Copyright 2008
United States Animal Health Association

Library of Congress Catalogue Control Number
2008903861

Meghan Richey
and
Rapid Solutions Group
Kansas City, Missouri
The United States Animal Health Association (USAHA), the nation's animal health forum for over a century, is a science-based, national organization of official state and federal animal health agencies, national allied organizations, district representatives and individual members founded in 1897 to protect animal and public health.

The Association's mission is implemented through deliberations of science-based committees and the adoption of resolutions and recommendations, aimed at solving problems. USAHA has 32 committees, varying in size from 11 to 135 members.

USAHA is administered by the Executive Committee and Board of Directors, which also determines policy. The Association headquarters are located in St. Joseph, Missouri.

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

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 clearinghouse for new information and methods that may be incorporated into laws, regulations, policy 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.

Official Animal Health Agency (50)

Alabama
Alaska
Arizona
Arkansas
California
Colorado
Connecticut
Delaware
Florida
Georgia
Hawaii
Idaho
Illinois
Indiana
Iowa
Kansas
Kentucky
Louisiana
Maine
Maryland
Massachusetts
Michigan
Minnesota
Mississippi
Missouri
Montana
Nebraska
Nevada
New Hampshire
New Jersey
New Mexico
New York
North Carolina
North Dakota
Ohio
Oregon
Pennsylvania
Rhode Island
South Carolina
South Dakota
Tennessee
Texas
Utah
Vermont
Virginia
Washington
West Virginia
Wisconsin
Wyoming

Official Federal Animal Health Agency (1)

USDA, APHIS, Veterinary Services

Territory Animal Health Agency (2)

North Mariana Islands, Navajo Nation

Foreign Animal Health Agency (3)

Australia, Canada, New Zealand

Other Federal Agencies (10)

USDA, Agricultural Research Service

USDA, Cooperative State Research, Education and Extension Service

USDA, AMS, Wildlife Services

USDA, ARS, Centers for Disease Control and Prevention

USDA, FAS, Science and Technology Directorate

USDA, FAS, Office of Health Affairs

USDA, FAS, U.S. Fish and Wildlife Service

USDA, National Park Service

USDA, NCFS, National Wildlife Health Center

USDA, Lawrence Livestock National Laboratory

National Allied Organizations (36)

Alpaca Owners & Breeders Association

American Association of Avian Pathologists

American Association of Swine Veterinarians

American Association of Small Ruminant Practitioners

American Association of Swine Veterinarians

American Association of Veterinary Laboratory Diagnosticians

American Association of Wildlife Veterinarians

American Association of Zoo Veterinarians

American Farm Bureau Federation

American Quarter Horse Assn. / American Horse Council

American Sheep Industry Association

American Veterinary Medical Association

Association of American Veterinary Medical Colleges

Association of Fish & Wildlife Agencies

Bertek

Exotic Wildlife Association

Himalayan Tseewa Association USA, Inc.

International Llama Registry

Livestock Exports Association, USA

Livestock Marketing Association

National Aquaculture Association

National Bison Association

National Cattlemen's Beef Association

National Cider Council

National Dairy Herd Improvement Association, Inc.

National Institute for Animal Agriculture

National Livestock Producers Association

National Milk Producers Federation

National Pork Board

National Pork Producers Council

National Renderers Association

National Turkey Federation

North American Dairy Farmers Association

North American Elk Breeders Association

NCBA/USA

U.S. Poultry & Egg Association

Regional Delegates (8)

Northeast (2), North Central (2), South (2), West (2)

Individual Members (1,121)
Control and Eradication of Porcine Reproductive and Respiratory Syndrome Virus
Scott Dee, University of Minnesota ........................................ 86

Control of Equine Infectious Anemia Should Take New Directions
Charles Issel, Gluck Equine Research Center, University of Kentucky .................................................. 90

Building and Infrastructure to Address Non-Program Diseases:
The Johne’s Disease Template
John Adams, Past Chair, National Johne’s Working Group ...... 100

C. USAHA Scientific Papers

Rapid Diagnostics For Avian Influenza-Advances in Testing
D. L. Suarez .............................................................................. 110

PrioCHECK® Trichinella Ab, a New Highly Sensitive and Specific ELISA for the Detection of Antibodies Against Trichinella spp. in Serum and Meat Juice of Pigs

Effects of Culture Conditions and Tuberculin Source on Interferon-γ Production in Whole Blood Cultures from Mycobacterium bovis Infected Cattle
I. Schiller, R. Waters, M. Vordermeier, M. Palmer, T. Egnuni, R. Hardegger, A. Kyburz, A. Raeber, B. Oesch ........................................................................ 131

A Visual DNA Chip for Identification of Different Genotypes of Foot-and-Mouth Disease Virus
Chu-Hsiang Pan, Ming-Hwa Jong, Parn-Hwa Chao, Lu-Yuan Liu, P. Wu, G.B. Ward, B.C. Donahue, M.A. Kenny, M. Y. Deng ......................................................... 140

Comparison of Diagnostic Tests to Detect Johne’s Disease Positive Animals in Western Farm Goats and Range Flock Sheep
B.E. Mamer, M. W. Ayers, M.S. Bulgin .................................. 142
Comparison of Pathogenicity of Different H5N1 HPAI Viruses in Chickens and Ducks
M.J. Pantin-Jackwood, D. R. Kapczynski, J. Wasielenko, L. Sarmento ................................................................. 144

Preliminary Evaluation of Potential Shedding of Mycobacterium bovis by Coyotes and Raccoons

D. USAHA Membership Meeting

MONDAY, OCTOBER 22, 2007

State of the Association – Lee Myers...............148
Executive Director Briefing – Benjamin Richey ........150
Treasurer’s Report – William Hartmann..................152
Report of the Committee on Nominations – Bret Marsh ................................................................. 154
Other Business

WEDNESDAY, OCTOBER 24, 2007

Report of the Action of the Committee on Nominations – Bret Marsh ................................................................. 155
Passing the Presidential Gavel – Lee Myers .............156
President’s Address – Jim Leafstedt ......................157
Recognition of Immediate Past President – Bret Marsh .................................................................................. 159
Report of the Committee on Resolutions – Bret Marsh .................................................................................. 160

E. Committee Business

USAHA/AAVLD COMMITTEE ON ANIMAL EMERGENCY MANAGEMENT

USAHA/AAVLD COMMITTEE ON ANIMAL HEALTH INFORMATION SYSTEMS

Report of the Committee – B. L. Akey and F. Elvinger ............169

COMMITTEE ON ANIMAL WELFARE

Report of the Committee – J.A. Facchiano .........................180

USAHA/AAVLD COMMITTEE ON AQUACULTURE

Report of the Committee – S. E. LaPatra and K. Snekvik ....187

COMMITTEE ON BIOLOGICS AND BIOTECHNOLOGY


COMMITTEE ON BLUETONGUE AND BOVINE RETROVIRUSES


COMMITTEE ON BRUCELLOSIS

Report of the Committee – G. Plumb ..............................217
Report of the Scientific Advisory Subcommittee on Brucellosis – P. Elzer .................................................................218
Report of the Feral Swine Subcommittee on Brucellosis and Pseudorabies – C. Black and J. Corn .................................219

COMMITTEE ON CAPTIVE WILDLIFE AND ALTERNATIVE LIVESTOCK

Report of the Committee – M. Miller .........................260

COMMITTEE ON DIAGNOSTIC LABORATORY & VETERINARY WORKFORCE DEVELOPMENT

COMMITTEE ON THE ENVIRONMENT
Report of the Committee – G. Meerdink .............................................280

COMMITTEE ON FEED SAFETY AND
COMMITTEE ON FOOD SAFETY

COMMITTEE ON FOREIGN AND EMERGING DISEASES
Report of the Committee – C. C. Brown .................................298
Time Specific Paper: Foot-and-Mouth Disease Virus Vaccines:
   Development of a Marker, Multiepitope Subunit Vaccine –
   M. J. Grubman ........................................................................305

COMMITTEE ON GOVERNMENT RELATIONS

COMMITTEE ON IMPORT-EXPORT
Report of the Committee – G. Winegar .................................320

COMMITTEE ON INFECTIOUS DISEASES
   OF CATTLE, BISON, AND CAMELIDS
Report of the Committee – H. D. Lehmkuhl .........................344

COMMITTEE ON INFECTIOUS DISEASES OF HORSES
Report of the Committee – P. J. Timoney ..............................349
Report of the Subcommittee on Equine Infectious Anemia –
   S. L. Halstead ........................................................................357
Report of the Subcommittee on Equine Piroplasmosis –
   K. Fowler .............................................................................368
Time Specific Paper: Recent Advances in Our Understanding of
   Equine Herpesvirus-1 (EHV-1) Myeloencephalopathy – G. P.
COMMITTEE ON INTERNATIONAL STANDARDS

