
</tr>
<tr>
<td>Cost for PCR testing</td>
<td>PCR supplies and equipment</td>
<td>$100,000.00</td>
</tr>
<tr>
<td>Cost for DNA fingerprinting</td>
<td>Personnel plus support costs (1 GS 13, 1 GS 8 and 1 GS 7)</td>
<td>$248,466.00</td>
</tr>
<tr>
<td>Cost for DNA fingerprinting</td>
<td>Equipment and supplies</td>
<td>$200,000.00</td>
</tr>
<tr>
<td>Estimated Costs</td>
<td></td>
<td>$1,450,000.00</td>
</tr>
</tbody>
</table>
Action Item (C6):
Evaluate tests for diagnosis of tuberculosis in captive cervids
Research and validation of new diagnostic tests for elk and white-tailed deer is needed. The Cervigam and other serological tests need to be validated for new cervid species.

Action required:
ARS-NADC currently research proposals on new diagnostic tests for elk and white-tailed deer should be funded. Costs for those proposals are estimated at $450,000 per year for 3-5 years.

<table>
<thead>
<tr>
<th>Costs (additional) Associated with C6 (ARS research)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total annual cost</td>
</tr>
</tbody>
</table>

Action Step – Surveillance (D)
Action Item (D1):
Review all state programs and regulations for bovine tuberculosis reporting.

Action required:
Coordinate and integrate the monitoring and surveillance activities of the state/federal animal health and public health sectors. Establish administrative arrangements between all sectors to facilitate immediate cross notification of cases or outbreaks.
Promote monitoring, surveillance and control programs in high-risk production areas for cattle bison, and captive cervids. All animal health sectors must ensure that contact tracing is carried out, area outbreaks are recognized, and epidemiology is monitored.
Require accredited veterinarians to be trained and approved as “designated accredited veterinarians” for conducting TB testing in each species as they currently are for cervids. This will ensure they are current on the TB testing technique and reporting criteria.

Resource Requirements:
Utilize current personnel

Action Item (D2):
Review the memorandum of understanding between FSIS and APHIS for bovine tuberculosis tissue collection at slaughter to improve routine surveillance at slaughter plants.
TUBERCULOSIS

Action required:
Update the memorandum of understanding between FSIS and APHIS for bovine tuberculosis tissue collection at slaughter.
Utilize the local AVIC, state veterinarian and their respective field personnel to convey the expected granuloma submission rate of 1 per 2000 adult cattle slaughtered (as specified in the TB UM&R) and provide routine feedback to plant personnel.

Resource Requirements:
Utilize current personnel.

Action Item (D3):
Increase Point Concentration Monitoring using inspection and collection of tissue samples from cattle, bison, and captive cervids at slaughter.

Action required:
Continue to closely monitor major slaughter plants most critical to the tuberculosis surveillance program. Prioritize collection of tissue samples at plants that slaughter adult cattle. The expected rate and number of granuloma submissions needs to be identified by plant and state and effectively communicated to meat inspection personnel, plant management and program officials. The minimum expected granuloma submission rate for adult cattle is specified in the UM&R as one per 2000 animals slaughtered.
Develop and implement efforts with state meat inspection agencies to ensure that surveillance for TB becomes a priority in facilities under their jurisdiction, as well. Develop an incentive awards program for state meat inspection personnel for identifying cases that result in detection of affected herds, similar to awards currently available to FSIS personnel.
Assure that all individual animal identification is routinely collected and accurately correlated to each carcass throughout the inspection process. All such identification devices are to be retained and submitted with specimens when suspicious lesions are detected.
Include surveillance of ante-mortem condemned carcasses.
Use the Secretary’s office, if necessary, to assure adequate collection by FSIS inspectors. If this is still not successful, then place APHIS personnel in the plants with in adequate TB sample submissions.

Resource Requirements:
Assume that one-half of the forty (40) major plants will need to have an APHIS personnel assigned in order to obtain adequate TB surveillance. (Twenty APHIS Animal Health Technicians)
Incentive awards for state meat inspection personnel.
Assume 5 submissions per year result in a confirmed case of TB that successfully results in the finding of a new TB affected cervid, cattle, or other livestock herd.
Assume that each of those submissions made by a lay inspector at a plant with an equal award paid to the inspector and veterinarian.

<table>
<thead>
<tr>
<th>Costs (additional) Associated with D3 (increase sampling at slaughter)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 AHT’s in cow-kill slaughter plants</td>
</tr>
<tr>
<td>Estimated incentive award cost for state meat inspection personnel (5 confirmed submissions at $3,750 each for lay inspector and veterinarian submitter)</td>
</tr>
<tr>
<td>Total (additional) cost (rounded)</td>
</tr>
</tbody>
</table>

Action Item (D4):
Monitor Cervid slaughter at specialty plants not inspected by FSIS or State meat inspection.

Action Items:
- Establish a voluntary inspection program for the slaughter of captive cervids at specialty plants. Providing such service would enable tuberculosis surveillance for species not currently inspected.
- Establish a cervid TB slaughter surveillance program with definitive criteria and goals. The program should define submission targets based on the number of cervid slaughtered in the state. Additionally, the program should be monitored to verify compliance with inspection, tissue submission rates and validate the surveillance based on the numbers of samples submitted.
- Encourage FSIS to re-classify cervids (and exotic hoof stock) as “amenable species” in order to provide inspection services without user fees.

Resource Requirements:
Thirty-one states have state meat inspection agencies (28) or otherwise require inspection of non-amenable species (3). Utilize AVIC and state veterinarian to develop relationships with those entities to ensure surveillance objectives are accomplished. Utilize existing state/federal field personnel to develop relationships with individual plants.
- Employ an APHIS AHT, or through cooperative agreements a state AHT, in each of the remaining 17 states that allow captive cervid farms or ranches to develop a TB surveillance program in plants that slaughter cervids. (17 APHIS Animal Health Technicians)

Action Item (D5):
Monitor wild cervids killed during hunting season
TUBERCULOSIS

Actions Required:
Start a voluntary TB inspection program with all cooperating states, during hunting seasons, or during periods of select culling, by state or federal wildlife agencies. Collect and submit tissues from lymph nodes of the head and viscera, if available. A veterinary medical officer or wildlife veterinarian on a part time basis, depending on the scope of the survey, can do this. If necessary, lay staff could be trained to collect the samples possibly increasing the size of the survey. Providing such service would enable tuberculosis surveillance for populations not currently inspected.

Provide training and financial support, as needed, to allow wildlife agencies to incorporate TB surveillance into ongoing CWD surveillance programs.

Resource Requirements:
Utilize existing state and federal wildlife biologists and technicians. Costs for laboratory evaluation of specimens, see Action Item (D9).

Action Item (D6):
Maintain aggressive levels of surveillance testing of livestock herds in Michigan.

Action Required:
Maintain surveillance testing in all areas of the state, at levels that will complement surveillance at slaughter, and will enable detection of TB infection at low prevalence rates on a herd basis.

Action Item (D7):
Increase the number of herds under disease free certification in each state to a pre-determined level to ensure adequate disease monitoring (sentinel surveillance) for respective geographic regions.

Action Required:
Provide special recognition to states that enroll a high percentage of their cattle and bison herds in an accreditation program and to conduct annual testing for TB.

Provide fee basis payments to veterinary practitioners to enroll cattle and bison herds in herd status programs in all states.

Provide fee basis payments to veterinarians to enroll captive cervid herd owners in a TB accredited or qualified herd status program and to conduct herd testing for TB.

Extend annual herd testing requirement for accredited free herds

Costs Associated with D5 (slaughter surveillance of captive cervids)

<table>
<thead>
<tr>
<th>17 AHT's @ $60,000 per year</th>
<th>$1,000,000.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total cost</td>
<td>$1,000,000.00</td>
</tr>
</tbody>
</table>
REPORT OF THE COMMITTEE

to two or three years to maintain free herd status in Modified Accredited Advanced and Accredited Free states.

Provide monetary incentives to producers to enroll herds in the TB certification programs by subsidizing the costs of testing by designated accredited veterinarians.

**Resource Requirements:**

Assumptions for accreditation tests of cattle herds:
- 1 million herds in US
- 5% characterized as purebred or seed stock producers (NASS expert)
- 10% would participate if costs subsidized
- Average herd size: 40 adult cattle
- Stop fee $80 per herd
- Test fee $8 per head

Annual estimated expense for cattle $2,000,000.00

Assumptions for Accreditation tests of cervid herds:
- 8200 herds in US (2003 APHIS survey)
- 25% would participate if costs subsidized
- Avg herd size 20 head (adjusted from 2003 APHIS survey)
- Stop fee $80 per herd
- Test fee $8 per head

Annual estimated expense for cervids $500,000.00

**Resource Requirements:**

Indemnity costs for Post-mortem of CCT/gIFN Reactors (assuming TB negative population):
- Cattle-5000 herds X 40 head X .02 CFT test suspects X .02 CCT test reactors X $3000 indemnity = $240,000
- Cervids-2050 herds X 20 head X .05 SCT test suspects X .05 CCT test reactors X $2000 indemnity = $205,000

**Resource Requirements:**

Costs for confirmatory testing of CFT test suspects:
- CCT test-assume current state/federal veterinarian staffing can do this work
- GfFN assay-Cattle: assume half of CFT test suspects would be tested by gFfN rather than CCT test-4000 CFT suspects X .5 gFfN X $30 lab (kit plus personnel) = $60,000 testing plus shipping-5000 herds X .8 suspect/herd X .5 use gFfN X $40 shipping = $80,000 freight

632
TUBERCULOSIS

<table>
<thead>
<tr>
<th>Costs Associated with D7 (increasing number of Accredited Free herds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cattle herds</td>
</tr>
<tr>
<td>Cervid herds</td>
</tr>
<tr>
<td>CCT/gIFN testing of CFT suspects found during herd tests</td>
</tr>
<tr>
<td><strong>Total cost</strong></td>
</tr>
</tbody>
</table>

**Action Item (D8):**
Enhance Veterinary Services standard reporting procedures for tuberculosis surveillance activities at all levels of the epidemiological delivery system.

**Actions Required:**
- Develop standards and certification training for accredited veterinarians performing TB tests.
- Insist that FSIS include in its data the number of adult and feeder cattle killed at slaughter. Also, request FSIS include suspicious pathology sent to FSIS laboratory.
- Encourage NASS to routinely survey and report census estimates for the cervid industry on the same frequency as reports in other livestock.
- Include documentation of conformance with slaughter surveillance goals and provide information back to FSIS and plants.
- Require TB inspection on carcasses condemned at ante mortem inspection.
- Evaluate the rate of submissions of suspected tissue samples for adult and feeder cattle.
- Monitor the distribution of the diseases in animals and detect outbreaks in animal species at the area and field levels and evaluate the impact of prevention, control, and eradication measures and activities on defined animal populations. Require field units to monitor and carry out contact tracing and conduct full epidemiological investigations in recognized area outbreaks.
- At the regional level, epidemiologists will monitor and report epidemiological findings in the states, and monitor and report on the performance of control and eradication programs.
- At the national level, epidemiologists for Animal Health Programs will monitor and report on:
  1. Tuberculosis epidemiology findings in the United States;
  2. The performance of control and eradication programs; and
  3. The planning of program activities (e.g., funding, regulations, and Uniform Methods & Rules updates).
REPORT OF THE COMMITTEE

National program epidemiologists will examine international trends for tuberculosis over time and make regional comparisons with the intent of revising import protocols as necessary and coordinating control efforts across international borders (e.g., Mexico).

Require all livestock species susceptible to bovine TB be identified with individual unique identification devices that can be traced back to the farm of origin.

**Resource Requirements:**

- Epidemiology and program management:
  - 2 additional positions on AHP staff, 1 additional position on each regional staff

| Costs Associated with D8 (Add Veterinarian Support Staff for Program Management) |
|---------------------------------|-----------------|
| 2 AHP staff veterinarians        | $220,000.00     |
| 2 regional epidemiologists       | $180,000.00     |
| Total cost                       | $400,000.00     |

**Action Item (D9):**

Incorporate TB surveillance and tissue collection on animals being evaluated for other disease programs (On farm or renderer collections for BSE).

**Action Required:**

- Develop protocols to collect tissues from animals being presented for other surveillance programs (i.e. BSE and CWD).

**Resources:**

- Utilize positions funded by BSE and CWD surveillance programs. Additional costs for histopathology at regional contract labs that support BSE surveillance program:
  - 260,000 non-ambulatory cattle surveillance
  - 120,000 wild deer surveillance
  - 25,000 captive cervid surveillance (assumes 10% annual mortality)

405,000 total examined

- Assume submissions at rate of 1% (any head or thoracic lymph node, or pulmonary pathology)
- 405,000 X .01 = 4050 submissions
- Estimated expenses if histopathology done at regional lab 4050 submissions X $20 = $81,000

634
Action Step - Information and Education (E)

Action Item (E1):
Develop and distribute new informational brochures or other media that clearly identifies specific risk factors and risk practices that potentiate the risk of acquiring bovine TB.

Actions required:
Identify and prioritize specific audiences to target for I&E.
Identify/assess suitability of existing TB literature and related references for potential I&E use.
Determine costs/identify cooperative funding sources to subsidize development of outreach materials through an extension service or equivalent.
Develop/distribute outreach materials as necessary to accommodate action item needs.
Establish measures to gauge effectiveness of outreach efforts.

Resource Requirements:
Brochures - Design and print 3, 4-color brochures, 100,000 copies each
Design: $4,500.00
Printing (100,000 copies, ea.): $21,000.00
Subtotal: $25,500.00
Fact Sheets - Design and print 3, 1-color fact sheets, 100,000 copies each
Design: $450.00
Printing (100,000 copies): $9,000.00
Subtotal: $9,450.00
PowerPoint Presentation:
Design: $1,500.00
Duplication (100 CDs with insert cards/jewel cases): $750.00
Subtotal: $2,250.00
Web site (gateway of TB information):
Design: $5,000.00
Production (programming, HTML coding, 508-compliance): $15,000.00
Subtotal: $20,000.00
Travel:
Meeting/conference attendance: $11,800.00
Subtotal: $11,800.00
Educational Technology Specialist (GS-13):
Salary and Benefits – 75% time: $80,000.00

Laboratory diagnostics for additional sampling $100,000.00
REPORT OF THE COMMITTEE

Subtotal: $80,000.00
Temporary Clerical Help - Fill materials requests, prepare paperwork for travel and procurement, compile and manage mailing lists
  Salary: $21,000.00  
  Subtotal: $21,000.00
LPA Assistance (GS-11):
  Salary and Benefits – 50% time
  Subtotal: $60,000.00
  Supplies - Computer equipment, peripherals, general office supplies, photocopying, video/photo duplications
  Subtotal: $20,000.00

E1 TOTAL: $250,000.00

Action Item (E2):
Conduct a descriptive analysis of the dairy heifer-raising industry.

Background:
The growth of the dairy industry over the past 20 years in the United States has required that sufficient replacement dairy heifers be raised and marketed efficiently to replace adult, milking cattle frequently culled from the large, commercial dairy herds throughout the United States. Heifer-raising operations often numbering in the thousands of heifers have developed in many States. These operations usually gather and group heifers from a multitude of sources, and may specialize in raising them to various ages and weights before they move to another facility.

Documentation and geographic mapping of existing dairy heifer-raising facilities nationally, and a descriptive analysis of the numbers and types of heifers they contain is lacking. Having such information is critical if education efforts regarding risk factors and practices that promote spread of bovine tuberculosis and other diseases are to be focused toward this segment of the industry.

Actions required:
Identify and fund a resource to conduct and document a descriptive, epidemiologic survey of the dairy heifer-raising industry in the United States that includes the trend in movements of dairy heifers, and a geographic information system analysis.

Provide results of the descriptive analysis in a format that will allow educational information related to risk factors and practices that promote spread of TB to be shared with the dairy heifer-raising industry.

Resource Requirements:
VMO/Epidemiologist (GS-13)
Salary and Benefits: $124,300.00
Administrative Support (GS-6)
Salary and Benefits: $65,000.00
TUBERCULOSIS

Supplies - Computer equipment, peripherals, general office supplies, photocopying, video/photo duplications: $10,700.00

E2 TOTAL: $200,000.00

Action Item (E3):
Develop and deliver continuing educational program for professional accredited veterinarians that clearly outlines the expectations industry and regulatory officials have of them when performing TB program activities.

Background:
Past successes in the TB eradication program have resulted in complacency in some segments of the veterinary community. Renewed efforts are necessary to inform and re-educate accredited veterinarians on their critical role in the TB eradication program.

Action required (E3.1):
Obtain funding and other resources to manage, develop, and deliver continuing educational programs for accredited veterinarians and other targeted veterinary populations, as specified in the actions below.

Resource Requirements (E3.1):
VS/PDS Training Specialist (GS-13)
Salary and Benefits: $100,000
Veterinary Medical Officer (GS-13)
Salary and Benefits: $124,300
Training Technician (GS-6)
Salary and Benefits: $65,000
Supplies - Computer equipment, peripherals, general office supplies, photocopying, video/photo duplications: $30,000.00

E3.1 Subtotal: $319,300.00

Action Required (E3.2):
Develop a continuing education CD-ROM with printed supplemental material that will include the following topics as a minimum:

- Current status and challenges related to bovine TB eradication in the US;
- Proper administration and reading of the intradermal tuberculin test;
- Use of the various tests used in the TB eradication program and the efficacy of each; and
- Requirements and responsibilities related to the reporting of tests completed and responses found.
REPORT OF THE COMMITTEE

Resource Requirements (E3.2.1):
Prepare a level 2 interactive CD-ROM for Producers, Federal and State veterinarians, and other stakeholders targeting TB current status and changes.
- Design: $35,000.00
- Contractor Cost: $7,000.00
- Maintenance and Changes: $25,000.00

E3.2.1 Subtotal: $67,000.00.00

Action Required (E3.2.2):
Produce and mail Sample Handling & Submission CD-ROMs.
Resource Requirements (E3.2.2):
- Duplication (1000 CDs with insert cards/jewel cases): $1,500.00
- Postage & Handling: $8,500.00

E3.2.2 Subtotal: $10,000.00

E3.2 Subtotal: $77,000.00

Action Required (E3.3.1):
Initiate continuing educational outreach activities to State Veterinarians, state veterinary medical associations, and other veterinary organizations using products developed in second action.
Resource Requirements (E3.3.1):
- VMO/Epidemiologist (GS-13) – 50% time
  - Salary and Benefits: $60,000.00
- Administrative Support (GS-6) – 50% time
  - Salary and Benefits: $30,000.00
- Supplies - General office supplies, photocopying, video/photo duplications: $10,000.00

E3.3.1 Subtotal: $100,000

Action Required (E3.3.2):
In cooperation with State Veterinarians and AVIC’s, initiate effort to identify and contact accredited veterinarians with below average record of reporting TB suspects. Individually contact and meet with these veterinarians to reacquaint them on the proper reading of intradermal TB test.
Resource Requirements (E3.3.2):
- (Labor is split between this Action Required and Action Required in E3.3.1 above)
TUBERCULOSIS

VMO/Epidemiologist (GS-13) – 50% time
Salary and Benefits: $60,000.00
Administrative Support (GS-6) – 50% time
Salary and Benefits: $30,000.00
Supplies - General office supplies, photocopying, video/photo duplications: $10,000.00

E3.3.2 Subtotal: $100,000

Action Required (E.3.3.3):
Reserve a place on the agenda of the accreditation orientation session for all fourth year veterinary students to discuss the current re-emergence of TB in the US. Implement a requirement as a condition of accreditation that all fourth year veterinary students attend a wet lab on the proper administration and reading of an intradermal TB test.
Resource Requirements (E.3.3.3):
(Cost absorbed between Actions Required in E3.3.1 and E3.3.2 above)

E3.3.3 Subtotal: $0.00

Action Required (E3.3.4):
Initiate outreach activities to consultants (non-accredited veterinarians, nutritionists, cooperative extension veterinarians and other animal husbandry professionals).
Resource Requirements:
VMO/Epidemiologist – 50% time
Salary and Benefits: $60,000.00
VS/PDS Training Specialist (GS-13) – 25% time
Salary and Benefits: $25,000.00
Administrative Support (GS-6) – 50% time
Salary and Benefits: $30,000.00
Supplies - General office supplies, photocopying, video/photo duplications: $5,000.00

E3.3.4 Subtotal: $120,000.00

Action Required (E3.3.5):
Provide TB information to the training organizations at PDS, NVSL, and CEAH for distribution/dissemination at major learning events.
Resource Requirements:
(Cost absorbed between Actions Required #3 and #4 above)

E3.3.5 Subtotal: $0.00
Action Required (E3.3.6):
Develop and distribute a Veterinary Services Notice or Memorandum that establishes the policy and requirement that only designated accredited veterinarians who have received special training (as described in Action 8) in the application and reading of the tuberculin test will be approved to conduct TB testing in cattle or bison. Veterinarians currently accredited by USDA who want to continue to be approved to conduct tuberculin testing in cattle and bison without interruption must receive this special training within one year of the date of the VS Notice or Memorandum.