Report of the Committee – R. D. Willer ..............................381

COMMITTEE ON JOHNE’S DISEASE

Report of the Committee – S. Wells .................................422
Report of the Scientific Advisory Subcommittee on Johne’s Disease – J. Stabel ..............................455
Time Specific Paper: Prevalence and Incidence to Date of Mycobacterium avium paratuberculosis Infection in Herds Participating in the U.S. National Johne’s Disease Demonstration Herd Project – C. P. Fossler .................456

COMMITTEE ON LIVESTOCK IDENTIFICATION

Report of the Committee – B. R. Hillman ..........................469

COMMITTEE ON NOMINATIONS AND RESOLUTIONS

Report of the Committee – B. D. Marsh .............................491

COMMITTEE ON PARASITIC DISEASES

Report of the Committee – J. L. Corn ............................561

COMMITTEE ON PHARMACEUTICALS

Report of the Committee – J. Bradshaw ..........................577

COMMITTEE ON PROGRAM

Report of the Committee – J. W. Leafstedt ......................581

COMMITTEE ON PUBLIC HEALTH AND RABIES

Report of the Committee – J. P. Sanders ..........................583
COMMITTEE ON PUBLIC RELATIONS
Report of the Committee – M. A. Littlefield ..............................587

COMMITTEE ON SALMONELLA
Report of the Committee – P. L. McDonough .............................590

COMMITTEE ON SCARPIE
Report of the Committee – J. Logan .........................................638

COMMITTEE ON SHEEP AND GOATS
Report of the Committee – C. B. Wolf .......................................658

COMMITTEE ON TRANSMISSIBLE DISEASES OF POULTRY
Report of the Committee – J. A. Smith .................................661
Report of the Subcommittee on Mycoplasma – F. J. Hoerr ...668
Report of the Subcommittee on Vaccinal Laryngotracheitis –
S. Davison .............................................................................669

COMMITTEE ON TRANSMISSIBLE DISEASES OF SWINE
Report of the Committee – H. Snelson .................................730
Report of the Feral Swine Subcommittee on PRV and Brucellosis
– C. Black ........................................................................734

COMMITTEE ON TUBERCULOSIS
Report of the Committee – K. M. Connell ............................738
Report of the Scientific Advisory Subcommittee on Tuberculosis
– M. V. Palmer ..................................................................741

COMMITTEE ON WILDLIFE DISEASES
Report of the Committee - J. R. Fischer .................................770
F. Other Reports

1. 2007 USDA-ARS Research Review: Vector-Borne Diseases

   Future Direction of the ARS Animal Health Vector-Borne Disease Research Program
   D. Strickman..........................................................796

   New Diagnostic Tools for Detecting Rift Valley Fever (RVF) and Other Arboviruses
   W. Wilson..............................................................798

   Predicting the Next Outbreak of Rift Valley Fever (RVF)
   K Linthicum..........................................................800

   The Molecular Epidemiology of Vesicular Stomatitis Virus (VSV)
   L. Rodriguez .........................................................802

   Studies of the Determinants of Vector-Borne Transmission of Anaplasma marginale May Lead to New Control Strategies
   G. Scoles..............................................................803

   Research Initiatives to Prevent the Introduction of Cattle Tick Fever in North America
   D. Knowles..........................................................805
2. 3rd Annual Applied Animal and Public Health Research and Extension Conference
American Association of Extension Veterinarians

Systematic Review of Vaccination as an Intervention for Salmonella in Broilers

Interrelationships of Salmonella Status of Flock and Grow-Out Environment at Sequential Segments in Broiler Production and Processing

An Outbreak of Salmonella newport in a Beef Cow Herd Associated with the Presence of BVD-PI Animals
R.F. Daly*, R.D. Neiger.................................................810

Educational Materials for Control of Bovine Viral Diarrhea
B.J. White.................................................................811

Characterization of Johne’s disease in Mississippi cattle
J.L. Carter*, C.L. Huston, S. Zhang......................813

Antibody Responses and Outcome of Clinical Mastitis Cases among J5 Vaccinates and Controls
D.J. Wilson ..........................................................814

Association of climatic variables on the Day of Birth with Passive Transfer in Beef Calves
B. Epperson*, A. Courtney ........................................816

Copper Nutrition and Toxicosis in Goats
P.B. Scharko*, U. Bryant ...........................................818

Evaluation of a Livestock Operation Damage Surveillance System after Hurricane Katrina
III. Organizational Matters

A. Bylaws of USAHA ..........................................................823
B. USAHA Administrative Policies ...........................................836
C. Previous Meetings ...........................................................838

IV. Appendix

A. Commonly Used Acronyms ..................................................845
I. 2006 Officers and Committees
   A. Officers
   B. Committees
Seated, from the left: Jim Leafstedt, President Elect; Lee Myers, President; Don Hoenig, First Vice President.

Standing, from the left: J Lee Alley, Secretary; Steve Halstead, Third Vice President; Bill Hartmann, Treasurer; Rich Breitmeyer, Second Vice President.
I.B. COMMITTEES

USAHA/AAVLD Committee on Animal Emergency Management
Co-Chairs: Keith Roehr, Lakewood, CO
Patricia Blanchard, Tulare, CA

John B. Adams, VA
Bruce L. Akey, NY
Gary A. Anderson, KS
Joan M. Arnoldi, WI
Tammy R. Beckham, NY
Shane A. Brookshire, GA
Consuelo Carrillo, NY
David M. Chico, NY
Leslie E. Cole, OK
Kevin Dennison, CO
Shelley F. Doak, ME
Orlo R. Ehart, DC
Brigid N. Elchos, MS
Dee Ellis, TX
Francois C. Elvinger, VA
W. Kent Fowler, CA
Cyrl G. Gay, MD
Leelve G. Gayle, TX
Jeffrey J. Hamer, NJ
Gregg Hawkins, TX
Elizabeth B. Herring, N
Donald E. Hoenig, ME
Greg P. Jillson, NM
Patrice N. Klein, MD
Charlotte Krugler, SC
Elizabeth A. Lautner, IA
Randall L. Leving, IA
Martha A. Littlefield, LA
Barbara M. Martin, IA
John Maulsby, CO
Thomas J. McGinn, III, DC
David L. Meeker, VA
Lee M. Myers, GA
Brian V. Noland, CO
Sandra K. Norman, IN
Kristy L. Pabilonia, CO
Boyd Parr, SC
Deidre A. Qual, ND
Jeanne M. Rankin, MT
Mark Robinson, MD
Paul E. Rodgers, CO
James A. Roth, IA
Mo D. Salmon, CO
A. David Scarfe, IL
Gary B. Sherman, MD
Marilyn M. Simunich, ID
Harry Snelson, NC
George A. Teagarden, KS
Kerry Thompson, DC
David B. Tomkins, TX
Alfonso Torres, NV
William C. Wagner, VA
Sherrilyn H. Wainwright, CO
David P. Warner, NC
Patrick Webb, IA
Ronald B. Wilson, TN
Pam Zaabel, IA

USAHA/AAVLD Committee on Animal Health Information Systems
Co-Chairs: Bruce L. Akey, Ithaca, NY
Francois C. Elvinger, Blacksburg, VA

Stan D. Bruntz, CO
Craig N. Carter, KY
James T. Case, CA
Max E. Coats, Jr., TX
Malcom G. Fearneyhough, TX
William L. Hartmann, MN
Jodi A. Hoynoski, VT
Elizabeth A. Lautner, IA
Janet Maass, CO
Kevin D. Maher, IA
Larry D. Mark, VA
Michael K. Martin, SC
Richard E. Pacer, MD
Deidre A. Qual, ND
Emi K. Saito, CO
Mo D. Salmon, CO
Committee on Animal Health Information Systems (continued)

Jack L. Schlater, IA
Robert Smith, VA
Glenn B. Smith, GA
Christine Spaulding, WA
Mark C. Thurmond, CA
Steve Weber, CO
Nora E. Wineland, CO

Committee on Animal Welfare
Chair: J Amelita Facchiano, Dallas, TX
Vice Chairs: Carolyn L. Stull, Davis, CA
Ria de Grassi, Sacramento, CA