Resource Requirements:
None

E3.3.6 Subtotal: $0.00

Action Required (E3.3.7):
Continuing education requirement for designated accredited veterinarians: All designated accredited veterinarians must attend a TB program update every three years that will include a session on the practical application of the intradermal test, and the use and efficacy of all tests used in the TB eradication program. These sessions will be taught by state/federal veterinarians. (This requirement should be consistent with provisions of the proposed changes in the veterinary accreditation program).

Resource Requirements:
Veterinary Medical Officer (GS-13)
Salary and Benefits: $124,300.00
VS/PDS Training Specialist (GS-13)
Salary and Benefits: $100,000.00
Training Technician (GS-6) – 50% time
Salary and Benefits: $35,000.00
Supplies - General office supplies, photocopying, video/photo duplications: $15,000.00]

E3.3.7 Subtotal: $274,300.00

Action Required (E3.3.8):
Incorporate into the standards for USDA veterinary accreditation the following education requirement for all veterinarians applying for accreditation to perform any regulatory activity related to food animal health certification:

New Educational Requirement: Complete at least one “wet lab” tuberculin test application seminar prior to graduation from an accredited veterinary school, or one TB program update seminar that
includes instruction on proper application of the tuberculin test and expected response rates before accreditation privileges to perform specific bovine tuberculosis eradication program activities is granted.

Resource Requirements:
None

E3.3.8 Subtotal: $0.00

E3 TOTAL: $990,600.00

Action Item (E4):
Assist industry officials in delivering information about specific risk practices for acquiring bovine TB by presenting talks and seminars at local, state and national industry gatherings.

Action required (E4.1):
Develop educational materials specifically targeting this audience (CD-ROM, PowerPoint, video, etc).
(Materials developed under Action Item E1 will be used.)

E4.1. Subtotal: $0.00

Action required (E4.2):
Enlist assistance of state and federal veterinarians in delivering presentations at industry meetings.

Resource Requirements:
Veterinary Medical Officer (GS-13) – 25% time
Salary and Benefits: $31,100.00
Administrative Support (GS-6) – 50% time
Salary and Benefits: $35,000.00

E4.2 Subtotal: $66,100.00

E4 TOTAL: $66,100.00

Action Item (E5):
Develop a training program that will prepare animal health and /or APHIS contract personnel to conduct blood and tissue sampling for bovine tuberculosis in cooperating slaughter plants and rendering facilities.

Background:
The recent finalization of the Blood and Tissue Sampling regulation in 9 CFR may provide APHIS with a tool which could enhance surveillance for bovine tuberculosis at slaughtering establishments and ren-
dering facilities. This regulation allows APHIS to conduct blood and tissue sampling in certain facilities as needed in order to increase surveillance for specific diseases using contract or APHIS-employed personnel. These personnel would need to be specially trained in many aspects of gross pathology recognition, sampling techniques, identification collection, reporting, and slaughter plant protocol and procedures before being placed in such positions to conduct these activities.

**Resource Requirements:**
- Veterinary Medical Officer (GS-13) – 50% time
  Salary and Benefits: $60,000.00
- VS/PDS Training Specialist (GS-13) – 50% time
  Salary and Benefits: $50,000.00
- Training Technician (GS-6) – 50% time
  Salary and Benefits: $30,000.00
- Supplies - General office supplies, photocopying, video/photo duplications: $30,000.00

**E5 TOTAL: $170,000.00**

**Action Item (E6):**
Provide funds to all state wildlife agencies to assist them in promoting measures, through information and education programs, to prevent tuberculosis transmission between wildlife and livestock in their respective states. This action item is linked to Strategy 2, Wildlife Management and Tuberculosis.

**Resource Requirements:**
- No additional labor costs are involved
- State funds: $5,000 x 50 states = $250,000.00

**E6 TOTAL: $250,000.00**

**Action Item (E7):**
Conduct information and education activities to assist Mexican officials in eradicating tuberculosis from all Mexican states that border the United States. This action item is linked to Strategy 6, Risk Mitigation, with respect to targeting the risk of TB exposure or infection of Mexican feeder cattle.

**Resource Requirements:**
- Specific allocation TBD.

**E7 TOTAL: $100,000.00**
TUBERCULOSIS

<table>
<thead>
<tr>
<th>ACTION STEP SUMMARY - INFORMATION AND EDUCATION (E)</th>
</tr>
</thead>
<tbody>
<tr>
<td>E1. Develop and distribute new informational brochures or other media that clearly identifies specific risk factors and risk practices that potentiate the risk of acquiring bovine TB.</td>
</tr>
<tr>
<td>E2. Conduct a descriptive analysis of the dairy heifer-raising industry.</td>
</tr>
<tr>
<td>E3. Develop and deliver continuing educational program for professional accredited veterinarians that clearly outlines the expectations industry and regulatory officials have of them when performing TB program activities.</td>
</tr>
<tr>
<td>E4. Assist industry officials in delivering information about specific risk practices for acquiring bovine TB by presenting talks and seminars at local, state and national industry gatherings.</td>
</tr>
<tr>
<td>E5. Develop a training program that will prepare animal health and /or APHIS contract personnel to conduct blood and tissue sampling for bovine tuberculosis in cooperating slaughter plants and rendering facilities.</td>
</tr>
<tr>
<td>E6. Provide funds to all state wildlife agencies to subsidize their efforts to stop transmission of information and education activities to of tuberculosis from wildlife in their respective states. This action item is linked to Strategy 2, Wildlife Management and Tuberculosis.</td>
</tr>
<tr>
<td>E7. Conduct information and education activities to assist Mexican officials in eradicating tuberculosis from all Mexican states that border the United States. This action item is linked to Strategy 6, Risk Mitigation, with respect to targeting the risk of TB exposure or infection of Mexican feeder cattle.</td>
</tr>
<tr>
<td>TOTAL</td>
</tr>
</tbody>
</table>

Action Step - Risk Mitigation (F)
Action Item (F1):
Reduce the risk of spreading tuberculosis by changing management practices and TB testing at dairy collection premises, and by TB testing dairy breeding cattle moving interstate from regions of risk.
REPORT OF THE COMMITTEE

Background:
Many industry practices potentially expose susceptible cattle to higher risk animals. Examples include mixing replacement heifers with terminal feeder cattle (including Mexican-origin steers and spayed heifers), and re-use on other farms of cull dairy cows from sale yards.

Action Required:
Provide personnel to annually certify all “moderate to large” premises where dairy calves and heifers are commingled from more than one source prior to freshening. Certification should require:

- Preventing fence-line contact of all dairy replacement or breeding cattle from all cattle maintained for non-breeding purposes;
- Keeping standardized records for a minimum of 5 years;
- Requiring permanent individual identification, allowing tracing to herd of origin, on all cattle entering and leaving premises;
- Requiring a negative official tuberculosis test within 60 days of movement out of the premises, in either interstate or intrastate commerce, regardless of status of state of origin, on all breeding cattle 6 months of age or older; and
- Quarantining breeding cattle less than 6 months of age at the time of movement upon arrival at their destination, and require an official tuberculosis test when they are 6 months of age.

Require a negative official tuberculosis test on all breeding dairy cattle 6 months of age or older moving interstate from “regions of unacceptable risk”. Dairy cattle less than 6 months of age at the time of movement shall be quarantined upon arrival in the state of destination and require a negative official tuberculosis test when they are 6 months of age. Cattle from TB certified free herds are exempt from this interstate testing requirement.

| Costs Associated with F1 (Management practices of dairy collection premises) |
|-------------------------------------------------|---------------------------------------------|
| Certification Costs                             | Estimate need about 40 GS-7 positions across US | $51,139.44 X 40 = $2,045,577.60 |
| CCT or Gamma Testing Costs                      | Number of Animals CCT = 2% of Number CFT Tests (2M^1.5 tests) | 60,000 animals |
|                                                 | Cost of CCT (Gamma $60 or CCT $100=Avg. $80 per test) Number of tests (60,000) * $80 | $4,800,000.00 |
| Estimated Costs                                 |                                             | $6,845,577.60 |

644
TUBERCULOSIS

**Action Item (F2):**
Reduce risk of spread of tuberculosis from Mexican cattle.

**Background:**
Although the numbers of infected Mexican steers and spayed heifers found at slaughter in U.S. plants has decreased in recent years, the level at which they continue to be found indicates that the U.S. is still importing infected cattle from Mexico. Therefore, cattle fed or pastured with these imported cattle are also at risk for being exposed to tuberculosis.

In addition, there is concern that states are not able to track the movements of imported cattle from Mexico. Prior notification of state of destination on cattle lots imported directly from Mexico is not consistent although required by USDA, APHIS, VS policy. Further, in many cases, cattle are diverted from their stated destination without sufficient follow-up by federal personnel.

**Action Required:**
Encourage states to require permits for all cattle moving into their state that originate from Mexico. Ensure the individual identification, premises of origin, port of entry, Mexican state of origin, and destination are recorded. Facilitate this by funding an electronic permit/health certificate program for all 50 states (costs included in A7).

USDA, APHIS, VS should consistently implement the November 2002 policy requiring notification of the state of destination when cattle are imported from Mexico - this requires no additional resources.

Provide oversight of Mexican cattle at cattle sorting facilities, and require a new Certificate of Veterinary Inspection, listing individual identification, to be issued before cattle leave the facility - may require personnel resources.

Investigate and follow-up on reported diversion of cattle from the destination listed on the import health certificate - may require personnel resources.

Require a 60-90 day quarantine period after entry into the United States, followed by an official tuberculosis test for any breeding cattle from Mexican states with lower status than modified accredited advanced. All such cattle must be physically separated by barrier from all other non-quarantined cattle during this period, including dairy cattle, breeding cattle, and other cattle.

Pre-import requirements for exhibition cattle, including roping steers, from Mexico will be the same as the requirements for breeding cattle. Upon entry into the U.S.A., exhibition cattle from Mexican states with lower status than modified accredited advanced will either be subjected to a 60-90 day quarantine period followed by an official tuberculosis test, or they will be subjected to testing by an official tuberculosis test on an annual basis prior to participation in exhibitions or events. All Mexican cattle participating in exhibitions or events must be accompa-
REPORT OF THE COMMITTEE

nied by documentation the state of origin, date of import, and a certifi-
cation of having passed the required post-entry quarantine and retest or, alternatively, certification of passing the annual test for the current exhibition year.

Maintain the ban on importing Mexican cattle that are genetically 40% or more Holstein until Mexican dairy cattle are no longer consid-
ered to be a tuberculosis risk for the United States.

<table>
<thead>
<tr>
<th>Costs Associated with F2 (Reduce risk from Mexican cattle)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Electronic Permits</strong></td>
</tr>
<tr>
<td><strong>CCT or Gamma Testing Costs</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Estimated Costs</strong></td>
</tr>
</tbody>
</table>

**Action Item (F3):**

Assist Mexican officials in eradicating tuberculosis from all Mexican states that border the United States or that export cattle to the United States.

**Background:**

In the last couple years, herds infected with bovine tuberculosis have been newly discovered in all 4 southwestern Border States. In the past, an epidemiologic review of the tuberculosis problem centering in the El Paso, Texas area revealed that a U.S. herd had the greatest risk of becoming infected with bovine tuberculosis if it was in close proximity to known infected herds in Juarez, Mexico. The Mexican Government has limited funding for eradication activities and relies heavily on local cattlemen to contribute to program activities. Therefore, many dairies in Mexico continue to operate with a very high prevalence of bovine tuberculosis.

If bovine tuberculosis could be eradicated from Mexican states on the U.S. border and states that export cattle to the U.S., then the risk of introducing infection into the United States could be reduced. Mexico would require monetary assistance in a cooperative effort to eradicate bovine tuberculosis from the Mexican Border States and states exporting cattle to the United States.

**Action Required:**
TUBERCULOSIS

The United States will assist Mexico by providing personnel to consult with Mexican officials, and assist with laboratory diagnosis; and epidemiological evaluation of bovine tuberculosis transmission. To facilitate this, USDA APHIS will fund 3 positions to assist the Mexican tuberculosis campaign. The positions will focus on laboratory support, improving animal health infrastructure, and epidemiological mentoring.

A team comprised of several individuals will be formed to provide ongoing mentoring of Mexican officials in the above areas through continuing interaction with particular Mexican states.

Cooperative tuberculosis research between the U.S.A. and Mexico will be promoted by encouraging U.S. researchers to develop collaborative agreements with Mexican researchers. The U.S. researchers with such collaborative agreements will be able to apply for USDA funds to support application of new technologies for combating bovine tuberculosis in the Mexican states, including field validation of experimental blood tests for cattle.

**ADDITIONAL Costs for (F3) (Assist Mexico)**

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 GS 12/13 positions</td>
<td>$313,372.32</td>
</tr>
<tr>
<td>Terry Beals Figure which includes salary benefits, support costs= 104,457.44 per person</td>
<td></td>
</tr>
<tr>
<td>Travel Costs for 3 individuals</td>
<td>$100,000.00</td>
</tr>
<tr>
<td>Travel for 1st year of the program</td>
<td></td>
</tr>
<tr>
<td>Mentoring Team Travel</td>
<td>$100,000.00</td>
</tr>
<tr>
<td>For Groups traveling to Mexico</td>
<td></td>
</tr>
<tr>
<td>Grant Money</td>
<td>$200,000.00</td>
</tr>
<tr>
<td>For Field Test Validation</td>
<td></td>
</tr>
<tr>
<td>Estimated Additional Costs</td>
<td>$513,372.32</td>
</tr>
</tbody>
</table>
The Committee met on Tuesday, October 26, 2004. At least 60 people, including 30 committee members, attended the meeting. Reports were provided concerning ongoing and emerging wildlife health issues of interest to United States Animal Health Association (USAHA) and its members. Summaries of these reports follow.

**Implementation of the Interagency Bison Management Plan by the Yellowstone National Park**

Dr. Glenn Plumb, United States Department of Interior (USDI), National Park Service (NPS), Yellowstone National Park (YNP), updated the committee on the activities related to the Interagency Bison Management Plan. Much of the controversy surrounding bison management at YNP revolves around the fact that approximately 50% of the bison are known to have been exposed to brucellosis. While brucellosis has been known from this population since early in the last century, the proportion of bison that are infectious at any time of the year is unknown.

The use of spatial and temporal separation of bison from cattle on private and public lands surrounding YNP provides a significant assur-
WILDLIFE DISEASES

ance to prevent the transmission of brucellosis from wild bison to domestic livestock. To further minimize the risk of transmission, cattle that occupy Special Management Areas (SMA) are being vaccinated for brucellosis. Implementation of the Interagency Bison Management Plan (IBMP) demonstrates a commitment to eventual eradication of brucellosis from the YNP bison population. The interagency partners have agreed to work within their respective authorities and areas of jurisdiction to implement deliberate, stepwise measures that manage the risk of transmission while building a foundation for the eventual elimination of brucellosis in the bison population.

Nearly all YNP bison select habitats within YNP during the summer months. However, the winter landscape makes forage less available to bison because of snow depth and snow structure characteristics. Thus, the areas available to bison during the most difficult months of winter are extremely small relative to year around distribution. Special management areas along the north and west boundaries of YNP have been designated to direct our management program which will in turn protect the brucellosis class free status for the state of Montana. Three separate zones are defined within each special management area.

Zone 1 = An area within YNP where bison are managed more intensively to assure that bison do not commingle with cattle on lands immediately outside the park.

Zone 2 = An area immediately outside YNP where bison will eventually be provided winter habitat, for use from November 1st through either early or mid May.

Zone 3 = An area immediately outside Zone 2 where bison will be intercepted and hazed back in to acceptable tolerance areas, or removed if necessary.

YNP is collaborating with two other federal and two state agencies to implement the IBMP. The management plan has two main objectives, to protect a free ranging wild population of bison and manage the population in a way that will avoid the risk of brucellosis transmission from bison to cattle (United States Department of Interior and United States Department of Agriculture (USDA) 2000). The key principles of the management strategy include the spatial and temporal separation of bison from cattle; a core area of suitable bison winter range outside YNP that will be phased in for bison use as increasing numbers of bison and cattle are vaccinated and; finally a minimum population size to protect the conservation value of this unique and valuable genome.

Bison that enter the SMA and challenge the area of tolerance are subject to a moderately complex management decision process. This decision process is what generates the vast majority of conflict between constituencies and the interagency partnership. Hazing is considered as a management tool for implementing the spatial and tem-
poral separation of bison and cattle. Should hazing become ineffective at managing bison distribution, bison will be captured. The decision regarding how to handle captured bison is an agency specific decision depending on which SMA bison are captured. At present, there are only two options: In early winter, disease management is the primary focus. In late winter, if the population is greater than 3,000 bison, agencies have the option to initiate population control measures by cropping bison, only if they are captured in the SMA, or continue testing bison captured to further pursue disease management goals.