Wilbur B. Amand, PA
Joan M. Arnoldi, WI
Chris D. Ashworth, AR
Shane A. Brookshire, GA
Crystal Bryant, TX
Tom Burkgren, IA
Beth W. Carlson, ND
David M. Chico, NY
Tim R. Cordes, MD
Stephen K. Crawford, NH
W. Ron DeHaven, IL
Kevin Dennisson, CO
Debra S. Duncan, KS
Reta Dyess, TX
Kathleen D. Finnerty, NY
W. Kent Fowler, CA
Nancy A. Frank, MI
Julie A. Gard, AL
Chester A. Gipson, MD
Gail C. Golab, IL
Nancy E. Halpern, NJ
Steven L. Halstead, MI
Marlene Halverson, MN
Jeffrey J. Hamer, NJ
Del E. Hensel, CO
Terry L. Klick, OH
Cathy A. Liss, VA
Martha A. Littlefield, LA
Calvin W S. Lum, HI
Janet Maass, CO
John R. MacMillian, WV
Amy W. Mann, DC
Chuck E. Massengill, MO
Terry R. Menlove, UT
Sherrie R. Niekamp, IA
Sandra K. Norman, IN
Roger E. Olson, MD
Elizabeth J. Parker, DC
John R. Ragan, MD
Sebastian Reist, NJ
Nancy J. Robinson, MO
Keith Roehr, CO
David D. Schmitt, IA
Andy Schwartz, TX
Dale F. Schwindaman, MD
Philip Stayer, MS
Bruce N. Stewart-Brown, MD
Paul L. Sundberg, IA
George A. Teagarden, KS
Robert M. S. Temple, OH
Mary Kay Thatcher, DC
Belinda S. Thompson, NY
Charles D. Vail, CO
Lyle P. Vogel, IL
Max Waldo, NE
Gary M. Weber, MD
Katherine Wetherall, CA
Norman G. Willis, CAN
Ross Wilson, TX
Josh L. Winegarner, TX
Nora E. Wineland, CO
Richard W. Winters, Jr., TX
Michael J. Wood, VT
Ernest W. Zirkle, NJ
USAHA/AAVLD Committee on Aquaculture
Co-Chairs: Scott E. LaPatra, Buhl, ID
   Kevin Snevak, Pullman, WA

Deborah L. Brennan, MS
Jones W. Bryan, SC
William W. Buisch, NC
Tony A. Caver, SC
Fred Cunningham, MS
Robert G. Ehlenfeldt, WI
James M. Foppoli, HI
Nancy A. Frank, MI
Andrew E. Goodwin, AR
Burke L. Healey, NC
Donald E. Hoenig, ME
Robert F. Kahrs, FL
Myron J. Kebus, WI
Lester H. Khoo, MS
Vader M. Loomis, PA
John R. MacMillian, WV
Phillip M. Mamer, ID
Larry D. Mark, VA
Otis Miller, NC
Brian M. O’Quin, OR
Lanny W. Pace, MS
Charles Palmer, CA
Jill B. Rolland, MD
John P. Sanders, WV
A. David Scarfe, IL
Norman G. Willis, CAN
Ria de Grassi, CA

Committee on Biologics & Biotechnology
Chair: Bob Tully, Lenexa, KS

Gary A. Anderson, KS
Joan M. Arnoldi, WI
Charles A. Baldwin, GA
Karen E. Burns-Grogan, GA
Yung Fu Chang, NY
James J. England, ID
William H. Fales, MO
Robert W. Fulton, OK
Ted Girshick, CT
Keith N. Haffer, SD
Larry L. Hawkins, MO
Chris S. Hayhow, KS
Ruud Hein, DE
Richard E. Hill, IA
Joseph N. Huff, CO
Majon Huff, CO
Robert F. Kahrs, FL
Terry L. Klick, OH
Hiram N. Lasher, DE
Lloyd H. Lauerman, WA
John C.. Lawrence, Me
Randall L. Levings, IA
Richard E. Pacer, MD
Robert E. Pitts, GA
Carol L. Rinehart, MO
Deepanker Tewari, PA
Deoki N. Tripathy, IL
Jeff T. Trunnell, IA
Mary Anne Williams, CA

Committee on Bluetongue And Bovine Retrovirus
Chair: James E. Pearson, Ames, IA
Vice Chair: William C. Wilson, Laramie, WY

T. Lynwood Barber, CO
Charles E. Brown, II, WI
Edward J. Dubovi, NY
James F. Evermann, WA
Robert W. Fulton, OK
Robert F. Gerlach, AK
Chester A. Gipson, MD
Joel Goldman, LA
William L. Hartmann, MN
Larry L. Hawkins, MO
Chris S. Hayhow, KS
Robert B. Hillman, NY
Committee on Bluetongue and Bovine Retrovirus (continued)

Thomas J. Holt, FL  
Robert F. Kahrs, FL  
Oscar Kennedy, VA  
Francine Lord, CAN  
N.James MacLachlan, CA  
Daniel G. Mead, GA  
James O. Mecham, WY  
Bennie I. Osburn, CA  
Eileen N. Ostlund, IA  
Richard E. Pacer, MD  
David E. Stallknecht, GA  
Susan W. Tellez, TX  
Mark C. Thurmond, CA  
Mary Anne Williams, CA  
George O. Winegar, MI

Committee on Brucellosis
Chair: Glenn E. Plumb, Yellowstone Park, WY  
Vice Chair: Claude E. Barton, Nashville, TN

John B. Adams, VA  
J Lee Alley, AL  
Keith E. Aune, MT  
Carter Black, GA  
Richard E. Breitmeyer, CA  
Becky L. Brewer-Walker, OK  
Marcus Bridges, MT  
John Chatburn, ID  
Max E. Coats, Jr., TX  
Thomas F. Conner, OH  
Walter E. Cook, WY  
Ed Corrigan, WI  
Donald S. Davis, TX  
Mark L. Drew, ID  
Anita J. Edmondson, CA  
Robert G. Ehlenfeldt, WI  
Philip H. Elzer, LA  
Steven R. England, NM  
Donald E. Evans, KS  
Dave E. Fly, NM  
James M. Foppoli, HI  
Tony G. Frazier, AL  
Bob Frost, CA  
Frank Galey, WY  
Tam Garland, MD  
Robert F. Gerlach, AK  
Arnold A. Gertonson, CO  
Michael J. Gilsdorf, DC  
L. Wayne Godwin, FL  
William L. Hartmann, MN  
Gregg Hawkins, TX  
Steven G. Hennager, IA  
Bob R. Hillman, TX  
E. Ray Hinshaw, AZ  
Sam D. Holland, SD  
Majon Huff, CO  
Dennis A. Hughes, NE  
David L. Hunter, MT  
Jon G. Johnson, TX  
Susan J. Keller, ND  
Terry L. Klick, OH  
Terry J. Kreeger, WY  
Maxwell A. Lea, Jr., LA  
Thomas F. Linfield, WY  
Jim R. Logan, WY  
Laurent O’Gene Lollis, FL  
Phillip M. Mamer, ID  
Bret D. Marsh, IN  
Barbara M. Martin, IA  
Chuck E. Massengill, MO  
George L. Merrill, NY  
Andrea Mikolon, CA  
Henry I. Moreau, LA  
Rick R. Nabors, TX  
Steven C. Olsen, IA  
Elizabeth J. Parker, DC  
Janet B. Payeur, IA  
Valerie E. Ragan, MD  
Thomas J. Roffe, MT  
Shawn P. Schafer, MN  
David D. Schmitt, IA  
Marilyn M. Simunich, ID  
Robert C. Stout, KY  
Paul L. Sundberg, IA  
George A. Teagarden, KS  
Kenneth J. Throlson, ND
**Committee on Brucellosis (continued)**

<table>
<thead>
<tr>
<th>Name</th>
<th>State</th>
</tr>
</thead>
<tbody>
<tr>
<td>James A. Watson, MS</td>
<td>MS</td>
</tr>
<tr>
<td>Gary M. Weber, MD</td>
<td>MD</td>
</tr>
<tr>
<td>Diana L. Whipple, IA</td>
<td>IA</td>
</tr>
<tr>
<td>Margaret A. Wild, CO</td>
<td>CO</td>
</tr>
<tr>
<td>Richard D. Willer, AZ</td>
<td>AZ</td>
</tr>
<tr>
<td>Larry L. Williams, NE</td>
<td>NE</td>
</tr>
<tr>
<td>Taylor Woods, MO</td>
<td>MO</td>
</tr>
<tr>
<td>Glen L. Zebarth, MN</td>
<td>MN</td>
</tr>
</tbody>
</table>

**Committee on Captive Wildlife and Alternative Livestock**

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

<table>
<thead>
<tr>
<th>Name</th>
<th>State</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wilbur B. Amand, PA</td>
<td>PA</td>
</tr>
<tr>
<td>Paul L. Anderson, MN</td>
<td>MN</td>
</tr>
<tr>
<td>Mark W. Atkinson, NV</td>
<td>NV</td>
</tr>
<tr>
<td>Daniel R. Baca, TX</td>
<td>TX</td>
</tr>
<tr>
<td>John R. Behrmann, PA</td>
<td>PA</td>
</tr>
<tr>
<td>Scott W. Bugai, TX</td>
<td>TX</td>
</tr>
<tr>
<td>Beth W. Carlson, ND</td>
<td>ND</td>
</tr>
<tr>
<td>Donald S. Davis, TX</td>
<td>TX</td>
</tr>
<tr>
<td>Mark L. Drew, ID</td>
<td>ID</td>
</tr>
<tr>
<td>Tim J. Feldner, MT</td>
<td>MT</td>
</tr>
<tr>
<td>John R. Fischer, GA</td>
<td>GA</td>
</tr>
<tr>
<td>Nancy A. Frank, MI</td>
<td>MI</td>
</tr>
<tr>
<td>Tam Garland, MD</td>
<td>MD</td>
</tr>
<tr>
<td>Robert F. Gerlach, AK</td>
<td>AK</td>
</tr>
<tr>
<td>Paul Gibbs, FL</td>
<td>FL</td>
</tr>
<tr>
<td>Colin M. Gillin, OR</td>
<td>OR</td>
</tr>
<tr>
<td>Michael J. Gilsdorf, DC</td>
<td>DC</td>
</tr>
<tr>
<td>Chester A. Gipson, MD</td>
<td>MD</td>
</tr>
<tr>
<td>Dean Goeldner, MD</td>
<td>MD</td>
</tr>
<tr>
<td>Robert Hilsenroth, PA</td>
<td>PA</td>
</tr>
<tr>
<td>Sam D. Holland, SD</td>
<td>SD</td>
</tr>
<tr>
<td>Fred Huebner, IA</td>
<td>IA</td>
</tr>
<tr>
<td>David L. Hunter, MT</td>
<td>MT</td>
</tr>
<tr>
<td>John P. Huntley, NY</td>
<td>NY</td>
</tr>
<tr>
<td>Carolyn Inch, CAN</td>
<td>CAN</td>
</tr>
<tr>
<td>Karl G. Kinsel, TX</td>
<td>TX</td>
</tr>
<tr>
<td>Patrice N. Klein, MD</td>
<td>MD</td>
</tr>
<tr>
<td>Terry L. Klick, OH</td>
<td>OH</td>
</tr>
<tr>
<td>Paul E. Knepley, PA</td>
<td>PA</td>
</tr>
<tr>
<td>Terry J. Kreeger, WY</td>
<td>WY</td>
</tr>
<tr>
<td>Carolyn Laughlin, OH</td>
<td>OH</td>
</tr>
<tr>
<td>Steve K. Laughlin, OH</td>
<td>OH</td>
</tr>
<tr>
<td>Calvin W S. Lum, HI</td>
<td>HI</td>
</tr>
<tr>
<td>Konstantin Lyashchenko, NY</td>
<td>NY</td>
</tr>
<tr>
<td>Phillip M. Mamer, ID</td>
<td>ID</td>
</tr>
<tr>
<td>Leslie McFarlane, UT</td>
<td>UT</td>
</tr>
<tr>
<td>Robert G. McLean, CO</td>
<td>CO</td>
</tr>
<tr>
<td>Thomas P. Meehan, IL</td>
<td>IL</td>
</tr>
<tr>
<td>George L. Merrill, NY</td>
<td>NY</td>
</tr>
<tr>
<td>Andrea Mikolom, CA</td>
<td>CA</td>
</tr>
<tr>
<td>Bruce L. Morrison, NE</td>
<td>NE</td>
</tr>
<tr>
<td>Kerry J. Mower, NM</td>
<td>NM</td>
</tr>
<tr>
<td>Julie Napier, NE</td>
<td>NE</td>
</tr>
<tr>
<td>Janet B. Payeur, IA</td>
<td>IA</td>
</tr>
<tr>
<td>Michael R. Pruitt, OK</td>
<td>OK</td>
</tr>
<tr>
<td>Emi K. Saito, CO</td>
<td>CO</td>
</tr>
<tr>
<td>Shawn P. Schafer, MN</td>
<td>MN</td>
</tr>
<tr>
<td>Tom A. Scheib, WI</td>
<td>WI</td>
</tr>
<tr>
<td>David D. Schmitt, IA</td>
<td>IA</td>
</tr>
<tr>
<td>Stephen M. Schmitt, MI</td>
<td>MI</td>
</tr>
<tr>
<td>Roy A. Schultz, IA</td>
<td>IA</td>
</tr>
<tr>
<td>Charly Seale, TX</td>
<td>TX</td>
</tr>
<tr>
<td>Jonathan M. Sleeman, VA</td>
<td>VA</td>
</tr>
<tr>
<td>Joe Starcher, WV</td>
<td>WV</td>
</tr>
<tr>
<td>Les C. Stutzman, NY</td>
<td>NY</td>
</tr>
<tr>
<td>Cleve Tedford, TN</td>
<td>TN</td>
</tr>
<tr>
<td>Robert M. S. Temple, OH</td>
<td>OH</td>
</tr>
<tr>
<td>John “Brad” Thurston, IN</td>
<td>IN</td>
</tr>
<tr>
<td>Kimberly K. Wagner, WI</td>
<td>WI</td>
</tr>
<tr>
<td>Rick Wahlert, CO</td>
<td>CO</td>
</tr>
<tr>
<td>Kenneth Waldrup, TX</td>
<td>TX</td>
</tr>
<tr>
<td>Ray Waters, IA</td>
<td>IA</td>
</tr>
<tr>
<td>Kyle W. Wilson, TN</td>
<td>TN</td>
</tr>
<tr>
<td>Richard W. Winters, Jr., TX</td>
<td>TX</td>
</tr>
<tr>
<td>Jill Bryan Wood, TX</td>
<td>TX</td>
</tr>
<tr>
<td>Glen L. Zebarth, MN</td>
<td>MN</td>
</tr>
</tbody>
</table>
Committee on Diagnostic Laboratory and Veterinary Workforce Development
Co-Chairs: Bob Frost, Lincoln, CA
Bennie I. Osburn, Davis, CA

J Lee Alley, AL
Alex A. Ardans, CA
Thomas W. Bates, CA
Judith Bossé, CAN
H. Michael Chaddock, DC
Neville P. Clarke, TX
John R. Clifford, DC
Karen Conyngham, TX
W. Ron DeHaven, IL
Leslie A. Dierauf, WI
Brian R. Evans, CAN
Peter J. Fernandez, AE
J. Pat Fitch, MD
Frank Galey, WY
Tam Garland, MD
Pam J. Hullinger, CA
Paul Kitching, CAN
Elizabeth A. Lautner, IA
Randall L. Levings, IA
Bret D. Marsh, IN
Barbara M. Martin, IA
Mary T. McBride, CA
Richard H. McCapes, CA
Terry F. McElwain, WA
Donal O’Toole, WY
Gary D. Osweiler, IA
Willie M. Reed, IN
Y. M. Saif, OH
A. David Scarfe, IL
Brian T. Smith, DC
Kimothy Smith, DC
Mark Spire, KS
Alfonso Torres, NY
Lyle P. Vogel, IL
Richard D. Willer, AZ

Committee on The Environment
Chair: Gavin Meerdink, Mahomet, IL
Vice Chair: Randall A. Lovell, Rockville, MD

Frank Galey, WY
L. Wayne Godwin, FL
John P. Honstead, CO
Laurent O’Gene Lollis, FL
Lee M. Myers, GA
Gary D. Osweiler, IA
Elizabeth J. Parker, DC
Jane F. Robens, MD
Larry J. Thompson, MO
Gary M. Weber, MD

Committee on Feed Safety
Chair: Kevin G. Custer, Des Moines, IA
Vice Chair: Richard Sellers, Arlington, VA

David C. Ailor, DC
Richard E. Breitmeyer, CA
Roy D. Brister, AR
C. Ross Hamilton, TX
Jay Hawley, IN
Tom Holder, MD
Rex D. Holt, GA
Elizabeth A. Lautner, IA
David L. Meeker, VA
Gary D. Osweiler, IA
Jane F. Robens, MD
James E. Stocker, NC
H. Wesley Towers, DE
Liz K. Wagstrom, IA
Doug Waltman, GA
Gary L. Waters, MT
Committee on Food Safety  
Chair: Daniel E. LaFontaine, Elgin, SC  
Vice Chair: Bonnie J. Buntain, Calgary, Alberta, CAN