The IBMP has been implemented for four years now. Accomplishments currently are being reviewed by an interagency review team and will be incorporated into the IBMP administrative record. Hazing of bison to manage distribution on the winter range has been initiated in both SMA’s during each of the four winters of operation. Patterns that have evolved in the west SMA show that groups of adult male bison are generally 10 or less and hazing occurs from late September until early June. In general, movements into the SMAs by groups of adult females begin in late winter and run well in to the parturition period. Movement of bison into the northern SMA, by groups of adult females, occurs earlier than at the west SMA and ceases prior to parturition. Movements by adult males into SMA’s constitute a lower proportion of the hazing events at the northern SMA. Over the last few years, population abundance has leveled off around 4,000 animals. In three of those four years more than 200 bison per year have been removed from the population by management actions.

The results of the status review will provide the interagency managers information regarding whether to move to the second step in our adaptive management procedures. While some challenges still exist, the plan is moving forward in accomplishing both of the established goals. Spatial and temporal separation of bison and cattle has been successful.

The IBMP also directs NPS to initiate a program to vaccinate bison. The contingency was that vaccinating bison at the SMA’s would be initiated once a safe vaccine was identified. A review of the literature describing the bio-safety parameters of RB51 was completed and signed in to the administrative record by the YNP Superintendent. In the spring of 2004, 113 calf and yearling bison were vaccinated at the north SMA.

In addition to in-chute parenteral vaccination of bison at the north SMA, NPS has a responsibility to develop a strategy for delivering vaccine to free-ranging bison that never go to the SMA’s. In order to move forward with remote vaccination, NPS must complete an environmental planning process to evaluate the alternatives. We anticipate this process to take 18 months with an expected decision document being issued in January of 2006. The purpose and need for this planning
WILDLIFE DISEASES

process are five fold:

- Meet the NPS mission to preserve native wildlife species as a component of a naturally operating ecosystem and protect them from exotic organisms;
- Address the NPS responsibility to implement the IBMP;
- Decrease the probability of individual bison shedding \textit{Brucella} organisms;
- Demonstrate systematic progress in further reducing risk of transmission from bison to livestock; and
- Decrease the percentage of YNP bison infected with brucellosis.

Remote delivery of a brucellosis vaccine presents many challenges. Delivery tools are currently limited with ballistic delivery of vaccine in bio-absorbable bullet packages showing the most promise. Two research groups have suggested that ballistic delivery of RB51 vaccine may require a greater dose than would be recommended through syringe injection delivery, and that short distances are required for the BTI pneumatic delivery system to be successful. YNP has studied those challenges to evaluate the feasibility of success in developing a remote delivery vaccination program. A partnership with Colorado State University has resulted in new ideas for encapsulating the RB51 vaccine. Photo encapsulation of vaccine has been shown to be successful in the laboratory. A relatively high percentage of the live bacteria in the vaccine dose survive the photo polymerization process. In addition, the ballistics of the hydrogel delivery package are very comparable to the traditional bio-bullet system. Field trials are currently in progress to compare the efficacy of this encapsulation methodology with the traditional lyophilization and compaction method.

Field evaluations of bison behavior have led to greater confidence in closely approaching bison consistently. A park based program is in place for gaining new knowledge about movement patterns using a system of randomly placed radio transmitting devices to monitor individual animal movements. In addition, aerial surveys by park biologists combined with ground based monitoring aid in documenting abundance of the population and seasonal distribution.

An interagency surveillance program to monitor brucellosis prevalence is also in place led by Montana/Animal and Plant Health Inspection Service (APHIS) at the west SMA and by NPS at the North SMA. Blood samples are collected from bison captured at the SMA’s and serology tests are conducted to determine exposure to \textit{Brucella abortus}. A small sample of bison is randomly captured by NPS field staff throughout the park and tested for brucellosis exposure as well.

In conclusion, the IBMP protects the State of Montana’s interests by maintaining the Brucellosis class-free status designated by APHIS
and when fully implemented should systematically reduce the incidence rate of brucellosis-infected animals. The IBMP also concurrently achieves the NPS Mission by conserving YNP bison population and providing for suitable core winter range areas outside of YNP. The interagency partnership continues to implement the IBMP in a very deliberate manner utilizing transparent decision trees and a documented administrative record.

**Wyoming Governor’s Brucellosis Coordination Team Update**

Dr. Frank Galey, Dean, College of Agriculture, University of Wyoming, reported to the Committee on the activities of the Wyoming Governor’s Brucellosis Coordination Team. Wyoming has experienced several new cases of brucellosis (due to *Brucella abortus*) in cattle in the past year. The cases of most interest are in the Greater Yellowstone Area. One case was directly traced to an elk origin whereas the other is very likely due to elk or bison due to reported commingling of animals. As a result of these cases, the Governor and Legislature of the State of Wyoming formed a Wyoming Brucellosis Coordination Team, with Dr. Galey as Chair. This team consists of 29 individuals including 19 members and 10 technical advisors charged with developing a list of issues, best management practices, and recommendations for four topics. Those topics include managing brucellosis in cattle and minimizing transmission between species, how the state’s agencies should best respond to subsequent cases, human health implications, and lastly, how to reduce and eventually eliminate brucellosis from the state’s wildlife paying special attention to the elk feeding grounds. The team was given one year to complete this task. It has covered the first three topics in detail and is currently working on the last topic (wildlife brucellosis). General recommendations developed by the team and current progress on the recommendations related to wildlife were reported to the Committee. The recommendations included:

- Development of Brucellosis Action Management Plan by each elk winter feedgrounds in order to reduce contact with cattle at times of high risk of disease transmission;
- Continued surveillance for brucellosis exposed animals, beyond reinstatement of Class Free status for Wyoming; and
- Research on *Brucella abortus*.

Additional wildlife-related issues recognized by the Team include the density of elk and bison herds in the Jackson Hole, Wyoming area and the need for continuing cooperation with federal partners including the U.S. Fish and Wildlife Service and NPS.
WILDLIFE DISEASES

Greater Yellowstone Interagency Brucellosis Committee Update

Dr. Tom Linfield, Montana State Veterinarian, provided an update on the activities of the Greater Yellowstone Interagency Brucellosis Committee (GYIBC) during the calendar year of 2003. The GYIBC was established in 1995, when a Memorandum of Understanding (MOU) was signed by the Secretaries of the Departments of Interior and Agriculture and the Governors of Montana, Wyoming, and Idaho, in an effort to collectively address problems caused by brucellosis in the Greater Yellowstone Area (GYA). Member agencies represented in GYIBC include the state and federal agencies responsible for management of wildlife, livestock, and lands in the GYA. The GYIBC has an Executive Committee, a Technical Subcommittee, and an Information and Education Subcommittee. The goal of the GYIBC is to protect and sustain the existing free-ranging elk and bison populations in GYA and protect public interests and economic viability of the livestock industries of Idaho, Montana, and Wyoming. A major focus of GYIBC is to facilitate development and implementation of brucellosis management plans to control and eventually eliminate brucellosis from wildlife in the GYA. In 2003, the Executive Committee recognized the need for an annual report in order to inform numerous and diverse stakeholders of GYIBC activities. The following report covers calendar year 2003:

The Executive Committee recognized the need to revise and update the original MOU. Significant changes were to more aggressively address brucellosis elimination from the GYA and to include Tribal representation on the GYIBC. This is addressed by including the Chairman of the Board of Directors of the Inter-Tribal Bison Cooperative (ITBC) to represent Native American Tribes.

The last year of a three-year study was conducted to determine environmental persistence of Brucella abortus (strain RB51) in infected fetal tissues. Bacilli remained viable for 80-90 days when placed in the environment in February versus 20-30 days when fetuses were placed in May. The third year of a fetal disappearance study also was conducted and showed that fetuses placed in YNP were scavenged more rapidly than those placed in adjacent environs. On average, fetuses were scavenged within 18 days, although disappearance times ranged from 1-78 days. Approximately half of the fetuses moved more than 100 feet, with one moved more than two miles across a frozen lake.

A study was proposed to determine the feasibility of a quarantine process for sero-negative bison calves from YNP. If successful, “disease-free” bison may be considered for YNP bison conservation efforts and potential restoration projects on suitable state, federal, and tribal lands.

The first report of disease caused by B. abortus in Rocky Mountain bighorn sheep was documented at the Wyoming Game and Fish
Department’s Sybille Wildlife Research Laboratory. Nine (four females and five males) captive sheep were infected with *B. abortus* biovar 4 following natural exposure to a fetus aborted by a research elk.

Additional topics summarized in D. Linfield’s report included:

- Detection of a cattle herd apparently infected via contact with infected elk on feedgrounds adjacent to the cattle operation. Following detection of a second infected cattle herd, Wyoming lost Class-Free status;
- Ninety-eight hazing operations were conducted around YNP boundaries;
- The 2003 Montana legislature authorized the Montana Fish, Wildlife, and Parks Commission to consider initiating a bison hunt. An environmental review of the proposed hunt is scheduled for completion in the fall of 2004. If Montana elects to move forward with a hunt; it could begin as early as the fall of 2004;
- The Idaho Fish and Game Department hired a veterinarian in October 2003, who has completed a work plan addressing issues and goals of the Governor’s Brucellosis Task Force report. Developing and implementing management practices to separate cattle and elk, decrease and eventually eliminate elk dependence on winter feeding, and conducting surveillance are primary objectives of the plan.
- A total of 570 elk were trapped and tagged, and 27 test-eligible female elk were bled for serological testing at six Wyoming feedgrounds as part of the Wyoming Game and Fish Department’s integrated Brucellosis-Feedgrounds-Habitat program. A total of 2,569 elk calves were vaccinated at 19 feedgrounds. The Strain 19 vaccination program was initiated in 2003 for the first time since the program that ran from 1989-1991 on the National Elk Refuge (NER). Habitat improvement projects were greatly hindered by the continuing drought in Wyoming;
- Sero-positive rates from 1-4 per cent were found among hunter-killed elk in Montana elk management units within the GYA indicating relatively low brucellosis exposure and infection among these animals;
- Analysis of seven different proposed alternatives including options for controlling brucellosis that would not require reductions in winter feeding or numbers of elk on the NER was conducted as part of continued work on the Bison and Elk Management Plan for the NER and Grand Teton National Park; and
Progress Report on the National CWD Management Plan and Federal Funding

Dr. Tom Thorne, Wyoming Department of Game and Fish, updated the committee on activities directed toward the goals established in the national plan for managing chronic wasting disease (CWD) in free-ranging and captive cervids, as well as on federal funds provided to support these activities and the needs for additional federal funds. In 2002, a task force of Federal and State agency representatives, co-chaired by the Director of the U.S. Fish and Wildlife Service and the Administrator of USDA-APHIS, prepared the Plan for Assisting State, Federal, and Tribal Agencies in Managing Chronic Wasting Disease in Wild and Captive Cervids (National CWD Management Plan). Subsequently, an Implementation Document was prepared by another state/federal working group. The Implementation Document contained specific responsibilities and budgetary needs for full implementation of the National CWD Plan. Although the Implementation Document was widely circulated, the U.S. Office of Management and Budget (OMB) did not approve it because of budgetary figures it contained; and therefore it was not officially implemented by Federal agencies.

United States Department of Agriculture (USDA), Animal and Plant Inspection Service (APHIS), Veterinary Services (VS), received federal funds to assist agencies with CWD management activities in captive, commercial cervids and free-ranging cervids in FY2003 and FY2004; however, the limited funding fell far short of meeting projected needs. Despite inadequate funding and failure of the federal government to formally adopt the Implementation Document, many elements of the National CWD Management Plan are being implemented on a piece-meal basis by state and federal agencies. Congressional support for additional funding has not been forthcoming, in part because some members of Congress believed little was being done to address CWD in free-ranging cervids and that funding was adequate. Consequently, it was decided at the 2003 meeting of the International Association of Fish and Wildlife Agencies (IAFWA) that a Progress Report on the National CWD Management Plan might clear up some misconceptions regarding state and federal efforts to manage CWD in free-ranging cervids. IAFWA took the lead in report preparation and invited USDOI and the USDA to participate, and a small working group was established.

The working group met in St. Louis, MO in January 2004, to initiate...
REPORT OF THE COMMITTEE

preparation of the progress report. Subsequent activities of the working group were carried out via email and telephone. The Progress Report followed the National CWD Management Plan and the Implementation Document in order to demonstrate CWD management progress according to the National CWD Management Plan. The USDA and USDOI were required to obtain OMB approval of the draft progress report, which resulted in difficulties because the report included projections of future budgetary needs and references to the Implementation Document.

After negotiations with OMB, references to the Implementation Document were deleted and the Progress Report was released in May 2004. In order to keep members of Congress informed of budgetary needs to fully address CWD in free-ranging cervids on a national scale, IAFWA proposed a budget summary based on the Implementation Document and the Progress Report. On September 9, 2004, 17 members of Congress used the Progress Report and IAFWA budgetary summary to prepare a letter sent to OMB encouraging additional funding for CWD management in free-ranging cervids and urging OMB to finalize the National CWD Management Plan.

Update on CWD Epidemiology Research

Dr. Michael Miller, Colorado Division of Wildlife, provided a brief update on analyses of CWD epidemiology data from mule deer (Odocoileus hemionus) populations in Larimer County, Colorado. Preliminary analyses have revealed it is likely that temporal, spatial, and demographic factors all influence prevalence patterns observed in naturally infected populations, and that recent management actions may have affected recent temporal trends. Dr. Miller reported spatial heterogeneity in CWD prevalence among wintering mule deer sub-populations, marked difference in CWD prevalence by sex and age groups, and clear local trends of increasing prevalence over a 7 year period that largely preceded management intervention. For both deer sexes, prevalence peaked in middle-aged animals; however, this differential was substantially larger for males. Dr. Miller concluded that demographic, spatial, and temporal factors all appear to contribute to the marked heterogeneity in CWD prevalence in endemic portions of north central Colorado, and that these factors likely combine in various ways to influence epidemic dynamics and responses to management on both local and broad geographic scales.

USDA-APHIS-VS Assistance for State CWD Surveillance and Management

Dr. Dean Goeldner, USDA, APHIS, Veterinary Services (VS) summarized the activities of USDA-APHIS-VS related to CWD. In FY 2004, APHIS received $18.5 million in appropriated CWD funding, including
$2.25 million in congressionally earmarked funding. The remainder was divided between the VS captive cervid program and support of free-ranging wildlife activities for the States, Tribes, and USDA-APHIS-Wildlife Services (WS) research and evaluation of rapid test technology.

Regarding captive deer and elk, USDA-APHIS is finalizing the proposed rule titled *Chronic Wasting Disease Herd Certification Program and Interstate Movement of Captive Deer and Elk* (published in the Federal Register on December 24, 2003), as well as the Uniform Methods and Rules document that will provide field guidance for the implementation of the final rule. In August 2004 USDA-APHIS-VS has issued an internal memo which provides procedures for defining areas where CWD has become established in wildlife and will consider purchase and depopulation of captive herds in those defined areas, regardless of their known exposure to CWD, because of their high-risk status.

In FY03, more than 12,000 farmed cervids were tested for CWD and 15,172 were tested in FY 2004. Since surveillance began in 1997, 29 farmed elk herds and 5 farmed white-tailed deer herds have been identified as CWD-positive herds. At this time, three positive elk herds remain in Colorado and two positive deer herds remain in Wisconsin. All are under State quarantine. USDA-APHIS-VS continues to offer indemnity and cover depopulation, disposal and testing costs for CWD-positive and exposed herds and trace animals. Due to smaller than anticipated indemnity expenditures in FY2004, VS was able to provide some one-time, end-of-year cooperative agreement funding to State agencies that manage CWD programs for farmed cervids, as well as some additional funding for Tier 1 State wildlife management agency cooperative agreements.

Regarding free-ranging deer and elk, USDA-APHIS-VS worked with IAFWA this year to develop an application and reporting template for USDA-APHIS-VS cooperative agreement funding with the State wildlife agencies. This template tracks expenditures as elements of the CWD National Plan and will make reporting to Congress on the implementation of the plan easier. USDA-APHIS-VS continues to solicit guidance from IAFWA on the formula structure for distributing cooperative funding to State wildlife agencies for CWD surveillance and management. In total, more than $5.4 million was distributed in FY 2004 through this program. All 50 States once again received funding. Points of interest from the FY 2004 application process: More States appear to be screening wildlife samples with rapid antigen-based test kits. While some States are doing more hunter-killed cervid surveillance, others are doing less and the overall trend in surveillance appears to be slightly downward. In addition, while some States focus almost exclusively on hunter-killed cervid surveillance, others are fo-
reporting primarily on targeted surveillance of symptomatic animals. Further discussion is needed on appropriate long-term surveillance strategies for CWD. Differences also still exist in the definition of a population and on the validity of multi-year sampling strategies. Finally, not all States are using the previously described template.

Most State reports for FY 2003 cooperative agreement activities have not yet been received by USDA-APHIS-VS. It would be helpful to have previous year reports prior to approving current year applications; however, this may not always be realistic. Nevertheless, it is imperative that these reports be submitted as soon as possible so that USDA-APHIS-VS can account for how the funds are being spent. The States also are reminded that funds not spent or obligated prior to the end of the cooperative agreement period cannot be carried over and must be returned to the U.S. Treasury.

USDA-APHIS-VS support for Tribal CWD activities was set at $750,000 for FY 2004. Again, a large portion of this cooperative agreement funding went to the Native American Fish and Wildlife Society to support its regional CWD biologists and assistance to tribes in their regions. However, 19 individual Tribes were awarded smaller cooperative agreements for CWD surveillance activities.

USDA-APHIS-VS continues to support research with USDA-APHIS-WS, including work on appropriate fencing for captive cervids and possible vaccine development. The USDA-APHIS Center for Veterinary Biologics has also approved four rapid test kits for use in wild cervid CWD surveillance testing at CWD contract laboratories.

USDA-APHIS-VS has had extensive discussions with the U.S. Environmental Protection Agency (EPA) on a variety of CWD-related issues, including 1) CWD-related waste disposal from diagnostic laboratories in EPA Region 8; 2) an EPA Office of Solid Waste memo on recommendations for the landfilling of CWD-positive carcasses; and 3) Section 18 exemptions under the Federal Insecticide, Fungicide and Rodenticide Act for the use of bleach, sodium hydroxide and Environ LpH as disinfectants for transmissible spongiform encephalopathy agents, including CWD.

USDA-APHIS-VS worked with United States Department of Interior (USDOI) and the States, via IAFWA, to produce the Progress Report on the CWD National Plan. This report was released and presented to Congress in May. USDA-APHIS-VS continues to work with its Federal, State and Tribal partners to implement the national plan within the framework of the federal budgeting process.

**Wildlife Disease Research at the National Wildlife Research Center**

Dr. Bob McLean, USDA-APHIS-WS National Wildlife Research Center (NWRC) provided a time-specific paper on their research ac-
WILDLIFE DISEASES

Wildlife Disease Surveillance by USDA-APHIS-WS

USDA-APHIS-WS concluded the first round of hiring for the Wildlife Disease Surveillance and Emergency Response Program (Program) during FY 2004. Twenty-three Wildlife Disease Biologists (WDB), an Assistant Disease Coordinator, a National Environmental Protection Act (NEPA) Coordinator, an Administrative Assistant and a Staff Officer were hired to build a basis for full-time wildlife disease monitoring and surveillance. Nine of the WDB's were hired for the Western Region, and 14 WDB's were hired for the Eastern Region. The rest of the positions, including the Wildlife Disease Coordinator, were strategically located across the United States to best administer the Program.