Deanna L. Baldwin, MD  
Marilyn F. Balmer, MD  
John R. Behrmann, PA  
Joseph L. Blair, VA  
Richard E. Breitmeyer, CA  
Peggy N. Carter, VA  
Jan Charminski, WY  
Max E. Coats, Jr., TX  
Carl W. Cushing, VT  
Reta Dyess, TX  
Kathleen D. Finnerty, NY  
Robert F. Gerlach, AK  
L. Wayne Godwin, FL  
Donald E. Hoenig, ME  
Tom Holder, MD  
Rex D. Holt, GA  
Clyde B. Hoskins, SC  
Danny R. Hughes, AR  
John P. Huntley, NY  
Lee C. Jan, TX  
Robert F. Kahrs, FL  
Susan J. Keller, ND  
Sung G. Kim, NY  
Spangler Klopp, DE  
Elizabeth A. Lautner, IA  
Laurent O’Gene Lollis, FL  
Kelli S. Ludlum, DC  
John R. MacMillian, WV  
Michael M. Mamminga, IA  
Bret D. Marsh, IN  
David T. Marshall, NC  
Kris Mazurczak, IL  
James D. McKeen, IA  
Katherine McNamara, VT  
Andrea Mikolon, CA  
Lee M. Myers, GA  
Nicole Neeser, MN  
Jill A. Nezworski, MN  
Edwin M. Odor, DE  
Carol A. Olmstead, MT  
Kenneth E. Olson, IL  
Gary D. Osweiler, IA  
Gerardo Quaassdorff, VT  
John R. Ragan, MD  
James T. Rankin, Jr., PA  
Nancy J. Robinson, MO  
Kerry A. Rood, UT  
Leon H. Russell, Jr., TX  
John P. Sanders, WV  
Glenn N. Slack, KY  
Harry Snelson, NC  
Philip Stayer, MS  
Bruce N. Stewart-Brown, MD  
Stanley A. Stromberg, OK  
Lyle P. Vogel, IL  
Larry L. Williams, NE  
Rob Williams, DC  
Nora E. Wineland, CO  
John F. Wortman, Jr., NM  
Ria de Grassi, CA

Committee on Foreign and Emerging Diseases  
Chair: Corrie C. Brown, Athens, GA  
Vice Chair: Alfonso Torres, Ithaca, NY

Helen M. Acland, PA  
John B. Adams, VA  
Bruce L. Akey, NY  
Wilbur B. Amand, PA  
Sandra Amass, IN  
Gary A. Anderson, KS  
Alex A. Ardans, CA  
Joan M. Arnoldi, WI  
Marianne Ash, IN  
Charles A. Baldwin, GA  
Thomas W. Bates, CA  
Karen M. Becker, MD  
Tammy R. Beckham, NY  
John R. Behrmann, PA  
Derek J. Belton, NZ  
Bob H. Bokma, MD  
Philip E. Bradshaw, IL  
Richard E. Breitmeyer, CA
Committee on Foreign and Emerging Diseases (continued)

Deborah L. Brennan, MS          Richard E. Hill, IA
Becky L. Brewer-Walker, OK       Donald E. Hoenig, ME
William W. Buisch, NC            Sam D. Holland, SD
Suzanne L. Burnham, TX           Thomas J. Holt, FL
Jerry J. Callis, NY              Floyd P. Horn, MD
Tony A. Caver, SC                Dennis A. Hughes, NE
Yung Fu Chang, NY                John P. Huntley, NY
David M. Chico, NY               John L. Hyde, NY
Neville P. Clarke, TX            Robert F. Kahrs, FL
Ronald R. Clarke, CAN            Thomas R. Kasari, CO
Leslie E. Cole, OK               Patrice N. Klein, MD
Thomas F. Conner, OH             Elizabeth A. Lautner, IA
Robert A. Cook, NY               Randall L. Levings, IA
Joseph L. Corn, GA               David J. Ligda, IN
Paula L. Cowen, CO               Martha A. Littlefield, LA
Robert A. Crandell, TX           Linda L. Logan, APO
Stephen K. Crawford, NH          Janet Maass, CO
Fred DeGraves, OH                Edward T. Mallinson, MD
Linda A. Detwiler, NJ            Bret D. Marsh, IN
Edward J. Dubovi, NY             Mary J. Marshall, UK
Anita J. Edmondson, CA           Barbara M. Martin, IA
Dee Ellis, TX                    Sarah J. Mason, NC
Francois C. Elvinger, VA         MaryAnn T. McBride, NC
John I. Enck, Jr., PA            Robert G. McLean, CO
Luis Alberto Espinoza, MEX       James O. Mecham, WY
Peter J. Fernandez, AE           David L. Meeker, VA
Steven Finch, MD                 Andrea Mikolon, CA
J. Pat Fitch, MD                 Thomas J. Myers, DC
James M. Foppoli, HI             Terry L. Nipp, DC
Rose Foster, MO                  James E. Novy, TX
W. Kent Fowler, CA               Bruno Oesch
Anthony M. Gallina, FL           Richard E. Pacer, MD
John E. George, TX               Charles Palmer, CA
Robert F. Gerlach, AK            Andres Perez, CA
Paul Gibbs, FL                   Kelly R. Preston, TX
Colin M. Gillin, OR              Gerardo Quaassdorff, VT
Joel Goldman, LA                 Deidre A. Qual, ND
Mara Elma E. Gonzalez            Keith Roehr, CO
Robert Ross Graham, VA           James A. Roth, IA
Nancy E. Halpem, NJ              Mo D. Salman, CO
Jeffrey J. Hamer, NJ             A. David Scarfe, IL
Percy W. Hawkes, UT              Jack L. Schlater, IA
Gregg Hawkins, TX                David D. Schmitt, IA
Larry L. Hawkins, MO             Dan J. Sheesley, DC
Ruud Hein, DE                    Richard D. Slemons, OH
David W. Hertha, AL              Harry Snelson, NC
Committee on Foreign and Emerging Diseases (continued)

David L. Suarez, GA
David E. Swayne, GA
R. Flint Taylor, NM
Cleve Tedford, TN
David Thain, NV
Lee Ann Thomas, MD
Mark C. Thurmond, CA
John "Brad" Thurston, IN
Peter J. Timoney, KY
Susan C. Trock, NY
Paul O. Ugstad, TX
Lyle P. Vogel, IL
Gale Wagner, TX
Sherrilyn H. Wainwright, CO
Marsharee Wilcox, MD
Margaret A. Wild, CO
Catherine L. Wilhelmsen, MD
Larry L. Williams, NE
Rob Williams, DC
Norman G. Willis, CAN
Ronald B. Wilson, TN
William C. Wilson, WY
Saul T. Wilson, Jr., AL
Richard W. Winters, Jr., TX
Pam Zaabel, IA

Committee on Government Relations
Chair: Donald E. Hoenig, Belfast, ME
Vice Chair: Richard E. Breitmeyer, Sacramento, CA

Bruce L. Akey, NY
J Lee Alley, AL
Tony G. Frazier, AL
Steven L. Halstead, MI
William L. Hartmann, MN
James W. Leafstedt, SD
Bret D. Marsh, IN
Lee M. Myers, GA
Nancy J. Robinson, MO
Keith Roehr, CO

Committee on Import-Export
Chair: Charles E. Brown, II, DeForest, WI
Vice Chair: George O. Winegar, Howell, MI

Dan Baker, CO
Bob H. Bokma, MD
Suzanne L. Burnham, TX
Tim R. Cordes, MD
Linda A. Detwiler, NJ
Mark Engle, TN
William H. Fales, MO
Bob Frost, CA
Chester A. Gipson, MD
Mara Elma E. Gonzalez,
Percy W. Hawkes, UT
Steven G. Hennager, IA
Robert B. Hillman, NY
Robert Hilsenroth, PA
Donald E. Hoenig, ME
Robert F. Kahrs, FL
Oscar Kennedy, VA
Ralph C. Knowles, FL
Elizabeth A. Lautner, IA
Jay C. Lemmermen, FL
Amy W. Mann, DC
Richard D. Mitchell, CT
Lee M. Myers, GA
Elizabeth J. Parker, DC
James E. Pearson, IA
Kelly R. Preston, TX
Gerardo Quaassdorff, VT
Paul E. Rodgers, CO
Susan W. Tellez, TX
Lynn Anne Tesar, SD
Lee Ann Thomas, MD
Peter J. Timoney, KY
Charles D. Vail, CO
James A. Watson, MS
Gary M. Weber, MD
David W. Winters, TX
Cindy B. Wolf, MN
### Committee on Infectious Diseases of Cattle, Bison And Camelids
**Chair:** Howard D. Lehmkuhl, Ames, IA  
**Vice Chair:** James F. Evermann, Pullman, WA

<table>
<thead>
<tr>
<th>Members</th>
<th>Hometown</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beth W. Carlson, ND</td>
<td></td>
</tr>
<tr>
<td>Karen Conyngham, TX</td>
<td></td>
</tr>
<tr>
<td>Daniel T. Crowell, NV</td>
<td></td>
</tr>
<tr>
<td>Edward J. Dubovi, NY</td>
<td></td>
</tr>
<tr>
<td>Anita J. Edmondson, CA</td>
<td></td>
</tr>
<tr>
<td>Darla R. Ewalt, IA</td>
<td></td>
</tr>
<tr>
<td>Bob Frost, CA</td>
<td></td>
</tr>
<tr>
<td>Robert W. Fulton, OK</td>
<td></td>
</tr>
<tr>
<td>Jennifer L. Greiner, IN</td>
<td></td>
</tr>
<tr>
<td>Burke L. Healey, NC</td>
<td></td>
</tr>
<tr>
<td>Del E. Hensel, CO</td>
<td></td>
</tr>
<tr>
<td>David L. Hunter, MT</td>
<td></td>
</tr>
<tr>
<td>Robert F. Kahrs, FL</td>
<td></td>
</tr>
<tr>
<td>John C. Lawrence, ME</td>
<td></td>
</tr>
<tr>
<td>James W. Leafstedt, SD</td>
<td></td>
</tr>
<tr>
<td>Janet Maass, CO</td>
<td></td>
</tr>
<tr>
<td>Chuck E. Massengill, MO</td>
<td></td>
</tr>
<tr>
<td>Steven C. Olsen, IA</td>
<td></td>
</tr>
<tr>
<td>Jeanne M. Rankin, MT</td>
<td></td>
</tr>
<tr>
<td>Julia F. Ridpath, IA</td>
<td></td>
</tr>
<tr>
<td>R. Flint Taylor, NM</td>
<td></td>
</tr>
<tr>
<td>George A. Teagarden, KS</td>
<td></td>
</tr>
<tr>
<td>Susan W. Tellez, TX</td>
<td></td>
</tr>
<tr>
<td>Robert M. S. Temple, OH</td>
<td></td>
</tr>
<tr>
<td>Marsharee Wilcox, MD</td>
<td></td>
</tr>
<tr>
<td>William C. Wilson, WY</td>
<td></td>
</tr>
</tbody>
</table>

### Committee on Infectious Diseases of Horses
**Chair:** Peter J. Timoney, Lexington, KY  
**Vice Chair:** James A. Watson, Jackson, MS

<table>
<thead>
<tr>
<th>Members</th>
<th>Hometown</th>
</tr>
</thead>
<tbody>
<tr>
<td>Helen M. Acland, PA</td>
<td></td>
</tr>
<tr>
<td>Debbie Barr, CAN</td>
<td></td>
</tr>
<tr>
<td>Derek J. Belton, NZ</td>
<td></td>
</tr>
<tr>
<td>Carter Black, GA</td>
<td></td>
</tr>
<tr>
<td>Shane A. Brookshire, GA</td>
<td></td>
</tr>
<tr>
<td>Jones W. Bryan, SC</td>
<td></td>
</tr>
<tr>
<td>Suzanne L. Burnham, TX</td>
<td></td>
</tr>
<tr>
<td>Clarence L. Campbell, FL</td>
<td></td>
</tr>
<tr>
<td>Craig N. Carter, KY</td>
<td></td>
</tr>
<tr>
<td>Tony A. Caver, SC</td>
<td></td>
</tr>
<tr>
<td>Max E. Coats, Jr., TX</td>
<td></td>
</tr>
<tr>
<td>Leroy M.. Coffman, Fl</td>
<td></td>
</tr>
<tr>
<td>Tim R. Cordes, MD</td>
<td></td>
</tr>
<tr>
<td>Ed Corrigan, WI</td>
<td></td>
</tr>
<tr>
<td>Stephen K. Crawford, NH</td>
<td></td>
</tr>
<tr>
<td>Leonard E. Eldridge, WA</td>
<td></td>
</tr>
<tr>
<td>Dee Ellis, TX</td>
<td></td>
</tr>
<tr>
<td>J Amelita Facchiano, TX</td>
<td></td>
</tr>
<tr>
<td>Dave E. Fly, NM</td>
<td></td>
</tr>
<tr>
<td>W. Kent Fowler, CA</td>
<td></td>
</tr>
<tr>
<td>Tony G. Frazier, AL</td>
<td></td>
</tr>
<tr>
<td>Paul Gibbs, FL</td>
<td></td>
</tr>
<tr>
<td>Keith N. Haffer, SD</td>
<td></td>
</tr>
<tr>
<td>Nancy E. Halpern, NJ</td>
<td></td>
</tr>
<tr>
<td>Steven L. Halstead, MI</td>
<td></td>
</tr>
<tr>
<td>Jeffrey J. Hamer, NJ</td>
<td></td>
</tr>
<tr>
<td>Gregg Hawkins, TX</td>
<td></td>
</tr>
<tr>
<td>Burke L. Healey, NC</td>
<td></td>
</tr>
<tr>
<td>Carl Heckendorf, CO</td>
<td></td>
</tr>
<tr>
<td>Steven G. Hennager, IA</td>
<td></td>
</tr>
<tr>
<td>Michael E. Herrin, OK</td>
<td></td>
</tr>
<tr>
<td>Robert B. Hillman, NY</td>
<td></td>
</tr>
<tr>
<td>Don P. Knowles, WA</td>
<td></td>
</tr>
<tr>
<td>Ralph C. Knowles, FL</td>
<td></td>
</tr>
<tr>
<td>Maxwell A. Lea, Jr., LA</td>
<td></td>
</tr>
<tr>
<td>Donald H. Lein, NY</td>
<td></td>
</tr>
<tr>
<td>Mary J. Lis, CT</td>
<td></td>
</tr>
<tr>
<td>Martha A. Littlefield, LA</td>
<td></td>
</tr>
<tr>
<td>Amy W. Mann, DC</td>
<td></td>
</tr>
<tr>
<td>Patrick L. McDonough, NY</td>
<td></td>
</tr>
<tr>
<td>Richard D. Mitchell, CT</td>
<td></td>
</tr>
<tr>
<td>Donald S. Munro, PA</td>
<td></td>
</tr>
<tr>
<td>Lee M. Myers, GA</td>
<td></td>
</tr>
<tr>
<td>Sandra K. Norman, IN</td>
<td></td>
</tr>
<tr>
<td>Don L. Notter, KY</td>
<td></td>
</tr>
<tr>
<td>Eileen N. Ostlund, IA</td>
<td></td>
</tr>
<tr>
<td>Robert E. Pitts, GA</td>
<td></td>
</tr>
<tr>
<td>Jewell G. Plumley, WV</td>
<td></td>
</tr>
<tr>
<td>Jeanne M. Rankin, WV</td>
<td></td>
</tr>
<tr>
<td>Keith Roehr, CO</td>
<td></td>
</tr>
<tr>
<td>Earl Rogers, UT</td>
<td></td>
</tr>
<tr>
<td>Michael A. Short, FL</td>
<td></td>
</tr>
</tbody>
</table>
Committee on Infectious Diseases of Horses (continued)

Robert C. Stout, KY
David Thain, NV
Belinda S. Thompson, NY
Kerry Thompson, DC
H. Wesley Towers, DE

Susan C. Trock, NY
Charles D. Vail, CO
Taylor Woods, MO
Ernest W. Zirkle, NJ

Committee on International Standards
Chair: Richard D. Willer, Phoenix, AZ
Vice Chair: Norman G. Willis, Ottawa, Ont.