A major component of the Program is the ability of WDB's to quickly mobilize and provide assistance with emergency disease control efforts and a summary of related activities follows: USDA-APHIS-WS received a request for assistance with the Washington State bovine spongiform encephalopathy (BSE) Task Force in the depopulation of 450 feeder calves. The BSE Task Force leaders praised WS employees for quick response and hard work for accomplishing loading operations two hours ahead of schedule despite difficult weather conditions. The Program responded to two requests from the Texas Animal Health Commission (TAHC) to collect wildlife and feral animals associated with two outbreaks of avian influenza. Blood, trachea swabs and anal swabs were collected from the animals. WS has provided assistance to Florida to assist with relief efforts from Hurricane Ivan. This assistance has been in the form of conducting surveys of damaged animal facilities.

Disease activities conducted by the WDB's included technical assistance, surveillance, and control of numerous diseases including West Nile Virus, plague, rabies, swine diseases, bovine tuberculosis histoplasmosis, trichomoniasis, bovine brucellosis, scrapie, etc. The following are provided as examples of some the Program accomplishments: The Program was responsible for assisting with CWD surveillance in 17 states and the District of Columbia. Surveillance activities fell primarily into two categories: sampling conducted on hunter-harvested animals and sampling conducted on animals taken during wildlife damage management. The Program is assisting in Oregon and California with surveillance of deer-hair-loss syndrome by providing lice samples from deer. The sampling was extended statewide in Oregon and included both white-tailed and mule deer. Additional samples from black-tailed deer were taken in Northern California. Many states have requested assistance with West Nile Virus (WNV) monitoring. For example, Illinois and Missouri employees cooperated on one project to
collect 190 samples from birds in the St. Louis, Missouri area. In Maryland and New Jersey, samples were taken from resident Canada geese captured during wildlife damage management and submitted to state health department laboratories for analyses.

The following training activities were by WDB's: Wildlife Chemical Immobilization and Euthanasia Training; Necropsy and Biological Sample Collection; Incident Command System 100 and 200; Personal Protective Equipment; Emergency animal Disease Preparedness and; Immobilization and Euthanasia.

Activities at the USDA-APHIS-WS-NWRC included establishment of a fully functioning Biosafety Level-2 research diagnostic laboratory to support its new wildlife disease research program; identification of a promising surveillance system for WNV in nesting cliff swallows: over-wintering WNV positive ectoparasites were found in swallow nests. This finding is significant because it indicates early season amplification of the virus, giving it an efficient jump-start within the cliff swallow ecosystem each year prior to amplification in the general avian community.

NWRC scientists were contracted by the Centers for Disease Control to conduct a survey of small wild mammals and their exposure to West Nile virus. Field surveillance in five states carried out by NWRC researchers and their WS operational counter-parts indicated that raccoons, opossum, *Peromyscus* mice, and fox squirrels all are commonly exposed to WNV. Pending investigations under experimental laboratory settings will determine the extent to which these species are amplifying hosts.

**Current and Topical Information for Managers Interested in Wildlife Diseases**

Dr. Leslie Dierauf, Director of the United States Department of Interior, U.S. Geological Survey (USGS), National Wildlife Health Center (NWHC) provided a summary on diseases of interest to wildlife managers. Avian vacuolar myelinopathy (AVM) is an emerging neurologic disease of wild birds in the southeastern United States. The disease was first recognized in bald eagles (*Haliaeetus leucocephalus*) at DeGray Lake, Arkansas in 1994, and 2 years later, was confirmed in a number of American coots (*Fulica americana*) on this and another lake in Arkansas. Since then, AVM has been confirmed in coots on ten lakes in four states (Arkansas, North Carolina, South Carolina, and Georgia; and also in asymptomatic birds at one reservoir in Texas. Besides coots and eagles, the disease has also occurred in several species of waterfowl, including mallards (*Anas platyrhynchos*), ring-necked ducks (*Aythya collaris*), bufflehead ducks (*Bucephala albeola*) and Canada geese (*Branta canadensis*), a great-horned owl (*Bubo virginianus*) and a killdeer (*Charadrius vociferus*).
Coots affected with AVM exhibit profound motor dysfunction and incoordination; they are reluctant to fly, ataxic on land and may swim in circles or on their backs. Histologically, the disease is characterized by diffuse, spongy degeneration throughout the white matter of the central nervous system (CNS) of affected birds. Despite extensive diagnostic and field investigations, the causative agent of AVM is still unknown. Recently, the disease was experimentally reproduced in red-tailed hawks (*Buteo jamaicensis*) upon ingestion of tissues from AVM-affected coots, providing evidence that eagles contract the disease by consuming affected coots or ducks. A subsequent experiment in which chickens (*Gallus* spp.) were fed different tissues from affected coots demonstrated that the causative agent was present in the gastrointestinal (GI) contents, but not in the brain, fat, kidney, liver or muscle of the chickens. During recent work, we demonstrated that ingestion of several samples of *Hydrilla* (but not all) from lakes with ongoing outbreaks of AVM resulted in brain lesions (in mallards) indicative of AVM. These results support the hypothesis that the causative agent of AVM is ingested by waterbirds while consuming aquatic vegetation at affected sites. At two sites with AVM, *Hydrilla* is the dominant aquatic vegetation; however, it is not present in all AVM-affected lakes.

Although we don’t have definitive data, we suspect the disease is associated with other aquatic vegetation that is dominant in other affected lakes. Based on results of our previous work with sentinel mallards and coots at WL that demonstrated that the exposure to AVM is site-specific and seasonal, we hypothesize the agent is either seasonally accumulated by aquatic vegetation, such as *Hydrilla*, or seasonally produced by one or more organisms associated with aquatic vegetation at affected sites. Also, upon ingestion of some *Hydrilla* samples collected during an AVM outbreak, several coots in our studies became sick and died with neurologic signs similar to those seen in wild birds, but lacking the characteristic brain lesions of AVM. We are currently in the process of conducting a site characterization of lakes with AVM in comparison with paired control lakes and additional animal trials to determine the etiologic agent.

Prairie dogs (*Cynomys* sp.) and their most dependent predator, the endangered black-footed ferret (BFF) (*Mustela nigripes*) are highly susceptible to sylvatic plague (*Yersinia pestis*) and have experienced significant declines in the last century, in part due to this disease. Prairie dogs are also significant reservoirs of plague for humans in the western United States. We have been conducting studies to determine if protective immunity against plague could be induced in black-tailed prairie dogs (*C. ludovicianus*) by voluntary consumption of a novel plague vaccine and in BFF’s by inoculation.

A recombinant raccoon poxvirus that expresses the F1 antigen of *Y. pestis* (designated RCN-F1) was incorporated into a palatable gel—
REPORT OF THE COMMITTEE

tin-based carrier bait and offered to 18 fasted prairie dogs for voluntary consumption; 18 negative control animals received placebo baits. Baits were given to prairie dogs at weeks 1 and 4, and at week 7, all animals were challenged with virulent *Y. pestis*. Survival rates differed significantly between the two groups (P<0.01); 10 of 18 (55.6%) vaccinates survived compared to two of 17 (11.8%) negative controls. Serum IgG antibody titers against *Y. pestis* F1 antigen increased significantly between baseline and post-prime samples (P<0.01) and between post-prime and post-boost samples (P<0.02) in the vaccinated animals. The results of this study suggest that a protective immune response to *Y. pestis* infection can be elicited through voluntary consumption of palatable baits laden with the RCN-F1 vaccine. This strategy may prove useful in controlling plague epizootics in free-ranging prairie dog colonies.

The BFF depends primarily on prairie dogs for both food and shelter and thus may be exposed to the bacteria either by consumption of plague-infected prey or by fleabite. Once thought to be extinct, a captive breeding and recovery program was established for the BFF in 1987 after an outbreak of canine distemper nearly decimated the last known wild colony that was discovered 6 years earlier. The occurrence of plague in prairie dog populations and its potentially devastating effect on BFF re-establishment is a major impediment to the captive breeding and recovery program of this federally listed endangered species. We conducted further experiments to assess the feasibility of vaccinating the BFF against plague using a recombinant fusion protein consisting of F1 and V antigens from *Y. pestis*. On days 0 and 28, post-reproductive BFF's were immunized with the fusion protein by subcutaneous (s.c.) injection. Control animals received a placebo by the same route. Two weeks after the second immunization, mean antibody titers to *Y. pestis* F1 antigen were measured and found to be significantly higher in vaccinates than their pre-immunization value (P<0.001) and significantly higher than the control value (P < 0.001). Six months post-immunization, 16 vaccinates and 8 controls were challenged with approximately 8,000 colony forming units (cfu) of virulent *Y. pestis* by s.c. injection. Eleven of 16 vaccinates survived challenge with no ill effects; their survival rate was significantly different (P=0.02) from the eight control animals, all of which died within 3-6 days. Two months later, the 11 surviving vaccinates were challenged again by ingestion of a plague-infected mouse. None of the animals showed any ill effects and all survived. In contrast, seven control animals fed infected mice died of plague within 2-4 days, including one animal that did not actually ingest the mouse, but likely sniffed or licked it. This study demonstrates that immunization of BFF’s with the recombinant F1-V fusion protein can induce significant antibody responses and reduce their susceptibility to plague infection. Until other methods of
plague control are developed, the F1-V vaccine might be useful in protecting black-footed ferrets in captive-breeding facilities and animals intended for reintroduction programs. Based on these results, this year we are immunizing groups of captive-reared BFF’s with F1-V at the National Black-footed Ferret Conservation Center. Vaccinated animals and an equal number of unvaccinated animals will be released in several states (Colorado, Arizona and Montana) this fall to determine if vaccination improves survival. Regarding chronic wasting disease, risk analysis tools have been successfully used to determine the potential hazard associated with disease introductions and have facilitated management decisions designed to limit the potential for disease introduction. CWD poses significant challenges for resource managers due to an incomplete understanding of disease etiology and epidemiology and the complexity of management and political jurisdictions. Tools designed specifically to assess the risk of CWD introduction would be of great value to policy makers in areas where CWD has not yet been detected.

To this end, the USGS created a steering committee representing states, native communities, federal, academic, and non-governmental entities. This committee formulated a collaborative process for the development of CWD risk assessment tools applicable to both free-ranging and captive populations. The committee recommended a workshop be held on the topic and suggested the format, content, and potential participants. Identified objectives of the workshop included:

- Identify and discuss the needs of various government and non-government groups involved with assessing, managing, and/or preventing CWD;
- Identify current gaps in CWD research specifically in relation to information applicable to the risk analysis process; and
- Construct a general, consensual, framework model that incorporates all factors identified as potentially associated with the presence or absence of CWD.

The resulting CWD Risk Analysis Workshop was held May 11-13, 2004 in Fort Collins, Colorado. It was attended by 28 individuals who represented a cross-section of management, research, and non-government organizations. Experts with experience in a variety of risk analysis approaches and representatives from public and private user groups, presented in the plenary session. The remainder of the workshop consisted of facilitated breakout sessions and all-group discussions.

A summary report of the Workshop has been produced, reviewed by the participants and is available upon request. It contains summaries of speaker presentations, group discussions, a list of identified risk factors, and the framework model. Further funding for this project is
not available. Nevertheless, we will try to work with existing resources to create additional products that will make limited risk analysis information tools available for managers.

Production of a prototype for the CWD Data Clearinghouse (CWDDC) began in March, 2004 as a collaborative project of the National Biological Information Infrastructure (NBII), the NBII Wildlife Disease Information Node (WDIN), and the USGS-NWHC. Following initial development, the Nebraska Game and Parks Commission, the Tennessee Wildlife Resources Agency, and the Wisconsin Department of Natural Resources joined the partnership, contributing a subset of their existing CWD data for testing purposes. The Maryland Department of Natural Resources offered their support as a test bed for the data entry process. When the prototype became functional, partner representatives, as well as those from USDA, USGS and non-governmental organizations, were invited to participate in multiple on-line "virtual workshops", to demonstrate the system, and offer feedback for improvements. Following the workshops, all participants were given the opportunity to trial the CWDDC at their own desks. These comments were then reviewed and changes were made to the prototype. This second version of the prototype will be demonstrated during the 2004 IAFWA meeting, and be available for testing and comments. Additional comments will be reviewed and incorporated before a working system is made available. The CWDDC will continually be modified to ensure that it meets agency needs.

A CWD-positive tissue bank is being developed in order to collect and maintain significant amounts of CWD-positive tissues and make them available for valid research projects as reference materials. Twelve elk, 12 mule deer and 12 white-tailed deer have been captured and transferred to Sybille Wildlife Facility in Wyoming. All 36 will be orally inoculated with CWD in the near future. Animals will be serially harvested and tissues collected at approximately 6, 12 and 18 months post-inoculation. This will provide a time series of tissues that may provide useful for testing various existing and new assays. Collaborators on this project include Wyoming Game and Fish Department, University of Wyoming, and the NWHC.

Another research project will identify and monitor strains of CWD in wild and captive cervids and establish a strain identification assay for CWD. Preliminary results indicate that a western blot fingerprinting technique may be useful for identifying specific CWD strains. Collaborators for this project are Dr. Richard Bessen at Montana State University and Dr. Tonie Rocke at the NWHC.

A CWD biomarker research project is being conducted to identify biomarkers indicative of CWD infection in cervids. Evidence of infection has been noted in the pituitary glands of (intracerebrally) scrapie--infected rodents. This result suggests that endocrine hormones are
promising biomarkers that may be useful for detecting CWD before the onset of clinical disease. Collaborators are Montana State University.

Effective disease detection in free-ranging cervids presents some unique statistical challenges. It is impossible to obtain a statistically random sample from free-ranging wildlife. Therefore, standard theory used for human and domestic disease detection cannot be applied. Computer simulation techniques are being utilized to design more effective surveillance designs for wildlife. Collaborators include the Iowa State Cooperative Fish and Wildlife Research Unit.

A variety of small mammals scavenge deer carcasses and could therefore potentially come in contact with infectious material. It is critical to understand whether CWD can jump the species barrier and become established in other wildlife species. We are initiating challenge studies in the NWHC isolation facility to examine whether small rodents can contract CWD and whether CWD can adapt to a rodent host.

The 2nd International CWD Conference will be held July 12-14, 2005 at the Monona Terrace Conference Center in Madison, Wisconsin. Wisconsin Department of Natural Resources is the primary sponsor, with assistance from USGS-NWHC and USDA-APHIS. Program planning is in early stages.

National West Nile Virus (WNV) Update: 2004

Dr. Daniel Mead, Southeastern Cooperative Wildlife Disease Study (SCWDS), briefly updated the Committee on the status of WNV in the United States. First identified in the U.S. in 1999, the mosquito-borne virus has been detected in every state except for Alaska and Hawaii. Mead stated that since 1999, the virus has been detected in over 275 avian, 22 mammalian, and 1 reptilian species.

Dr. Mead briefed the Committee on nationwide 2003 and 2004 bird, human and equine surveillance results. Mead stated that ~73,861 dead birds were reported to officials in 2003. According to Mead, WNV was detected in 11,597 of those dead birds. During 2004, WNV has been detected in 6,014 wild birds. During 2003, 9,389 human cases were reported from 41 states. This year, 1,951 human cases, including 184 blood donors, have been reported from 40 states. During 2003, 4,494 equine cases were reported. This year there have only been 951 equine cases reported.

Dr. Mead also updated the committee on a variety of WNV research projects continuing or recently completed at the SCWDS and the University of Georgia’s College of Veterinary Medicine. Projects included research into the role of peridomestic avian species in WNV epidemiology, detection and reporting rates of surrogate dead crows (decoys) placed in the environment under urban and rural condition, and envi-
WNV Infection in Sage Grouse

Dr. Todd Cornish, Wyoming State Veterinary Diagnostic Laboratory, provided a report on WNV infection in sage grouse. The greater sage grouse (*Centrocercus urophasianus*) is a declining species native to sagebrush habitats of western North America. Historically widespread, the species has disappeared from much of its original range, with an estimated total population decline of 45-80% and local declines of 17-92%. Loss and degradation of nesting and brood-rearing habitat from human change is thought to be the single most important factor leading to fragmentation, reduction, and extirpation of populations. These changes have led to several petitions to list sage grouse under the Endangered Species Act, and also increase the risks to sage-grouse populations from other factors, including diseases like West Nile virus WNV.

In the summers of 2003 and 2004, WNV was diagnosed as the cause of mortality for 32 free-ranging sage-grouse from Wyoming and Montana and 5 free-ranging grouse from Alberta. At necropsy, significant gross lesions were not observed in most birds. Consistent microscopic lesions included acute necrosis in many organs, including spleen, kidney, heart, and adrenal gland, without significant inflammation. West Nile virus infection was confirmed by real time reverse transcriptase polymerase chain reaction (RT-PCR)120 and immunohistochemistry in all birds, and by virus isolation in select birds.

End of year survivorship data collected in 2003 from three marked populations of sage-grouse in Wyoming and Montana indicate that WNV infection was responsible for a 25% decrease in annual survivorship of adult hens in each of these populations. Lek count data collected in 2004 further demonstrate significant proportional decreases in sage-grouse populations at sites where WNV was confirmed as a cause of mortality in 2003, with several lek populations experiencing local extirpations. Serological surveys performed on birds from several marked populations of sage-grouse in Wyoming and Montana and on marked birds from Alberta and hunter-killed birds from areas in Wyoming that experienced WNV sage-grouse mortalities demonstrated that 0/300 birds had serum-neutralizing antibodies against WNV.

In spring of 2004 an experimental trial was performed at the University of Wyoming to determine the outcome of experimental WNV infection in greater sage-grouse. Forty adult birds were captured, acclimated to captivity, and tested for serum-neutralizing antibodies to WNV. All birds were negative for such antibodies, were divided into treatment groups, and dosed with $10^2$, $10^4$, or $10^6$ plaque forming units (PFU) of
a 2003 WY sage-grouse isolate of WNV subcutaneously. A fourth treatment group consisted of birds directly exposed to inoculated birds (in-contact controls) with a final negative control group. All inoculated birds died or required euthanasia by day 7, regardless of dose, and 40% of contact birds also were infected and died. Clinical signs were observed up to 12 hours before death, including depression, anorexia, ataxia, fine tremors of the head and neck, recumbency, and inability to walk or fly. Virus was isolated from most tissues and samples examined, and demonstrated in most tissues and samples by immunohistochemistry and real time RT-PCR, including oral and cloacal swabs in 100% of inoculated birds. Birds were viremic from day 2 through termination of the trials (up to day 7), with an average viral titer of 10^8 PFU/ml.

In contrast to most other species in the order Galliformes, sage-grouse appear to be quite susceptible to fatal infection with WNV. Natural infections appear to be causing localized population declines and possible localized population extirpations and experimental infections and serological survey data suggest that WNV causes very high mortality in greater sage-grouse, with no evidence of survival in the lab or the field following infection. Further surveillance and field/laboratory studies are required to assess the range-wide significance of this emerging disease on greater sage-grouse populations, and to address management and recovery plans for this species of concern.