Joan M. Arnoldi, WI
Corrie C. Brown, GA
Tony A. Caver, SC
John R. Clifford, DC
Karen Conyngham, TX
Michael J. David, MD
Brian R. Evans, CAN
Peter J. Fernandez, AE
John R. Fischer, GA
Bob Frost, CA
Cyril G. Gay, MD

Donald E. Hoenig, ME
Paul Kitching, CAN
Elizabeth A. Lautner, IA
Bret D. Marsh, IN
Andrea Mikolon, CA
Elizabeth J. Parker, DC
Kelly R. Preston, TX
Matt A. Taylor, CAN
Alfonso Torres, NY
Rob Williams, DC

Committee on Johne's Disease
Chair: Scott J. Wells, St Paul, MN
Vice Chair: Andy Schwartz, Austin, TX

John B. Adams, VA
Marilyn F. Balmer, MD
Richard E. Breitmeyer, CA
Charles E. Brown, II, WI
Todd M. Byrem, MI
Yung Fu Chang, NY
Michael T. Collins, WI
Thomas F. Conner, OH
Robert A. Cook, NY
Ed Corrigan, WI
Stephen K. Crawford, NH
Anita J. Edmondson, CA
Robert G. Ehlenfeldt, WI
John I. Enck, Jr., PA
William H. Fales, MO
Keith R. Forbes, NY
Bob Frost, CA
L. Wayne Godwin, FL
Jeffrey J. Hamer, NJ
Beth Harris, IA

William L. Hartmann, MN
Steven G. Hennager, IA
Donald E. Hoenig, ME
Sam D. Holland, SD
John P. Honstead, CO
David L. Hunter, MT
Jamie S. Jonker, VA
Karen R. Jordan, NC
Susan J. Keller, ND
John C. Lawrence, ME
Donald H. Lein, NY
Mary J. Lis, CT
Laurent O’Gene Lollis, FL
Vader M. Loomis, PA
Gordon ‘Cobie’ Magness, SD
Beth E. Mamer, ID
Chuck E. Massengill, MO
George L. Merrill, NY
Chris W. Murdock, MO
Edwin M. Odor, DE
Committee on Johne’s Disease (continued)

Kenneth E. Olson, IL  
Elizabeth J. Parker, DC  
Boyd Parr, SC  
Elisabeth Patton, WI  
Janet B. Payeur, IA  
Kristine R. Pettrini, Mn  
Jewell G. Plumley, WV  
Michael R. Pruitt, OK  
Sebastian Reist, NJ  
Suelee Robbe-Austerman, SD  
Paul E. Rodgers, CO  
Allen J. Roussel, Jr., TX  
Sarah B. S. Shapiro Hurley, WI  
William P. Shulaw, OH  
Shri N. Singh, KY  
Ben Smith, WA  
Judith R. Stabel, IA  
Susan M. Stehman, NY  
Les C. Stutzman, NY  
Cleve Tedford, TN  
Deepanker Tewari, PA  
Charles O. Thoen, IA  
John “Brad” Thurston, IN  
James A. Watson, MS  
Gary M. Weber, MD  
Diana L. Whipple, IA  
Robert H. Whitlock, PA  
Ronald B. Wilson, TN  
Ching-Ching Wu, IN  
Ria de Grassi, CA

Committee on Livestock Identification
Chair: Bob R. Hillman, Austin, TX  
Vice Chair: Kevin D. Maher, Ames, IA

J Lee Alley, AL  
Joan M. Arnoldi, WI  
John R. Behrmann, PA  
Carter Black, GA  
Richard E. Breitmeyer, CA  
Paul Brennan, IN  
Becky L. Brewer-Walker, OK  
Allen Bright, NE  
Crystal Bryant, TX  
James T. Case, CA  
John Chatburn, ID  
Karen Conyngham, TX  
Anita J. Edmondson, CA  
James J. England, ID  
J Amelita Facchiano, TX  
Glenn K. Fischer, TX  
Robert H. Fourdraine, WI  
W. Kent Fowler, CA  
Tony G. Frazier, AL  
L. Wayne Godwin, FL  
Randy R. Green, DC  
Jennifer L. Greiner, IN  
Steven L. Halstead, MI  
Jeffrey J. Hamer, NJ  
Neil E. Hammerschmidt, MD  
Gregg Hawkins, TX  
Bill Hawks, DC  
E. Ray Hinshaw, AZ  
Sam D. Holland, SD  
Jodi A. Hoynoski, VT  
Joseph N. Huff, CO  
Jon G. Johnson, TX  
Susan J. Keller, ND  
Cleon V. Kimberling, CO  
Terry L. Klick, OH  
Ralph C. Knowles, FL  
Maxwell A. Lea, Jr., LA  
James W. Leafstedt, SD  
Jim R. Logan, WY  
Laurent O’Gene Lollis, FL  
Kelli S. Ludlum, DC  
Amy W. Mann, DC  
Bret D. Marsh, IN  
David T. Marshall, NC  
John Maulsby, CO  
MaryAnn T. McBride, NC  
Terry R. Menlove, UT  
Henry I. Moreau, LA  
Jim Niewold, IL  
Kenneth E. Olson, IL  
Elizabeth J. Parker, DC  
Boyd Parr, SC
Committee on Livestock Identification (continued)

Holly J. Pecetti, NV  
John R. Ragan, MD  
Valerie E. Ragan, MD  
Jeanne M. Rankin, MT  
Nancy J. Robinson, MO  
Joe D. Ross, TX  
Bill Sauble, NM  
Shawn P. Schafer, MN  
Charly Seale, TX  
Mark J. Shaw, TX  
Rick L. Sibbel, IA  
Glenn N. Slack, KY  
Bob Smith, OK  
Glenn B. Smith, GA  
Mark Spire, KS  
Joe Starcher, WV  
Robert C. Stout, KY  
Scott Stuart, CO  
Paul L. Sundberg, IA  
Kerry Thompson, DC  
Richard C. Traylor, TX  
Victor L. Velez, CA  
Liz K. Wagstrom, IA  
Rick Wahlert, CO  
Patrick Webb, IA  
Gary M. Weber, MD  
Ross Wilson, TX  
Josh L. Winegarner, TX  
Cindy B. Wolf, MN  
Taylor Woods, MO  
John F. Wortman, Jr., NM.

Committee on Nominations and Resolutions  
Chair: Bret D. Marsh, Indianapolis, IN

Bruce L. Akey, NY  
J Lee Alley, AL  
Philip E. Bradshaw, IL  
Jones W. Bryan, SC  
Clarence L. Campbell, FL  
Karen Conyngham, TX  
Joe B. Finley, TX  
Bob Frost, CA  
Thomas J. Hagerty, MN  
Donald E. Hansen, OR  
Bob R. Hillman, TX  
John F. Hudelson, CO  
Susan J. Keller, ND  
Maxwell A. Lea, Jr., LA  
Donald H. Lein, NY  
Michael R. Marshall, UT  
Richard H. McCapes, CA  
John R. Ragan, MD  
Glenn B. Rea, OR  
A P. Schneider, ID  
J C. Shook, PA  
Joe Starcher, WV  
H. Wesley Towers, DE  
Max A. Van Buskirk, PA  
Richard D. Willer, AZ  
Larry L. Williams, NE  
Ernest W. Zirkle, NJ

Committee on Parasitic Diseases  
Chair: Joseph L. Corn, Athens, GA  
Vice Chair: J. Mathews Pound, Kerrville, TX

Bob H. Bokma, MD  
Corrie C. Brown, GA  
Leroy M. Coffman, FL  
A. A. Cuthbertson, NV  
J. Kieth Flanagan, FL  
John E. George, TX  
Chester A. Gipson, MD  
Larry L. Hawkins, MO  
Thomas J. Holt, FL  
Lee C. Jan, TX  
Ralph C. Knowles, FL  
Ulysses J. Lane, NC  
Linda L. Logan, APO  
Terry F. McElwain, WA
Committee on Parasitic Diseases (continued)

Daniel G. Mead, GA  
Andrea Mikolon, CA  
Don L. Notter, KY  
James E. Novy, TX  
Richard E. Pacer, MD  
Kelly R. Preston, TX  
Jack L. Schlater, IA  
Robert C. Stout, KY  
Lee Ann Thomas, MD  
Paul O. Ugstad, TX  
Gale Wagner, TX  
Sherrilyn H. Wainwright, CO  
James A. Watson, MS  
John B. Welch, TX  
David W. Winters, TX

Committee on Pharmaceuticals

Chair: James R. Bradford, Kalamazoo, MI  
Vice Chair: Liz K. Wagstrom, Des Moines, IA

Tom Burkgren, IA  
Michael L. Coe, UT  
William H. Fales, MO  
Larry L. Hawkins, MO  
Richard E. Hill, IA  
Donald E. Hoenig, ME  
Patrick L. McDonough, NY  
Valerie H. Patten, NY  
A. David Scarfe, IL  
Paul L. Sundberg, IA  
R. Flint Taylor, NM  
Deepanker Tewari, PA  
Lyle P. Vogel, IL

Committee on Program

Chair: James W. Leafstedt, Alcester, SD  
Vice Chair: Donald E. Hoenig, Belfast, ME