Highly Pathogenic Avian Influenza Viruses and Wild Birds

Dr. David Stallknecht, the Southeastern Cooperative Wildlife Disease Study, reported on highly pathogenic avian influenza (HPAI) viruses and wild birds. Outbreaks of HPAI virus (H5N1) were reported this past winter among domestic poultry in Cambodia, China, Indonesia, Japan, Laos, South Korea, Thailand, and Vietnam. The virus has been responsible for 43 confirmed human cases, including 31 deaths. In June and July 2004, H5N1 activity was reported in domestic poultry in China, Thailand, and Vietnam indicating new outbreaks or continuation of the winter events. Additionally, investigators have found that the H5N1 virus apparently is widespread among domestic ducks in southern China. The World Health Organization has expressed concern about the threat the virus poses to human health.

Reports of HPAI mortality in wild birds were associated with the winter outbreaks raising questions related to the possible role of wild birds in the maintenance or transmission of the virus. Although some wild bird mortality has been attributed to the H5N1 virus, currently there is no direct evidence to support a role for wild birds in the epidemiology of this virus. However, two events during the last two years suggest that we should keep an open mind. The most recent event was the isolation of an H5N1 virus from a peregrine falcon found dead in Hong Kong during January 2004. The other event occurred during the win-
REPORT OF THE COMMITTEE

ter of 2002-2003, with confirmed outbreaks of H5N1 HPAI in two waterfowl parks in Hong Kong. During these outbreaks, mortality was documented in captive wild ducks and greater flamingos and in free-flying gray herons and a black-headed gull.

It is well established that wild birds represent the reservoir for avian influenza viruses (AIV) worldwide; however, there are no reports of direct transmission of any AIV from wild birds to humans. A wide variety of AIV has been isolated from numerous species in the orders Anseriformes (ducks, geese, and swans) and Charadriiformes (shorebirds, gulls, and terns). These isolates have included all of the currently known AIV hemagglutinin (H) and neuraminidase (N) subtypes that are used to classify these viruses. AIV is transmitted within these wild populations through a fecal/oral route via cloacal shedding of virus and contaminated water. Infection rates in wild birds are dependent on season, location, age, and species. In North American ducks, for example, high infection rates (which can exceed 30%) are primarily associated with juvenile mallards during pre-migration staging in late summer, when birds are migrating from northern breeding areas. With shorebirds, consistent isolations of AIV have been reported only from ruddy turnstones during spring migration stopovers at Delaware Bay. In short, the epidemiology of these viruses in wild birds is complex and dependent on behavior as well as species susceptibility to infection.

AIV diversity within these wild populations also presents a complex picture with regard to subtype and virulence. Subtype diversity in wild bird populations does not occur randomly. In duck populations in North America, for example, H3, H4, and H6 subtypes represent the majority of isolates, and this has been a consistent finding for more than 30 years. The H5 and H7 AIV subtypes have been isolated from wild birds, but they are uncommon and, with a single exception, have been non-pathogenic viruses. HPAI H5 and H7 viruses from wild birds are extremely rare. Of the thousands of viruses isolated from wild birds worldwide, only one previously had been associated with either domestic or wild bird mortality. This virus, an H5N3, the first AIV reported from a wild bird species, caused mortality in common terns in South Africa in 1961. The origin of this virus remains unknown and there is no evidence that it persisted in any wild bird population following this single outbreak.

There are some unique observations associated with the Hong Kong waterfowl park outbreaks that deserve attention. At these waterfowl parks, mortality attributable to a HPAI virus (H5N1) was reported from numerous species of ducks and geese. Although captive, these species represent a group of wild birds (ducks and geese) that have not been previously associated with clinical disease or mortality attributable to AIV infection. In addition, HPAI mortality was documented in captive flamingos and from several free-living birds, including gray
WILDLIFE DISEASES

herons and a black-headed gull. This is not the first time that an AIV has been isolated from gray herons or black-headed gulls, but, as with ducks, it is the first time that mortality was associated with infection.

With influenza the basic rule is “never say never.” The current H5N1 HPAI outbreaks in domestic poultry in Southeast Asia, the zoonotic potential of this virus, reports of wild and zoo bird mortality associated with this virus, and previous reports of wild bird mortality associated with a closely related H5N1 virus in Hong Kong certainly deserve attention. Mortality associated with the HPAI outbreaks in the Hong Kong waterfowl parks indicates that some H5N1 HPAI viruses may be pathogenic to some wild bird species. However, these results provide little insight into either transmission or maintenance of HPAI in wild bird populations or transmission between wild and domestic avian populations. These unfolding events dramatically underscore the need to better understand the epidemiology of AIV in our wild bird populations and to identify mechanisms for both interspecies transmission and the emergence of HPAI viruses.

Wyoming Elk Die off at Red Rim

Dr. Terry Kreeger, Wyoming Game and Fish Department, reported on a large mortality event involving elk. In February and March 2004, 304 cases of elk (Cervus elaphus) paresis were confirmed in the Red Rim habitat area southwest of Rawlins, Wyoming. Elk were found in sternal recumbency, they were alert and reactive, but unable to rise. Several cases progressed to lateral recumbency, lack of response and eventual death. Some elk provided food and water did not progress but did not improve either. The majority of cases were euthanized for humane reasons. On gross necropsy elk were in fair to good body condition; some elk had subcutaneous hemorrhage. A few cases exhibited pale streaking of the muscles, particularly the semimembranosus, semitendinosus, and gastrocnemius muscles.

Thirty-eight potential causes of paresis were ruled out. During field investigations, large quantities of ground lichen (Xanthoparmelia chlorochroa) were noticed. This lichen was also found in the rumen contents of several elk. Approximately 50 kg of the lichen was gathered and fed to captive elk. Three elk were given a mixed diet of lichen and alfalfa for 3 days, then lichen only for 7 days, and then back to lichen and alfalfa for 2 days at which time the experiment was ended. On day 10, one elk went down in sternal recumbency and was unable to rise. On day 13, a second elk went down in a similar manner. Both elk were euthanized and necropsied. Gross and microscopic lesions were consistent with lesions from the elk affected in the field. The cause of mortality was attributed to the consumption of lichen. The third elk showed no signs of toxicity, but it was unknown how much, if any, of the lichen it consumed. Interestingly, several other domestic and wild
species were also in the area of the die-off, had access to the lichen, but were not affected. The toxic compound of the lichen has not yet been identified, though literature suggests that it may be usnic acid. In the future, the lichen will be analyzed for toxic compounds and the diets of other herbivores will be examined to determine if they ate the lichen.

Bovine Tuberculosis in Michigan Deer

Dr. Stephen Schmitt, Michigan Department of Natural Resources, reported during the year 2003, surveillance activities for *M. bovis* continued statewide. In white-tailed deer, 32 animals cultured positive from 17,301 deer submitted for testing. Since 1995, a total of almost 123,869 deer statewide have been tested and 481 have tested positive. Apparent prevalence in the core area of the outbreak was 1.7% in 2003. Since surveillance began in 1995, prevalence in both yearlings and all adult deer tested from the core area has undergone a statistically significant (p= 0.05 yearlings; p= 0.001, all adults combined) downward trend. In the remainder of the five county area of northeast Michigan where TB is most prevalent, apparent prevalence was 0.2%. Prevalence continues to be highest in older bucks. Of 481 positive deer found since 1994, 67% have come from only 8 townships, suggesting foci of relatively higher prevalence surrounded by broad areas of much lower prevalence. To date, 1,513 non-cervids of 16 species have been cultured for the disease; 42 have been positive. Eighteen of those have been coyotes. Gross lesions have been extremely rare in non-cervids, and none of the positives has shown extensive pathology. Since 1996, 1,290 elk have been tested for TB. The first positive elk was found in 2000, at the eastern edge of the elk range, near the core outbreak area in deer. Since then, three more elk have tested positive. DNA analyses of isolates from infected animals of all species continue to implicate a single strain of *M. bovis*.

Strategies for eradication of TB from Michigan wildlife focus on 1) reducing deer population densities and 2) reducing man-made aggregations of deer by restriction or elimination of baiting and recreational feeding. These strategies have been implemented through provision of extra rifle seasons and unlimited antlerless permits in the former case and by banning or restriction of deer baiting and feeding in the latter. In the five county area most affected by TB, deer numbers have declined by approximately 38% since 1995, but persistent focal areas of high density, particularly on private land, remain problematic. Since 1999, baiting and feeding have been prohibited in seven counties, where TB has been found in deer. Compliance with restrictions has been uneven, and enforcement continues to pose a challenge, though the overall scope of baiting and feeding has declined substantially since 1997.
WILDLIFE DISEASES

The Michigan Department of Natural Resources (MDNR) Wildlife Disease Laboratory is sharing a $58 million, 152,500 square foot facility with the College of Veterinary Medicine’s Diagnostic Center for Population and Animal Health (DCPAH) which consolidates activities from five separate locations on the Michigan State University (MSU) campus, on the agricultural campus of MSU in East Lansing. DCPAH occupies 90% of the building and the MDNR’s Wildlife Disease Lab 10%. Recognized as leaders in wildlife disease, the MDNR Wildlife Disease Lab had started at MSU (then Michigan State Agriculture College) in 1934. By 1957, wildlife disease problems outgrew the original facility, and the MDNR Lab moved to a facility at the Rose Lake Wildlife Research Center. In August 2004, the MDNR Lab has come full circle and is back at MSU.

To better understand the biology of bovine TB, efforts are underway to:
- Determine the routes of transmission of bovine TB between wildlife and domestic animals;
- Determine which wild animals are capable of being infected with and transmitting bovine TB;
- Develop new diagnostic strategies and techniques;
- Determine what influences the spread of bovine TB in wildlife; and
- What determines how the disease is manifested in wildlife.

To better understand the impact of bovine TB on farm families, communities and society efforts are underway to:
- See the program from the perspective of farm families;
- Determine how various stakeholder groups respond to and are affected by the bovine TB situation in MI;
- Establish the factors influencing public perceptions and behaviors which would enhance efforts to manage associated issues and conflicts;
- Document the economic impact of the bovine TB situation in MI of private property values; and
- Observe the attitudes, behavior and efforts of hunters in areas of MI where bovine TB has been found.

To understand the distribution and determinants of bovine TB within populations efforts are underway to:
- Monitor the occurrence of bovine TB in wild cervids;
- Monitor the occurrence of bovine TB in wild carnivores and omnivores; and
- Conduct risk analyzes related to bovine TB.

To determine if bovine TB can be diagnosed by a single blood test,
## REPORT OF THE COMMITTEE

<table>
<thead>
<tr>
<th>Study</th>
<th>Investigators</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valuing losses from depopulating dairy herds</td>
<td>Wolf, Harsh and Lloyd</td>
<td>2000</td>
</tr>
<tr>
<td>Dairy farm decisions on how to proceed in the face of TB</td>
<td>Wolf &amp; Nott</td>
<td>2000</td>
</tr>
<tr>
<td>Deer behavior at fall baiting and winter feeding sites</td>
<td>Winterstein, Muzo, Garner, Campa</td>
<td></td>
</tr>
<tr>
<td>Bovine tuberculosis: the perspective of farm families</td>
<td>Griffore &amp; Phenice</td>
<td>2000</td>
</tr>
<tr>
<td>A statewide survey of bovine TB knowledge and attitudes</td>
<td>Griffore &amp; Phenice</td>
<td>2002</td>
</tr>
<tr>
<td>Extension directors views of bovine tuberculosis</td>
<td>Griffore, Phenice, Walker, Carolan</td>
<td>2002</td>
</tr>
<tr>
<td>Factors associated with bovine TB on cattle farms</td>
<td>Kaneene, Bruning Fann, Granger, Miller, Porter-Spalding, O’Brien</td>
<td>2002</td>
</tr>
<tr>
<td>Geographic analysis of bovine TB in free-ranging white-tailed deer</td>
<td>Miller, Kaneene, Schmitt, Lusch, Fitzgerald</td>
<td></td>
</tr>
<tr>
<td>Dynamics of Bovine TB in Wild White-tailed deer in Michigan</td>
<td>Hickling</td>
<td>2002</td>
</tr>
<tr>
<td>Ecological correlates with TB hotspots</td>
<td>Winterstein &amp; Hughey</td>
<td></td>
</tr>
</tbody>
</table>
WILDLIFE DISEASES

Instead of the comparative cervical test, which requires that cattle be handled twice (injection and reading) studies examining gamma interferon are also being conducted.

Completed studies include:

In addition, studies are ongoing to:
- Develop a farm-level biosecurity model;
- Incorporate epidemiology and spatial aspects into a state level risk analysis;
- Understand attitudes, behavior, and effort of hunters in bovine TB areas of Michigan;
- Survey hunter preferences for deer herd size;
- Understand deer migration and movement patterns before and after baiting and feeding ban;
- Determine harvest efficiency of hunting over bait –vs- non-bait hunting;
- Examine the relatedness among TB positive deer compared to the rest of the population;
- Understand white-tailed deer population characteristics and landscape use patterns in southwestern Lower Michigan;
- Examine the efficacy of deer repellents derived from plant species; and
- Examine the effect of Johne’s disease status on the reliability of caudal fold TB test

Other Discussions

Dr. Tracy Lynn, USDA-APHIS-VS, briefly reported on the development of a new national surveillance system for zoonotic diseases and intentions to involve the wildlife disease community in this effort.

Ms. Phyllis Mendon of the National Deer Farmers Association discussed her desire to form a CWD Working Group and invited interested persons to provide contact information to her.

A draft resolution was introduced that proposed federal regulation of movement of tissues from deer and elk carcasses to prevent introduction of CWD to new areas. The draft resolution was withdrawn following lengthy committee discussion.

The Committee approved one resolution and forwarded it to the Committee on Nominations and Resolutions for approval by the general membership. The resolution addressed a request for the involvement of state wildlife management agencies in coordination and implementation of activities described in Homeland Security Presidential Directive 9.
F. OTHER REPORTS

WHAT IS USAHA?

(Submitted for publication in the U.S. Veterinary 2005)
Richard D. Willer, President
United States Animal Health Association

Established in 1897 to deal with the adverse impact of Texas fever (bovine babesiosis) on the cattle industry, the United States Animal Health Association (USAHA) continues to serve as the nation’s animal health forum. It is a science-based, dues-supported, voluntary national organization whose membership includes 65 state, federal and international animal and public health agencies, 31 allied animal agriculture industry and professional organizations, and 1,200 individual members representing academia, animal owners and animal health professionals including practicing veterinarians.

USAHA serves as a forum for communication and coordination on animal related issues. Those issues have changed and expanded over the last century beyond animal health and disease control to include animal welfare, food safety, public health and, more recently, homeland security. By serving as a clearing house for new information and methods, it acts to develop solutions to animal health and food safety related issues based on science, new information and methods, public policy, risk/benefit analysis and the ability to develop consensus for changing law, regulations, policies and programs.

USAHA is overseen by a 102 member Board of Directors. In addition to the chief animal health officials from all fifty states and the chief veterinary officers of the United States, Canada, Mexico, Australia and New Zealand, the Board of Directors also includes representation from the American Veterinary Medical Association, Association of American Veterinary Medical Colleges, American Association of Veterinary Laboratory Diagnosticians and International Association of Fish and Wildlife Agencies, and the national associations representing bovine, swine, zoo and wildlife veterinarians, and avian pathologists. Finally, 20 national livestock and poultry industry associations are also represented on the Board. The Board meets during the Association’s Annual Meeting held each fall. An Executive Committee, composed of the elected officers, acts on behalf of the Board when it is not in session. A list of Board membership and elected officers can be accessed at the USAHA website: www.usaha.org.

To accomplish its mission, USAHA conducts a number of activities throughout the year, including holding an annual meeting in conjunction with the American Association of Veterinary Laboratory Diagnosticians. During this annual meeting, 32 science-based species- and
WHAT IS USAHA?

Subject-specific committees meet to hear new scientific information and deliberate on animal-related issues with the goal of reaching a science-based consensus resolution to the problems. In addition to the committee meetings, scientific plenary sessions are held where the latest research is presented to members of both organizations.

The animal-related issues confronting this nation have expanded tremendously over the last few decades. Where previously the control and elimination of livestock disease was the primary focus of USAHA, that subject area has expanded to include animal disease impacts on public health and at the interface of wildlife and livestock, as well as the protection of the security of this nation from threats of agro- and bio-terrorism. Because veterinarians are the only health professionals trained in multi-species, comparative medicine, the veterinary profession plays a critical role in addressing these complex issues and is and will continue to be a major contributor to the successes of USAHA and the protection of this nation’s animal agriculture resources.
The United States Animal Health Association (USAHA) serves as the nation’s forum for animal health. During the 108 years of its existence, many animal health problems have been addressed and successfully resolved. Established in 1897 to deal with Texas fever (bovine babesiosis), one of the earliest recognized economically important diseases of livestock in the United States, USAHA served as the forum for exchanging scientific information establishing how the disease was transmitted. Consensus was built in the USAHA forum that wide use of acaracides to eliminate the two species of ticks that were the vectors for this disease along with close inspection prior to shipment of cattle should be initiated in order to stop the disease from occurring and to remove interstate movement restrictions that were impeding commerce.

The efforts on Texas fever resulted not only in restoration of less restrictive movement of cattle, but also in the total elimination of this severe, and frequently deadly disease from the United States. Indeed, the experimental work done on this disease provided the clue for the development of control measures for many diseases including malaria, yellow fever, typhus, African sleeping sickness and Rocky Mountain spotted fever. In addition, much of the nation’s agriculture development, especially in the South, can be attributed to the elimination of these tick vectors. The success of building consensus for a workable eradication program despite differences of opinion and motivation proved to be the foundation for how the Association approached disease issues over the course of the 20th century and now, into the 21st century.

USAHA has played a leadership role throughout its existence for a wide variety of animal health and food safety problems. While initial efforts were directed toward the control and elimination of economically important livestock and poultry diseases and the implementation of an inspection system that ensured wholesome meat and poultry products, those subject areas have expanded in the last few decades to include animal disease impacts on public health and at the interface of wildlife and livestock. More recently, the protection of the security of this nation from threats of agro- and bio-terrorism has been added as a focus of USAHA.

Over the past 100 years, a number of economically important diseases have been controlled or eliminated from the nation’s livestock and poultry populations, such as Texas cattle fever, foot- and-mouth
Foot-and-mouth disease (FMD) is the most economically devastating disease impacting the livestock industry. While FMD is not a disease with high mortality, it is highly contagious, causes significant loss in production, is costly to eradicate, causes many indirect economic losses, and disrupts important export markets for live animals and animal products. During the 20th century, FMD struck the United States
USAHA-ACCOMPLISHMENTS TO ANIMAL AGRICULTURE
INDUSTRIES AND THE NATION’S SECURITY

five times—in 1902, 1908, 1914, 1924 and 1929. Direct costs and indirect losses to the Nation are estimated at $253 million, a considerable amount of money in those days. FMD was a hot topic of discussion at the annual meetings of USAHA during those years. While the United States has been FMD free since 1929, we have been constantly under threat of an accidental introduction. This is true now more than ever with the ease of movement of people and the ever increasing level of world trade as a result of free trade agreements. Added to that increased threat of accidental introduction is the aspect of intentional introduction by enemies of the United States. USAHA has emphasized foreign animal disease exclusion and emergency preparedness for over a decade and continues to work on enhancement of our ability to protect this nation’s animal agriculture. Indeed, USAHA has actively participated on the National Animal Health Emergency Management Steering Committee since its inception and works closely with the U.S. Department of Agriculture and the new Department of Homeland Security on animal agriculture safeguarding issues.

Two success stories in disease eradication of costly swine diseases are the elimination of hog cholera (classical swine fever) and, more recently, pseudorabies. Reports of problems with “cholera” affecting swine date back to the early 1830’s. Periodic outbreaks occurred and by the late 1950’s, hog cholera was costing producers $50 million a year. Thus, in 1961, an intensive campaign to eliminate hog cholera was initiated. During the 17 years it took to eradicate this disease, key research on diagnosis and vaccination, and control methods were discussed at the annual meetings of USAHA. In fact, a key symposium on hog cholera held in conjunction with USAHA’s 65th annual meeting helped kick off the eradication campaign.

Pseudorabies virus eradication in commercial swine is a more recent example of a successful disease eradication program. Because of widespread, albeit sporadic, incidence of pseudorabies in swine, a new USAHA committee was formed in 1981 to address this economically important disease. Although it was generally thought to be a disease that could be eradicated, lack of initial industry support led the committee to discuss the initiation of pilot eradication projects. Once these projects proved successful and demonstrated that the disease could be eliminated without major economic impact on producers, producers became a full partner in the state-federal-industry eradication program. Remarkable progress was made in ten short years and with the help of newly developed gene-deleted “marker” vaccines, pseudorabies has been virtually eliminated from the domestic swine population. Future challenges being addressed by USAHA include how to eliminate pseudorabies from the feral swine population and reduce the risk of contact with commercial swine that are now free of the disease.

Two zoonotic livestock diseases that are nearing eradication from
the United States and that have been a focus of USAHA for many years are brucellosis and tuberculosis. The annual losses to the cattle industry as a result of brucellosis were estimated to be $25 million in 1961. With the help of a good vaccine introduced in 1941 (Strain 19), the milk ring test introduced in 1952, and controls on the interstate movement of breeding cattle, the prevalence of brucellosis has been reduced to essentially zero in domestic livestock. The last remaining vestige of brucellosis is in wildlife, specifically bison and elk that range in and around Yellowstone and Grand Teton National Parks. In order to eliminate this last focus of Brucella abortus and declare the United States free of this disease, USAHA has stepped in to provide a special forum for all stakeholders to address this extremely complex issue using the best available science, and to develop a list of future research needs to provide the tools required to eliminate this disease.

The eradication program for tuberculosis was one of this nation's earliest disease programs. Discussions at USAHA's annual meeting have occurred since the Association was founded. Good progress has been made and the disease is nearing eradication. Like brucellosis, the complete elimination of tuberculosis from the United States has several challenges. Namely, Mycobacterium bovis, the causative organism, was discovered in Michigan white-tailed deer a decade ago. While great effort and money has been expended on this problem alone, the incidence of tuberculosis in Michigan deer has not dropped, and they continue to be a risk for exposure of domestic livestock. In addition, due to the high incidence of tuberculosis in cattle in Mexico, imported cattle from that country have provided increased risk for the re-introduction of the disease to areas that had previously been declared free. Through the efforts of USAHA, these two issues have been addressed and strategies formulated to reduce these risks to our cattle population. In 1991, USAHA assisted in the formation of a joint United States/Mexico Committee to address tuberculosis issues on both sides of the border. This Bi-National Committee meets several times annually including in conjunction with the USAHA annual meeting. Efforts of this committee have resulted in a reduced tuberculosis risk in cattle imported from Mexico. More recently, USAHA assembled a special working group of experts to prepare a strategic plan for the final eradication of the disease from the United States.

As has been stated over the years, motivation to eliminate a disease is high when the disease is on a rampage and the losses are obvious. The real challenge in any disease eradication program is to overcome the final or apathetic stage to complete the job when the incidence of disease is low. Through USAHA leadership, stakeholders are being re-energized to pursue the end goal of complete eradication of brucellosis and tuberculosis.

The current United States animal disease diagnosis and surveil-
USAHA-ACCOMPLISHMENTS TO ANIMAL AGRICULTURE INDUSTRIES AND THE NATION’S SECURITY

lance system at the laboratory level is a shared responsibility of publicly funded state animal health laboratories and federal animal health laboratories of the U.S. Department of Agriculture (USDA). The three cornerstones of this critical laboratory “system,” or National Animal Health Laboratory Network as it is called, are two USDA laboratory complexes, one located at Ames, Iowa, and the other on Plum Island, New York, and a network of state veterinary diagnostic laboratories.

Recognizing the importance of the nation’s animal disease laboratory system to safeguarding our agriculture animal populations, USAHA turned its attention to the USDA laboratory complex located at Ames, Iowa. This complex of laboratories is certainly one of the most critical components of the nation’s animal health laboratory system. In view of the fact that the laboratory facilities at Ames, Iowa had reached the end of their functional life and supported by reports of reviews conducted by governmental and non-governmental agencies that urged the development and maintenance of a state-of-the-art national animal health laboratory network, the USAHA made the modernization, upgrading and consolidation of the laboratories located there the number one priority of the Association beginning in 1998. This initiative may have been the single most intensive effort ever made over the course of USAHA's 108-year history.

The Ames, Iowa complex is comprised of USDA laboratories of the Center for Veterinary Biologics, the National Animal Disease Center and the National Veterinary Services Laboratories. These facilities have a multitude of functions including to serve as the national diagnostic reference laboratory; to conduct research on important domestic animal diseases; to license, inspect and test all veterinary biologics that are produced in or imported into the United States; to help in the prevention of the introduction of foreign animal diseases through early identification; to monitor for new and emerging diseases, such as Bovine Spongiform Encephalopathy; to support other animal health laboratories by providing certification, training, reagents and test confirmation; to develop vaccines and diagnostics to control disease; and to discover the causes of disease and how they are transmitted. This laboratory complex is a critical component in the protection of the $100 billion value of livestock production and $10 billion in animal-product exports.

As mandated in the 1996 Farm Bill, the Secretary of Agriculture established a strategic planning task force to review current laboratory and research facilities and establish a vision that could make U.S. food, agriculture and forestry research, laboratory, and education facilities a model of first-rate science and efficiency well into the 21st century. One of the recommendations of the task force encouraged USDA to give high priority to the renovation and/or construction of integrated laboratory facilities at Ames, Iowa. This task force report supported
work that USDA had initiated in 1998 to prepare a “Master Plan” that would create a single new combined laboratory facility. Earlier USDA reports, including the 1992 “Facility Condition Study,” addressed the infrastructure needs at Ames and recommended providing resources for the renovation and construction of new laboratory facilities.

In order to garner support for funding of the “Master Plan” and move the plan to completion, USAHA initiated an intensive campaign based on a 32-page, 2001 special investigative edition of the USAHA newsletter that was devoted entirely to the current status, needs and future plans of and for the Ames laboratory facilities, as well as research, diagnostic and regulatory programs conducted at Ames. The campaign was directed toward all agriculture leaders that could, in turn, influence budget decision-makers in Congress. While USAHA is restricted from lobbying because of its non-profit charter, USAHA, through its elected officers and committee chairs, has pushed the issue relentlessly starting in 2000. The efforts appear to have been successful. Providing Congress appropriates President George W. Bush’s requested $178 million for the 2005 federal budget, the $460 million facility will be fully funded with an expected completion date of 2007. The building of these facilities is the largest construction effort ever undertaken by USDA. Considering the importance of animal agriculture to this nation’s existence and security, and the welfare of each and every citizen, these dollars are well spent.

Nearly concurrent with the Master Plan initiative of USAHA, the American Association of Veterinary Laboratory Diagnosticians (AAVLD), which meets annually in conjunction with USAHA, initiated efforts to establish a network of state animal diagnostic laboratories that could conduct important surveillance for foreign and emerging animal diseases and provide surge capacity to the USDA laboratories during a major disease outbreak. In addition, this laboratory network component of the national laboratory system would also strengthen current state-based laboratory testing for export of live animals and animal products, ensure that testing meets international quality standards, and enhance surveillance for diseases of international concern to expand global markets.

In 2002, with the signing of the Public Health Security and Bioterrorism Preparedness and Response Act (Bioterrorism Act), the Secretary of Agriculture was directed to develop an agricultural early warning surveillance system enhancing the capacity and coordination between state veterinary diagnostic laboratories, federal facilities and public health agencies. Congress appropriated funding in support of the Bioterrorism Act for 12 state/university animal disease diagnostic laboratories to develop capacity and surveillance programs for 8 high priority foreign animal diseases considered to be bioterrorist threats. While funding for the 12 pilot laboratories has enhanced the early warning surveil-
USAHA-ACCOMPLISHMENTS TO ANIMAL AGRICULTURE INDUSTRIES AND THE NATION'S SECURITY

lance system, additional funding is needed to support ongoing requirements for the pilot laboratories and to add additional laboratories to the network. USAHA is working closely with AAVLD and the Association of American Veterinary Medical Colleges (AAVMC) to secure that additional funding support.

USAHA has now turned its attention to another critical laboratory infrastructure. The USDA's Plum Island Animal Disease Center and Foreign Animal Disease Diagnostic Laboratory located on Plum Island off the eastern tip of Long Island, New York, are integral components of this nation’s system for the safeguarding of our nation's over 1.7 billion animals. The federal government's scientists, support staff and laboratories dedicated exclusively to research and diagnosis of foreign animal diseases that threaten our mammalian livestock and equine populations with catastrophic illness are located at the Plum Island laboratory complex. The Plum Island laboratories, like the Ames facilities, have passed their expected useful life span. While the facility is still functional and able to meet all bio-safety requirements, it is technologically outdated requiring expenditure of millions each year on repairs and upgrades. A special 32-page investigative edition of the USAHA newsletter devoted entirely to the Plum Island laboratories was published in 2003 and addressed the current status, needs and future plans of and for the laboratory facilities, as well as the research, diagnostic and regulatory programs carried out on Plum Island.

While the Plum Island laboratory needs are urgent, the solution to the issue has yet to be found, USAHA continues to bring all stakeholders to the table to discuss and reach consensus on an approach to preserve the functions that occur at the facility and provide the necessary funding for the construction of new facilities. USAHA has forged partnerships to assist in this endeavor, including with the American Veterinary Medical Association, AAVMC and the animal agriculture industries as a force multiplier to reach consensus and support.

The National Animal Health Laboratory Network is critical to this nation’s security. Recognizing that animal disease threats are transboundary (do not respect international borders) and that the animal agriculture systems are closely linked between Canada, Mexico and the United States, USAHA is working toward incorporating similar laboratory networks in all three countries into a North American Animal Health Laboratory Network. This will provide for the sharing and leveraging of animal laboratory resources for disease surveillance and early identification, response and recovery should a foreign or emerging animal disease affect any of the partners.

Avian influenza (AI) is another example of how USAHA can successfully address a complex disease issue. Highly pathogenic varieties of AI virus are considered foreign animal diseases and rapidly eliminated once identified in poultry. There have been two major outbreaks

In 1964, a new low pathogenic AI virus type was discovered in turkeys in California. Since 1964, there have been multiple outbreaks in turkeys and chickens. Because some low pathogenic varieties have the ability to mutate into highly pathogenic forms and have an impact on trade of poultry products, they are of concern and eliminated when discovered. In addition, some avian influenza viruses can affect people. Recently, USAHA, through one of its committees and associated working groups, addressed the need for a low path AI control and eradication program. Through these efforts, consensus was reached in the design of a reasonable program that addresses both commercial poultry and poultry sold in live bird markets. To the credit of all involved in the process, this effort, started in 2002, was completed in two years.

Because veterinarians are the only health professionals trained in multi-species, comparative medicine, USAHA recognized the critical importance the veterinary profession plays in addressing complex animal health issues and the protection of our nation’s animal agriculture resources. Veterinarians have and will continue to be important contributors to the success of USAHA. Very early on in the history of USAHA and disease control and eradication programs, practicing veterinarians were relied upon to assist state and federal animal health agencies in their disease control and eradication efforts. Indeed, discussions were held from the very beginning of USAHA on how to best train and accredit veterinarians to assist with eradication efforts. Veterinary practitioners, through the USDA/State Veterinarian veterinary accreditation process, have served this nation well over the years in the successful control and elimination of livestock and poultry diseases. In this new environment of threats of agro- and bio-terrorism, the need for review and enhancement of the veterinary accreditation process has been underscored. Recent recommendations, including several originating from USAHA, have called for upgrading of the veterinary accreditation process in recognition that veterinarians, along with livestock and poultry owners, are the front-line defense in safeguarding this country from foreign and emerging animal diseases.

USAHA has many other animal issue challenges. To name them and adequately discuss them would take many additional pages. Included among these challenges are the transmissible spongiform encephalopathies such as chronic wasting disease in deer and elk, scrapie in sheep and bovine spongiform encephalopathy in cattle; Johne's disease in dairy and beef cattle; the active participation in the development of animal welfare standards by the World Organization for Animal Health, also know as the OIE; and the development of a national
animal identification system. For every challenge there is opportunity. USAHA has seized those opportunities and utilized the tried-and-true formula of getting all stakeholders to the table, bring in the best science and, through discussion, develop consensus solutions. While it has been a very successful 108 years, the 21st century will see many more accomplishments through deliberation and consensus building in the nation’s animal health forum provided by the United States Animal Health Association.
III. Governance
   A. Bylaws
   B. Proposed Bylaw Changes
   C. Administrative Policies
   D. Record of Previous Meetings
BYLAWS OF THE UNITED STATES ANIMAL HEALTH ASSOCIATION

ARTICLE I – NAME

The name of this Association shall be “The United States Animal Health Association.”

ARTICLE II – PURPOSE

The United States Animal Health Association is a forum for communication and coordination among State and Federal governments, universities, industry, and other concerned groups for consideration of issues of animal health and disease control, animal welfare, food safety and public health. It is a clearinghouse for new information and methods, which may be incorporated into laws, regulations, policy, and programs. It develops solutions of animal health-related issues based on science, new information and methods, public policy, risk/benefit analysis and the ability to develop a consensus for changing laws, regulations, policies, and programs.

ARTICLE III – MEMBERS

3.1. Classes of Members. The classes of members are: Official Agency Members; Allied Organization Members; Individual Members; Student Members; Elected Regional Delegate Members; International Members; Life Members; and, Honorary Members.

a. Official Agency Member. The animal health department or agency of each state, U. S. territory or commonwealth, and the District of Columbia; the animal health department of the United States of America; and such other governmental departments or agencies as the Board of Directors may, by a two-thirds majority vote, approve.

b. Allied Organization Member. Any non-profit organization that is national in scope and actively and directly concerned with and supportive of the interests and objectives of the Association as outlined in Article II-Purpose, may become a member upon approval of the Board of Directors by a two-thirds majority vote.

c. Individual Member. Any person engaged in work related to animal production, animal health, food safety, public health, veterinary medicine and animal research and who supports the interests and objectives of the Association as outlined in Article II-Purpose, may
BYLAWS OF THE
UNITED STATES ANIMAL HEALTH ASSOCIATION

become a member upon approval of the Executive Committee by a majority vote.

d. **Elected Regional Delegate Member.** Such elected regional delegates as provided for in Article VI-Board of Directors shall by virtue of such election automatically become members of the Association and shall serve from the close of the annual meeting following their election to the close of the following annual meeting and shall pay dues as the Board of Directors may determine.

e. **Student Member.** Any person enrolled in the study of animal production, animal health, food safety, public health, veterinary medicine, and animal health research who supports the interests and objectives of the Association as outlined in Article II-Purpose is eligible to become a member of the Association. Student members may take part in the open proceedings and meetings of the Association but shall not hold voting privileges as provided in 3.2.

f. **International Member.** The chief official agency member from any foreign federal animal health, food safety, public health and animal health research agency or department, and any foreign national animal industry organization or person who supports the interests and objectives of the Association as outlined in Article II-Purpose, or said person’s designee, is eligible to become a member of the Association upon approval of the Board of Directors by a two-thirds majority. International members may take part in the open proceedings and meetings of the Association but shall not hold voting privileges as provided in 3.2. However, the Association recognizes that Australia, Canada, Mexico and New Zealand are voting members and shall continue to remain full voting members after the adoption of these bylaws. New International Members shall obtain voting rights only by amendment of the bylaws.

g. **Life Member.** Any individual member who has maintained membership in the Association for 35 years, or if such member is at the point of retirement, for 25 years, is eligible to be a life member. Past Presidents of the Association are deemed to be life members. Life members shall have all the privileges of regular membership and shall be exempted from payment of all dues. Past presidents, or individual members elected to life membership shall be exempt from the payment of one-half of annual meeting registration fees after the year 2001; provided that retired past presidents who receive no remuneration for expenses incurred while in attendance are fully exempt from the payment of annual meeting registration fees.
h. **Honorary Member.** Any person not otherwise a member of the Association who has contributed materially to the advancement of animal science, food safety, public health, veterinary medicine, animal research, or the purposes of the Association, may be nominated by the Executive Committee for Honorary Membership. Honorary Membership shall be conferred by a majority vote of the Board of Directors. Honorary Members shall be exempt from the payment of all dues and shall not have voting privileges as provided in 3.2.

3.2 **Voting.** Each member shall have one vote, unless otherwise provided in these By-Laws.

a. **By State and Federal Official Agency Members and Allied Organization Members.** The director or chief executive officer of each Official Agency Member and Allied Organization Member shall appoint and certify in writing to the Executive Director of the Association a person to be its representative who shall represent, vote, and act for each of these classifications of member in all the affairs of the USAHA, until further notification.

3.3. **Dues.** The Board of Directors at any annual meeting shall have the power to determine the amount of dues.

a. **Non-payment of Dues.** Subject to any policy the Board of Directors may establish for reinstatement, failure to pay dues within 90 days of notice of delinquency shall result in automatic termination of membership.

b. **Voluntary Withdrawal of Membership.** A member may voluntarily terminate membership effective upon submission of notice of withdrawal to the Association but shall not be entitled to a refund of any dues paid.

3.4. **Effective Date of Membership.** Membership shall become effective upon submission of written application in the form required, satisfaction of eligibility requirements, election to membership by an appropriate vote of the Executive Committee, and payment of annual dues.

3.5. **Suspension or Expulsion.** For cause, and upon reasonable notice setting forth the specific reasons therefor, any member may be suspended or terminated. Sufficient cause for such suspension or termination of membership shall be violation of these bylaws or any lawful rule or practice duly adopted by this Association, or any other conduct prejudicial to its interests. Suspension or expulsion shall be by two-thirds vote of the entire...
BYLAWS OF THE
UNITED STATES ANIMAL HEALTH ASSOCIATION

membership of the Board of Directors.

ARTICLE IV – MEETINGS

4.1. Annual. There shall be an annual meeting between September 15 and November 15 for receiving annual reports and the transaction of other business.

a. Notice Requirements. Written notice setting forth the Agenda and location of the annual meeting shall be mailed or transmitted electronically to all members at least 60 days prior to the first day of such meeting.

b. Annual Meeting Location. The location of the annual meeting shall be selected by the Regional Districts on the following rotational basis: North Central, Northeast, Western, and Southern; and with the concurrence of the chief animal health official of the state in which the meeting is to be held. The location and site shall be finally selected in accordance with guidelines proposed by the Executive Director and approved by the Executive Committee. The Board of Directors shall be advised of the selected meeting location at least five years in advance of the meeting. In the event that any annual meeting location becomes unavailable and/or unacceptable the Executive Committee is authorized to select an alternate location.

c. Closure. The annual meeting shall be considered officially closed upon the completion of the Board of Directors’ meeting held on the last day of the annual meeting.

4.2. Special. Special meetings may be called by the President, in consultation with the Executive Committee, or by a majority of the Board of Directors. Notice of any special meeting shall be mailed, published in the Association newsletter and/or transmitted electronically to the membership with a statement of time and place and information as to the subject(s) to be considered at least 30 days prior to the date of the meeting. Emergency situations shall be dealt with by the Executive Director with the approval of the Executive Committee who shall provide as much notice to the Board of Directors as may be practical under the circumstances.

4.3. Quorum. A quorum of the Executive Committee shall consist of two-thirds of its membership. A quorum of the Board of Directors shall consist of 30 or more members, providing that a majority of those in attendance is comprised of Official Agency Members. A quorum of the general membership shall consist of 30 or more members.
Section 5.1. Elected Officers. The elected officers of the Association shall be a President, President-Elect, First Vice-President, Second Vice-President, Third Vice-President, and Treasurer. They shall be voting members in good standing of the Association.

a. President. The President is the chief officer of the Association and shall preside at the annual meeting and all meetings of the Executive Committee and perform such other duties as customarily belong to that office or which the Board of Directors or Executive Committee from time to time may assign. The president is an ex-officio member of all Committees and may designate an appropriately qualified member as his designee to attend any committee meetings of the Association in his place and stead.

b. President-Elect. The President-Elect shall act in place of the President in the event of his/her absence, death, or inability to act. When so acting the President-Elect shall have all the powers of and be subject to all restrictions upon the President. Specifically he/she shall be the chairman of all meetings of the Board of Directors. He/she shall perform such other duties as the President, Board of Directors or Executive Committee from time to time may assign. The President-Elect shall automatically become President upon election at the close of the annual meeting.

c. First Vice-President. The First Vice-President shall act in place of the President Elect in the event of his/her absence, death or inability to act; and shall perform such other duties as the President, Board of Directors or Executive Committee may assign.

d. Second Vice-President. The Second Vice-President shall act in place of the First Vice-President in the event of his/her absence, death or inability to act; and shall perform such duties as the President, Board of Directors or Executive Committee may assign.

e. Third Vice-President. The Third Vice-President shall take the place of the Second Vice-President in the event of his/her absence, death, or inability to act; and shall perform such duties as the President, Board of Directors or Executive Committee may assign.

f. Treasurer. The Treasurer shall be the chief financial officer of the Association, shall be chairman of the Audit Committee and perform those duties that are delegated to the office by the Board of Directors
BYLAWS OF THE
UNITED STATES ANIMAL HEALTH ASSOCIATION

and the Executive Committee. The treasurer shall not be responsible
for the day-to-day financial transactions of the Association, which will
be assumed by the Executive Director.

g. Election.
1) The Committee on Nominations and Resolutions shall annually
report its recommendations for the offices of President, President-
Elect, First Vice-President, Second Vice-President, Third Vice-
President, Treasurer and Regional Delegates to the Association
membership at the first business session.

2) The District from which the President originated shall submit a
nominee for the office of Third Vice President.

3) Should vacancy(ies) occur before the next annual meeting, the
District(s) from which the officer(s) vacated shall submit a nominee
for the office of Second Vice President (if two vacancies occur a
First Vice President will also need to be nominated).

4) Nominees for Regional Delegates from the Districts shall be
selected by the individual districts and supplied in a timely fashion
to the Committee on Nominations and Resolutions for inclusion in
its report.

5) The Committee on Nominations report will be presented during
the first business session. The committee report shall be posted
on the registration bulletin board immediately following its
presentation at the first business session. The report shall be
read again during the second business session at a time certain
specified in the program for “Report of Action of the Committee on
Nominations and Resolutions.” If a paper is being presented at
the specified time, the presentation will be completed and,
immediately after, the report shall be read. If the program is ahead
of schedule, a recess will be taken until the time specified in the
program for the amendments to the slate presented by the
Committee.

6) The report or amendments approved by a majority vote of the
membership is forwarded to the Board of Directors. The
acceptance of the report by a majority vote of the Board of Directors
shall constitute election of the nominees to office.

h. Term. The officers shall serve for one year or until their successors
are elected and qualify.
BYLAWS OF THE
UNITED STATES ANIMAL HEALTH ASSOCIATION

5.2. Executive Director. The Executive Director shall be employed by and serve at the pleasure of the Executive Committee, manage the Association’s day-to-day affairs and perform such other duties as customarily belong to that office or as the Board of Directors or Executive Committee may assign. The Executive Committee shall prepare and negotiate a contract with the Executive Director for a period of not more than five (5) years which shall be subject to approval by a majority of the Board of Directors. If the Association does not have an Executive Director, the Board of Directors shall elect a Secretary.

ARTICLE VI – BOARD OF DIRECTORS

6.1. Board of Directors. The Board of Directors shall have authority over all matters of the Association within the limits of the bylaws.

6.2. Composition. The Board of Directors shall be composed of the following:
   a. The Official Agency members, or their designees.
   b. One representative selected by each of the Allied Organization members.
   c. Two delegates-at-large from each of the four regional districts.
   d. Past presidents of the Association.
   e. The International Member who is the chief animal health executive officer representing the principal federal animal health department of Canada, Mexico, Australia and New Zealand, or said person’s designee.

6.3. Meetings. The Board of Directors shall have a regular meeting at the time and place of the annual meeting, and shall meet at such other times and places selected by the President or by request of a majority of the directors, in which latter event, the President shall promptly set the time and place of the meeting. Notice of all meetings of the Board of Directors shall be mailed, published in the Association newsletter or transmitted electronically at least thirty days in advance of such meetings. The President, on such reasonable notice as may be practicable under the circumstances, may call emergency meetings of the Board of Directors. At any meeting of the Board of Directors, the President Elect (Chairman of the Board of Directors), with a majority vote of the Board of Directors, may call for an Executive Session limiting attendance.
6.4. Duties. The Board of Directors shall: receive all committee reports and accept or reject all or part of them; review and approve or disapprove with comment the actions of the Executive Committee; and perform such other functions set forth in the By-Laws of the Association.

ARTICLE VII – EXECUTIVE COMMITTEE

7.1. Executive Committee. The Association shall have an Executive Committee composed of the elected officers and the immediate Past President of the Association. In addition the Executive Director shall serve as an ex officio, non-voting member of the Executive Committee and shall not be counted for the purpose of determining a quorum.

7.2. Duties. The Executive Committee shall manage the financial, administrative and internal affairs of the Association when the Board of Directors is not in session. To exercise the authority of the Board of Directors, the Executive Committee must act as a whole, and must forthwith submit its action for approval at the next meeting of the Board of Directors.

7.3. Meetings. The Executive Committee shall meet at least four times each fiscal year at such time and place and upon such notice as the President determines. The Executive Committee is authorized to take action upon the concurring votes of a majority of its members a quorum being present.

7.4. Emergency Meetings. Should the President determine that an emergency situation exists, the President may convene a telephone or other type of electronic conference meeting of the Executive Committee, which may then act provided a quorum participates.

ARTICLE VIII – ORGANIZATIONAL DISTRICTS

8.1. Districts. The Association shall be organized into five districts composed of the Northeast Regional District, the North Central Regional District, the Southern Regional District, the Western Regional District and the District-At-Large.


   b. The North Central Regional District consists of Association members of the states of Illinois, Indiana, Iowa, Kansas, Michigan,
BYLAWS OF THE
UNITED STATES ANIMAL HEALTH ASSOCIATION

Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin.

c. The Southern Regional District consists of Association members of the states of Alabama, Arkansas, Georgia, Florida, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia; and the Virgin Islands and Puerto Rico.

d. The Western Regional District consists of Association members of the states of Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming.

e. The District-At-Large shall be composed of the Allied Organization Members and the Elected Regional Delegate Members.

ARTICLE IX – STANDING AND SPECIAL COMMITTEES

9.1. General. The President shall annually appoint from the members of the Association such standing or special committees or subcommittees and their chairpersons as may be required by the bylaws or as he/she may find necessary. Each committee shall meet at least once per year at the time of the annual meetings of the Association, and at such other times as the President of the Association and committee Chairman deem necessary to accomplish the work of the Committee. Only members of the Association permitted by these by-laws are permitted to vote on the work of the committee.

9.2. Program Committee. A program committee shall be appointed by the President and shall consist of the chairpersons of all committees and the elected officers of the Association to develop the programs for the annual and any special meetings of the Association with the goal of furthering the purposes of the Association. The Program Committee shall be chaired by the President-Elect and co-chaired by the First Vice-President.

9.3. Committee on Nominations and Resolutions. The Committee on Nominations and Resolutions shall be comprised of the living past presidents of the Association, the Presidents of the Northeast, North Central, Southern and Western Regional Districts, and the President of the District-At-Large.
a. **Chairman.** The immediate past President of the Association shall chair this committee.

b. **Nomination of Elected Officers.** This Committee shall receive, consider and recommend to the Association's membership at the annual meeting nominations for the elected officers specified in 5.1 and delegates from each district as specified in 6.2.c. The recommendation of elected officers and delegates from each district shall be submitted no later than the third day of September next preceding the annual meeting at which the election will be held.

c. **Resolutions.** This Committee shall review all resolutions of the standing and special committees for ambiguities and redundancy but shall not alter their intent. After this review, this committee shall present the resolutions to the general membership for approval, which shall require a majority vote.

9.4. **Audit Committee.** The Audit Committee shall receive the annual audit report, and confirm that all financial affairs of the Association are in order and make such recommendations to the Board of Directors as may be necessary to ensure the proper management of the finances of the Association.

9.5. **Special Committees.** The President with the advice of the Executive Committee shall appoint the chairman and members of such other committees as are necessary to accomplish the purposes of the Association.

**ARTICLE X – MISCELLANEOUS**

10.1. **Amendments.**

a. **In General.** These bylaws may be amended by: (1) Specific proposed amendment(s) being presented in writing to the Board of Directors for preliminary approval; (2) If preliminarily approved by majority vote of the Board of Directors, the proposed amendment(s) shall then be presented to the membership; by printing in the next annual proceedings; (3) The proposed amendment(s) shall then be presented to the membership at the next annual meeting for approval by the affirmative vote of two-thirds of the members of the Association present at a meeting at which a quorum is present. In the event the amendment(s) proposed are not approved by the Board of Directors as set forth in (1), then the proposed amendment(s) may be presented by a petition signed by at least thirty members which shall result in their proceeding through steps (2) and (3) as if the Board of Directors...
BYLAWS OF THE
UNITED STATES ANIMAL HEALTH ASSOCIATION

had initially approved the proposed amendment(s)

b. Notice. Written notice of an intention to amend the bylaws containing the text of any amendment must be sent to all members. Prior to presentation to the annual meeting for final approval, the amendment(s) shall be printed in the report of the annual proceedings of the immediately preceding annual meeting.

10.2. Fiscal Year. The Executive Committee shall from time to time establish the Association’s fiscal year.

10.3. Parliamentary Procedure. Robert’s Rules of Order Newly Revised shall govern the proceedings of the Association, the Board of Directors and all committees in all cases not otherwise provided for in applicable federal or state statute or rule, the articles of incorporation or bylaws of the Association or its policies or procedures.

10.4. Confidential Information. Confidential information of the Association shall be maintained in confidence and not used for any other than Association purposes nor disclosed to others, except as permitted by law, these bylaws or written consent of the Association, by Association members, directors, officers, employees and agents.

10.5. Liability of Officers and Directors. The officers and directors of the Association shall not be personally liable for the debts or actions of the Association.

10.6. Annual Audit. The Association shall cause an independent certified public accountant, selected by the Executive Committee, to make an annual examination of its financial accounts and shall submit the report of examination to Audit Committee.

10.7. Compensation/Reimbursement. No member of the Board of Directors, committee member or elected officer of the Association shall receive any compensation for his or her services as such. The Association shall develop policies providing for reimbursement of expenses reasonably incurred in attending meetings and performing special assignments of the Association by the elected officers.

10.8. Dissolution. In the event of dissolution, the Association shall distribute its assets as required by the laws and statutes of the State of Delaware; and distribute its remaining net assets in a manner permitted an entity to maintain its status as exempt from taxation under Section 501 (c) (6) of the Internal Revenue Code of 1986, as amended, or any successor provision.
PROPOSED BYLAW CHANGES

Article VI – Board of Directors

6.2 Composition. The Board of Directors shall be composed of the following:

a. The Official Agency members or their designees
b. One representative selected by each of the Allied Organization members
c. Two delegates-at-large from each of the four regional districts
d. Past presidents of the Association
e. The International member who is the chief animal health executive officer representing the principal federal animal health department of Canada, Mexico, Australia and New Zealand
f. Members of the Executive Committee

Article IX – Standing and Special Committees

9.3 Committee on Nominations and Resolutions

c. Resolutions. This committee shall review all resolutions of the standing and special committees (the Executive Committee and Board of Directors are standing Committees) for ambiguities and redundancy, but shall not alter their intent. After this review, this committee shall present the resolutions to the general membership for approval, which shall require a majority vote.
ESTABLISHMENT AND OPERATION OF STANDING COMMITTEES

1. All members of standing committees must be paid up members of USAHA.

2. The Chair, Vice Chair, and all members of USAHA Committees shall be appointed by the President. It is expected that member appointments will be made in consultation with Committee Chair.

3. Efforts should be made to keep committee size between 15 and 50 members, and to maintain a geographical balance, as well as an appropriate balance of State, federal, industry and technical members.

4. Committee Chairs shall be appointed for a term of not more than five years, and may not be reappointed Chair for at least one year.

5. All recommendations and resolutions shall be approved by a majority of the committee members present before adjournment of a committee meeting.

6. All USAHA members present at committee meetings may enter into discussions. Only committee members may introduce resolutions or vote on items of business.

7. Committees shall submit reports only to the Board of Directors and Resolutions only to the Committee on Nominations and Resolution. Committee resolutions and reports have no standing until approved by the Board of Directors.

8. Committee Chairs may appoint subcommittees as necessary. Subcommittee members must be members of the parent committee. Subcommittees shall report only to the parent committee.
<table>
<thead>
<tr>
<th>Date</th>
<th>Place of Meeting</th>
<th>President</th>
<th>Secretary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sept. 27-28, 1897†</td>
<td>Fort Worth, TX</td>
<td>* Mr. C. P. Johnston, Springfield, IL</td>
<td>* Mr. D. O. Lively, Fort Worth, TX</td>
</tr>
<tr>
<td>Oct. 11-12, 1898</td>
<td>Omaha, NE</td>
<td>* Mr. C. P. Johnston, Springfield, IL</td>
<td>* Mr. Taylor Riddle, KS</td>
</tr>
<tr>
<td>Oct. 11-12, 1899††</td>
<td>Chicago, IL</td>
<td>* Mr. C. P. Johnston, Springfield, IL</td>
<td>* Mr. Mortimer Levering, Lafayette, IN</td>
</tr>
<tr>
<td>Oct. 2-3, 1900</td>
<td>Louisville, KY</td>
<td>* Mr. C. P. Johnston, Springfield, IL</td>
<td>* Dr. E. T. Eisenman, Louisville, KY</td>
</tr>
<tr>
<td>Oct. 8-9, 1901</td>
<td>Buffalo, NY</td>
<td>* Dr. E. P. Niles, VA</td>
<td>* Dr. E. T. Eisenman, Louisville, KY</td>
</tr>
<tr>
<td>Sept. 23-24, 1902</td>
<td>Wichita, KS</td>
<td>* Mr. W. H. Dunn, TN</td>
<td>* Mr. Wm. P. Smith, Monticello, IL</td>
</tr>
<tr>
<td>Sept. 22-23, 1903</td>
<td>Denver, CO</td>
<td>* Dr. W. E. Bolton, Woodward, OK</td>
<td>* Mr. Wm. P. Smith, Monticello, IL</td>
</tr>
<tr>
<td>Aug. 23-24, 1904</td>
<td>St. Louis, MO</td>
<td>* Dr. J. C. Norton, AZ</td>
<td>* Mr. Wm. P. Smith, Monticello, IL</td>
</tr>
<tr>
<td>Aug. 15-16, 1905</td>
<td>Guthrie, OK</td>
<td>* Mr. Wm. P. Smith, Monticello, IL</td>
<td>* Dr. S. H. Ward, St. Paul, MN</td>
</tr>
<tr>
<td>Aug. 15-16, 1906</td>
<td>Springfield, IL</td>
<td>* Mr. M. M. Hanks, Quanah, TX</td>
<td>* Dr. S. H. Ward, St. Paul, MN</td>
</tr>
<tr>
<td>Sept. 16-17, 1907</td>
<td>Richmond, VA</td>
<td>* Dr. F. Luckey, Columbia, MD</td>
<td>* Dr. S. H. Ward, St. Paul, MN</td>
</tr>
<tr>
<td>Sept. 14-16, 1908</td>
<td>Washington, DC</td>
<td>* Dr. Charles G. Lamb, CO</td>
<td>* Dr. C. E. Cotton, St. Paul, MN</td>
</tr>
<tr>
<td>Sept. 13-15, 1909</td>
<td>Chicago, IL</td>
<td>* Dr. W. H. Dalymple, Baton Rouge, LA</td>
<td>* Dr. C. E. Cotton, St. Paul, MN</td>
</tr>
<tr>
<td>Dec. 5-7, 1910</td>
<td>Chicago, IL</td>
<td>* Dr. C. E. Cotton, St. Paul, MN</td>
<td>* Mr. J. J. Ferguson, Chicago, IL</td>
</tr>
<tr>
<td>Dec. 5-6, 1911</td>
<td>Chicago, IL</td>
<td>* Dr. John F. Devine, Goshen, NY</td>
<td>* Mr. J. J. Ferguson, Chicago, IL</td>
</tr>
<tr>
<td>Dec. 3-5, 1912</td>
<td>Chicago, IL</td>
<td>* Dr. Macyck P. Ravener, Madison, IL</td>
<td>* Mr. J. J. Ferguson, Chicago, IL</td>
</tr>
<tr>
<td>Dec. 2-4, 1913</td>
<td>Chicago, IL</td>
<td>* Dr. Peter F. Bahnson, Atlanta, GA</td>
<td>* Mr. J. J. Ferguson, Chicago, IL</td>
</tr>
<tr>
<td>Feb. 16-18, 1914</td>
<td>Chicago, IL</td>
<td>* Dr. S. H. Ward, St. Paul, MN</td>
<td>* Mr. J. J. Ferguson, Chicago, IL</td>
</tr>
<tr>
<td>Dec. 2-3, 1915</td>
<td>Chicago, IL</td>
<td>* Dr. J. L. Gibson, Des Moines, IA</td>
<td>* Mr. J. J. Ferguson, Chicago, IL</td>
</tr>
<tr>
<td>Dec. 5-7, 1916</td>
<td>Chicago, IL</td>
<td>* Dr. O. E. Dyson, Springfield, IL</td>
<td>* Mr. J. J. Ferguson, Chicago, IL</td>
</tr>
<tr>
<td>Dec. 3-5, 1917</td>
<td>Chicago, IL</td>
<td>* Dr. J. G. Wills, Albany, NY</td>
<td>* Dr. S. H. Ward, St. Paul, MN</td>
</tr>
<tr>
<td>Dec. 2-4, 1918</td>
<td>Chicago, IL</td>
<td>* Dr. M. Jacob, Knoxville, TN</td>
<td>* Dr. S. H. Ward, St. Paul, MN</td>
</tr>
<tr>
<td>Dec. 1-3, 1919</td>
<td>Chicago, IL</td>
<td>* Dr. G. W. Dumphy, Lansing, MI</td>
<td>* Dr. D. M. Campbell, Chicago, IL</td>
</tr>
<tr>
<td>Nov. 29-Dec. 1, 1920</td>
<td>Chicago, IL</td>
<td>* Dr. S. F. Musselman, Frantfort, KY</td>
<td>* Dr. D. M. Campbell, Chicago, IL</td>
</tr>
<tr>
<td>Nov. 28-30, 1921</td>
<td>Chicago, IL</td>
<td>* Dr. W. F. Crewe, Bismarck, MD</td>
<td>* Dr. Theo. Burnett, Columbus, OH</td>
</tr>
<tr>
<td>Dec. 6-8, 1922</td>
<td>Chicago, IL</td>
<td>* Dr. T. E. M. Munce, Harrisburg, PA</td>
<td>* Dr. Theo. Burnett, Columbus, OH</td>
</tr>
<tr>
<td>Dec. 5-7, 1923</td>
<td>Chicago, IL</td>
<td>* Dr. W. J. Butler, Henena, MT</td>
<td>* Dr. O. E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>Date</td>
<td>Place of Meeting</td>
<td>President</td>
<td>Secretary</td>
</tr>
<tr>
<td>-----------------------</td>
<td>------------------</td>
<td>------------------------------------------</td>
<td>---------------------------------</td>
</tr>
<tr>
<td>28. Dec. 3-5, 1924</td>
<td>Chicago, IL</td>
<td>* Dr. J. G. Femeyhough, Richmond, VA</td>
<td>* Dr. O. E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>29. Dec. 2-4, 1925</td>
<td>Chicago, IL</td>
<td>* Dr. J. H. McNeil, Trenton, NJ</td>
<td>* Dr. O. E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>30. Dec. 1-3, 1926</td>
<td>Chicago, IL</td>
<td>* Dr. John R. Mohler, Washington, DC</td>
<td>* Dr. O. E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>31. Nov. 30-Dec. 2, 1927</td>
<td>Chicago, IL</td>
<td>* Dr. L. Van Es, Lincoln, NE</td>
<td>* Dr. O. E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>32. Dec. 5-7, 1928</td>
<td>Chicago, IL</td>
<td>* Dr. C. A. Cary, Auburn, AL</td>
<td>* Dr. O. E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>33. Dec. 4-6, 1929</td>
<td>Chicago, IL</td>
<td>* Dr. Chas. O. Lamb, Denver, CO</td>
<td>* Dr. O. E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>34. Dec. 3-5, 1930</td>
<td>Chicago, IL</td>
<td>* Dr. A. E. Wright, Washington, DC</td>
<td>* Dr. O. E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>35. Dec. 2-4, 1931</td>
<td>Chicago, IL</td>
<td>* Dr. J. W. Connaway, Columbia, MD</td>
<td>* Dr. O. E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>36. Nov. 30-Dec. 2, 1932</td>
<td>Chicago, IL</td>
<td>* Dr. Peter Malcolm, Des Moines, IA</td>
<td>* Dr. O. E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>37. Dec. 6-8, 1933</td>
<td>Chicago, IL</td>
<td>* E. T. Faulder, Albany, NY</td>
<td>* Dr. O. E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>38. Dec. 5-7, 1934</td>
<td>Chicago, IL</td>
<td>* Dr. T. E. Robinson, Providence, RI</td>
<td>* Dr. O. E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>39. Dec. 4-6, 1935</td>
<td>Chicago, IL</td>
<td>* Dr. Edward Records, Reno, NV</td>
<td>* Dr. O. E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>40. Dec. 2-4, 1936</td>
<td>Chicago, IL</td>
<td>* Dr. Walter Wisnicky, Madison, WI</td>
<td>* Dr. O. E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>41. Dec. 1-3, 1937</td>
<td>Chicago, IL</td>
<td>* Dr. R. W. Smith, Concord, NH</td>
<td>* Dr. O. E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>42. Nov. 30-Dec. 2, 1938</td>
<td>Chicago, IL</td>
<td>* Dr. D. E. Westmoreland, Frankfort, KY</td>
<td>* Dr. O. E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>43. Dec. 6-8, 1939</td>
<td>Chicago, IL</td>
<td>* Dr. J. L. Aby, Indianapolis, IN</td>
<td>* Dr. O. E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>44. Dec. 4-6, 1940</td>
<td>Chicago, IL</td>
<td>* Dr. H. D. Port, Cheyenne, WY</td>
<td>Dr. Mark Welsh, College Park, MD</td>
</tr>
<tr>
<td>45. Dec. 3-5, 1941</td>
<td>Chicago, IL</td>
<td>* Dr. E. A. Crossman, Boston, MA</td>
<td>Dr. Mark Welsh, College Park, MD</td>
</tr>
<tr>
<td>46. Dec. 2-4, 1942</td>
<td>Chicago, IL</td>
<td>* Dr. I. S. McAdory, Auburn, AL</td>
<td>Dr. Mark Welsh, College Park, MD</td>
</tr>
<tr>
<td>47. Dec. 1-3, 1943</td>
<td>Chicago, IL</td>
<td>* Dr. W. H. Hendricks, Salt Lake City, UT</td>
<td>* Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>48. Dec. 6-8, 1944</td>
<td>Chicago, IL</td>
<td>* Dr. J. M. Sutton, Atlanta, GA</td>
<td>* Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>49. Dec. 5-7, 1945</td>
<td>Chicago, IL</td>
<td>Dr. C. U. Duckwork, Sacramento, CA</td>
<td>* Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>50. Dec. 4-6, 1946</td>
<td>Chicago, IL</td>
<td>* Dr. William Moore, Raleigh, NC</td>
<td>* Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>51. Dec. 3-5, 1947</td>
<td>Chicago, IL</td>
<td>* Dr. Will J. Miller, Topeka, KS</td>
<td>* Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>53. Oct. 12-14, 1949</td>
<td>Columbus, OH</td>
<td>* Dr. T. O. Brandenburg, Bismarck, ND</td>
<td>* Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>54. Nov. 1-3, 1950</td>
<td>Phoenix, AZ</td>
<td>* Dr. C. P. Bishop, Harrisburg, PA</td>
<td>* Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
</tbody>
</table>
## RECORD OF PREVIOUS MEETINGS

<table>
<thead>
<tr>
<th>Date</th>
<th>Place of Meeting</th>
<th>President</th>
<th>Secretary</th>
</tr>
</thead>
<tbody>
<tr>
<td>55. Nov. 14-16, 1951</td>
<td>Kansas City, KS</td>
<td>* Mr. F. E. Molin, Denver, CO</td>
<td>* Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>57. Sept. 23-25, 1953</td>
<td>Atlantic City, NJ</td>
<td>* Dr. T. Childs, Ottawa, Canada</td>
<td>* Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>58. Nov. 10-12, 1954</td>
<td>Omaha, NE</td>
<td>* Dr. T. C. Green, Charleston, WV</td>
<td>* Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>59. Nov. 16-18, 1955</td>
<td>New Orleans, LA</td>
<td>Dr. H. E. Wilkins, Helena, MT</td>
<td>* Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>60. Nov. 28-30, 1956</td>
<td>Chicago, IL</td>
<td>* Dr. A. L. Brueckner, Baltimore, MD</td>
<td>* Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>61. Nov. 13-15, 1957</td>
<td>St. Louis, MO</td>
<td>Dr. G. H. Good, Cheyenne, WY</td>
<td>* Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>62. Nov. 4-6, 1958</td>
<td>Miami Beach, FL</td>
<td>* Dr. John G. Milligan, Montgomery, AL</td>
<td>* Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>63. Nov. 15-18, 1959</td>
<td>San Francisco, CA</td>
<td>* Mr. F. G. Buzzell, Augusta, ME</td>
<td>* Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>64. Oct. 17-21, 1960</td>
<td>Charleston, WV</td>
<td>* Dr. J. R. Hay, Chicago, IL</td>
<td>* Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>65. Oct. 30-Nov. 3, 1961</td>
<td>Minneapolis, MN</td>
<td>Dr. A. P. Schneider, Boise, ID</td>
<td>* Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>67. Oct. 15-18, 1963</td>
<td>Albuquerque, NM</td>
<td>* Dr. T. J. Grennan, Jr. Providence, RI</td>
<td>* Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>70. Oct. 10-14, 1966</td>
<td>Buffalo, NY</td>
<td>Dr. C. L. Campbell, Tallahassee, FL</td>
<td>* Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>71. Oct. 16-20, 1967</td>
<td>Phoenix, AZ</td>
<td>Dr. Grant S. Kaley, Albany, NY</td>
<td>* Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>72. Oct. 6-11, 1968</td>
<td>New Orleans, LA</td>
<td>* Dr. John F. Quinn, Lansing, MI</td>
<td>* Dr. W. L. Bendix, Richmond, VA</td>
</tr>
<tr>
<td>73. Oct. 12-19, 1969</td>
<td>Milwaukee, WI</td>
<td>* Dr. John L. O'Hara, Reno, NV</td>
<td>* Dr. W. L. Bendix, Richmond, VA</td>
</tr>
<tr>
<td>75. Oct. 24-29, 1971</td>
<td>Oklahoma City, OK</td>
<td>* Dr. M. D. Mitchell, Pierre, SD</td>
<td>* Dr. W. L. Bendix, Richmond, VA</td>
</tr>
<tr>
<td>76. Nov. 5-10, 1972</td>
<td>Miami Beach, FL</td>
<td>Dr. J. C. Shook Mechanicsburg, PA</td>
<td>* Dr. W. L. Bendix, Richmond, VA</td>
</tr>
<tr>
<td>77. Oct. 14-19, 1973</td>
<td>St. Louis, MO</td>
<td>* Dr. W. C. Tobin, Denver, CO</td>
<td>* Dr. W. L. Bendix, Richmond, VA</td>
</tr>
<tr>
<td>79. Nov. 2-7, 1975</td>
<td>Portland, OR</td>
<td>* Dr. J. E. Andrews, GA</td>
<td>* Dr. W. L. Bendix, Richmond, VA</td>
</tr>
<tr>
<td>80. Nov. 7-12, 1976</td>
<td>Miami Beach, FL</td>
<td>* Dr. H. E. Goldstein, Columbus, OH</td>
<td>* Dr. W. L. Bendix, Richmond, VA</td>
</tr>
<tr>
<td>81. Oct. 16-21, 1977</td>
<td>Minneapolis, MN</td>
<td>* Dr. A. E. Janawicz, Montpelier, VT</td>
<td>* Dr. W. L. Bendix, Richmond, VA</td>
</tr>
<tr>
<td>Date</td>
<td>Place of Meeting</td>
<td>President</td>
<td>Secretary</td>
</tr>
<tr>
<td>--------------</td>
<td>------------------</td>
<td>---------------------------</td>
<td>----------------------------</td>
</tr>
<tr>
<td>Oct. 21-Nov. 3, 1978**</td>
<td>Buffalo, NY</td>
<td>**Dr. L. E. Bartell, Sacramento, CA</td>
<td>* Dr. W. L. Bendix, Richmond, VA</td>
</tr>
<tr>
<td>Oct. 28-Nov. 2, 1979</td>
<td>San Diego, CA</td>
<td>* Dr. T. F. Zweigart, Raleigh, NC</td>
<td>Dr. J. C. Shook, Hyattsville, MD</td>
</tr>
<tr>
<td>Nov. 2-7, 1980</td>
<td>Louisville, KY</td>
<td>* Mr. B. W. Hawkins, Ontario, OR</td>
<td>Dr. J. C. Shook, Hyattsville, MD</td>
</tr>
<tr>
<td>Oct. 11-16, 1981</td>
<td>St. Louis, MO</td>
<td>* Dr. L. W. Hinchman, Indianapolis, IN</td>
<td>Dr. J. C. Shook, Hyattsville, MD</td>
</tr>
<tr>
<td>Nov. 7-12, 1982</td>
<td>Nashville, TN</td>
<td>Dr. G. B. Rea, Salem, Or</td>
<td>Dr. J. C. Shook, Hyattsville, MD</td>
</tr>
<tr>
<td>Oct. 16-21, 1983</td>
<td>Las Vegas, NV</td>
<td>Dr. J. R. Ragan, Nashville, TN</td>
<td>Dr. J. C. Shook, Annapolis, MD</td>
</tr>
<tr>
<td>Oct. 21-26, 1984</td>
<td>Ft. Worth, TX</td>
<td>* Mr. J. O. Pearce, Jr. Okeechobee, FL</td>
<td>Dr. J. C. Shook, Annapolis, MD</td>
</tr>
<tr>
<td>Oct. 27-Nov. 1, 1985</td>
<td>Milwaukee, WI</td>
<td>* Dr. David U. Walker, Montpelier, VT</td>
<td>Dr. J. C. Shook, Annapolis, MD</td>
</tr>
<tr>
<td>Oct. 19-14, 1986</td>
<td>Louisville, KY</td>
<td>* Dr. N. W. Kruse, Lincoln, NE</td>
<td>Dr. J. C. Shook, Mechanicsburg, PA</td>
</tr>
<tr>
<td>Oct. 25-30, 1987</td>
<td>Salt Lake City, UT</td>
<td>Dr. J. F. Hudelson, Denver, CO</td>
<td>Dr. J. C. Shook, Mechanicsburg, PA</td>
</tr>
<tr>
<td>Oct. 16-21, 1988</td>
<td>Little Rock, AR</td>
<td>* Dr. J. A. Cobb, Atlanta, GA</td>
<td>Dr. J. C. Shook, Mechanicsburg, PA</td>
</tr>
<tr>
<td>Oct. 28-Nov. 3, 1989</td>
<td>Las Vegas, NV</td>
<td>Mr. P. E. Bradshaw, Griggsville, IL</td>
<td>Dr. J. C. Shook, Mechanicsburg, PA</td>
</tr>
<tr>
<td>Oct. 6-12, 1990</td>
<td>Denver, CO</td>
<td>Dr. M. A. Van Buskirk, Harrisburg, PA</td>
<td>Dr. J. C. Shook, Mechanicsburg, PA</td>
</tr>
<tr>
<td>Oct. 26-Nov. 1, 1991</td>
<td>San Diego, CA</td>
<td>* Dr. P. L. Smith, Sacramento, CA</td>
<td>Dr. J. C. Shook, Mechanicsburg, PA</td>
</tr>
<tr>
<td>Oct. 31-Nov. 6, 1992</td>
<td>Louisville, KY</td>
<td>Dr. J. Lee Alley, Montgomery, AL</td>
<td>Dr. J. C. Shook, Mechanicsburg, PA</td>
</tr>
<tr>
<td>Oct. 23-29, 1993</td>
<td>Las Vegas, NV</td>
<td>Dr. T. J. Hagerty, St. Paul, MN</td>
<td>Dr. J. C. Shook, Mechanicsburg, PA</td>
</tr>
<tr>
<td>Oct. 29-Nov. 4, 1994</td>
<td>Grand Rapids, MI</td>
<td>* Mr. J. B. Finley, Jr., Encinal, TX</td>
<td>Dr. J. C. Shook, Mechanicsburg, PA</td>
</tr>
<tr>
<td>Oct. 28-Nov. 3, 1995</td>
<td>Reno, NV</td>
<td>Dr. H. Wesley Tows, Dover, DE</td>
<td>Dr. J. C. Shook, Mechanicsburg, PA</td>
</tr>
<tr>
<td>Oct. 12-18, 1996</td>
<td>Little Rock, AR</td>
<td>Dr. M. R. Marshall, Salt Lake City, UT</td>
<td>Dr. J. C. Shook, Mechanicsburg, PA</td>
</tr>
<tr>
<td>Oct. 17-24, 1997</td>
<td>Minneapolis, MN</td>
<td>Dr. Larry L. Williams, Lincoln, NE</td>
<td>Dr. J. C. Shook, Mechanicsburg, PA</td>
</tr>
<tr>
<td>Oct. 3-9, 1998</td>
<td>San Diego, CA</td>
<td>Dr. Jones W. Bryan, Columbia, SC</td>
<td>Dr. J. C. Shook, Mechanicsburg, PA</td>
</tr>
<tr>
<td>Oct. 7-14, 1999</td>
<td>San Diego, CA</td>
<td>Dr. Richard H. McCapes, Davis, CA</td>
<td>Dr. J. C. Shook, Mechanicsburg, PA</td>
</tr>
<tr>
<td>Oct. 10-17, 2000</td>
<td>Birmingham, AL</td>
<td>Dr. Ernest W. Zirkle, Trenton, NJ</td>
<td>Dr. J. Lee Alley, Montgomery, AL</td>
</tr>
<tr>
<td>Nov. 1-8, 2001</td>
<td>Hershey, PA</td>
<td>Dr. Bob R. Hillman, Boise, ID</td>
<td>Dr. J. Lee Alley, Montgomery, AL</td>
</tr>
<tr>
<td>Oct. 17-24, 2002</td>
<td>St. Louis, MO</td>
<td>Dr. Maxwell Lea, Jr., Baton Rouge, LA</td>
<td>Dr. J. Lee Alley, Montgomery, AL</td>
</tr>
<tr>
<td>Oct. 9-16, 2003</td>
<td>San Diego, CA</td>
<td>Mr. Bob Frost, Lincoln, CA</td>
<td>Dr. J. Lee Alley, Montgomery, AL</td>
</tr>
<tr>
<td>October 21-27, 2004</td>
<td>Greensboro, NC</td>
<td>Dr. Donald Leon, Ithaca, NY</td>
<td>Dr. J. Lee Alley, Montgomery, AL</td>
</tr>
</tbody>
</table>

* Deceased  † Reprinted in 54th Annual Report  ††Reprinted in the 66th Annual Report  ** Resigned Dec. 12, 1977 + This was the last meeting of the Interstate Association of Livestock Sanitary Boards