Bruce L. Akey, NY  
J Lee Alley, AL  
James R. Bradford, MI  
Richard E. Breitmeyer, CA  
Corrie C. Brown, GA  
Charles E. Brown, II, WI  
Kathleen M. Connell, WA  
Robert A. Cook, NY  
Joseph L. Corn, GA  
Kevin G. Custer, IA  
Francois C. Elvinger, VA  
Mark Engle, TN  
J Amelita Facchiano, TX  
John R. Fischer, GA  
Bob Frost, CA  
Steven L. Halstead, MI  
William L. Hartmann, MN  
Bob R. Hillman, TX  
Daniel E. LaFontaine, SC  
Scott E. LaPatra, ID  
Howard D. Lehmkuhl, IA  
Martha A. Littlefield, LA  
Jim R. Logan, WY  
Bret D. Marsh, IN  
Patrick L. McDonough, NY  
Gavin Meerdink, IL  
Lee M. Myers, GA  
Bennie I. Osburn, CA  
James E. Pearson, IA  
Glenn E. Plumb, WY  
Keith Roehr, CO  
John P. Sanders, WV  
John A. Smith, GA  
Peter J. Timoney, KY  
Bob Tully, KS  
Scott J. Wells, MN  
Richard D. Willer, AZ  
Cindy B. Wolf, MN
Committee on Public Health and Rabies
Chair: John P. Sanders, Kearneysville, WV
Vice Chair: Nancy A. Frank, Lansing, MI

Helen M. Acland, PA
Sue K. Billings, KY
Charles S. Brown, NC
William H. Clay, DC
Leroy M. Coffman, FL
Joseph L. Corn, GA
Donald S. Davis, TX
Thomas J. DeLiberto, CO
Leslie A. Dierauf, WI
Michael R. Dunbar, CO
James M. Foppoli, HI
Keith N. Haffer, SD
Richard E. Hill, IA
Donald E. Hoenig, ME
Kristin G. Holt, GA
John P. Honstead, CO
Patrice N. Klein, MD
Spangler Klopp, DE
Donald H. Lein, NY
Martha A. Littlefield, LA
Margie M. Lyness, GA
Robert G. McLean, CO
Thomas P. Meehan, IL
David L. Meeker, VA
Lee M. Myers, GA
Sandra K. Norman, IN
Marguerite Pappaioanou, DC
Leon H. Russell, Jr., TX
Tom J. Sidwa, TX
Robert H. Singer, CA
Dennis Slate, NH
Paul L. Sundberg, IA
Belinda S. Thompson, NY
Lyle P. Vogel, IL
Liz K. Wagstrom, IA
Margaret A. Wild, CO
Ignacio T. dela Cruz, MP

Committee on Public Relations and Information Technology
Chair: Martha A. Littlefield, Baton Rouge, LA
Vice Chair: Karen Conyngham, Austin, TX

J Lee Alley, AL
Kathleen M. Connell, WA
Thomas J. Holt, FL
Larry D. Mark, VA
Lee M. Myers, GA
James A. Watson, MS
Richard D. Willer, AZ

Committee on Salmonella
Chair: Patrick L. McDonough, Ithaca, NY
Vice Chair: Doug Waltman, Oakwood, GA

Joan M. Arnoldi, WI
Deanna L. Baldwin, MD
Marilyn F. Balmer, MD
Richard E. Breitmeyer, CA
Max Brugh, GA
Jones W. Bryan, SC
Karen E. Burns-Grogan, GA
Tony A. Caver, SC
Stephen R. Collett, GA
Kevin G. Custer, IA
Sherrill Davison-Yeakel, PA
Robert J. Eckroade, PA
John I. Enck, Jr., PA
James M. Foppoli, HI
Rose Foster, MO
Tony G. Frazier, AL
Richard K. Gast, GA
Hashim M. Ghori, AR
Eric N. Gingerich, PA
Randy R. Green, DC
Jean Guard-Bouldin, GA
Chris S. Hayhow, KS
Committee on Salmonella (continued)

Carl J. Heeder, MN
Ruud Hein, DE
Bill W. Hewat, AR
Tom Holder, MD
Carolyn Inch, CAN
Hailu Kinde, CA
Dale C. Lauer, MN
Elizabeth A. Lautner, IA
Howard M. Magwire, MD
Jerry D. Maiers, NC
Edward T. Mallinson, MD
Beth E. Mamer, ID
James D. McKeen, IA
Hugo Medina, MN
David L. Meeker, VA
Donald S. Munro, PA

Thomas J. Myers, DC
Kakambi V. Nagaraja, MN
Steven H. Olson, MN
Robert L. Owen, PA
Stephen Pretanik, DC
Nancy Reimers, CA
John P. Sanders, WV
H. L. Shivaprasad, CA
Philip Stayer, MS
Bruce N. Stewart-Brown, MD
Hilary S. Thesmar, DC
Liz K. Wagstrom, IA
Gary L. Waters, MT
Scott J. Wells, MN
Nora E. Wineland, CO
Ching-Ching Wu, IN

Committee on Scrapie

Chair: Jim R. Logan, Cheyenne, WY
Vice Chair: Charles Palmer, Redding, CA

Deborah L. Brennan, MS
Shane A. Brookshire, GA
Beth W. Carlson, ND
John R. Clifford, DC
Thomas F. Conner, OH
Walter E. Cook, WY
Linda A. Detwiler, NJ
Anita J. Edmondson, CA
Dee Ellis, TX
Keith R. Forbes, NY
Michael J. Gilsdorf, DC
Craig T. Hanson, SD
William L. Hartmann, MN
Carolyn Inch, CAN
Susan J. Keller, ND
James W. Leafstedt, SD
Thomas F. Linfield, WY

Mary J. Lis, CT
Michael R. Marshall, UT
Cheryl A. Miller, IN
Brian V. Noland, CO
Edwin M. Odor, DE
Kristine R. Petrini, MN
Jewell G. Plumley, WV
Michael R. Pruitt, OK
Nancy J. Roberts, OK
Paul E. Rodgers, CO
Joe D. Ross, TX
Ben Smith, WA
Diane L. Sutton, MD
Lynn Anne Tesar, SD
Delwin D. Wilmot, NE
Nora E. Wineland, CO
Cindy B. Wolf, MN
Committee on Sheep and Goats
Chair: Cindy B. Wolf, St Paul, MN
Vice Chair: Don P. Knowles, Pullman, WA

Derek J. Belton, NZ
Deborah L. Brennan, MS
Marie S. Bulgin, ID
John R. Clifford, DC
Max E. Coats, Jr., TX
Thomas F. Conner, OH
Linda A. Detwiler, NJ
Anthony M. Gallina, FL
Chester A. Gipson, MD
Jeffrey J. Hamer, NJ
Craig T. Hanson, SD
Steven G. Hennager, IA
David W. Hertha, AL
Joseph N. Huff, CO
Cleon V. Kimberling, CO
James W. Leafstedt, SD
Howard D. Lehmkuhl, IA
Mary J. Lis, CT
Jim R. Logan, WY
Linda L. Logan, APO
Gordon ‘Cobbie’ Magness, SD

David T. Marshall, NC
Michael R. Marshall, UT
Cheryl A. Miller, IN
Ron C. Miller, PA
Charles Palmer, CA
Kristine R. Petrini, MN
Michael R. Pruitt, OK
Suelee Robbe-Austerman, SD
Paul E. Rodgers, CO
Joe D. Ross, TX
Mo D. Salman, CO
William P. Shulaw, OH
Ben Smith, WA
Susan M. Stehman, NY
Diane L. Sutton, MD
Cleve Tedford, TN
David Thain, NV
George O. Winegar, MI
Nora E. Wineland, CO
David W. Winters, TX

Committee on Transmissible Diseases of Poultry
and Other Avian Species
Chair: John A. Smith, Baldwin, GA
Vice Chair: Julie D. Helm, Columbia, SC

Bruce L. Akey, NY
Alex A. Ardans, CA
John K. Atwell, NC
George P. Badley, AR
Marilyn F. Balmer, MD
Sue K. Billings, KY
Richard E. Breitmeyer, CA
Deborah L. Brennan, MS
Paul Brennan, IN
Max Brugh, GA
Karen E. Burns-Grogan, GA
Tony A. Caver, SC
Steven R. Clark, NC
Max E. Coats, Jr., TX
Stephen R. Collett, GA
Debra C. Cox, MD

Sherrill Davison -Yeakel, PA
Robert J. Eckroade, PA
Aly M. Fadly, MI
Steven J. Finch, MD
Tony M. Forshey, OH
Rose Foster, MO
Hashim M. Ghorai, AR
Eric N. Gingerich, PA
Robert Ross Graham, VA
Randy R. Green, DC
James C. Grimm, TX
Scott J. Gustin, AR
Nancy E. Halpern, NJ
Jeffrey J. Hamer, NJ
William L. Hartmann, MN
Chris S. Hayhow, KS
Committee on Transmissible Diseases of Poultry and Other Avian Species (continued)

Carl J. Heeder, MN
Fidelis N. Hegngi, MD
Ruud Hein, DE
Michael E. Herrin, OK
David W. Hertha, AL
Bill W. Hewat, AR
Donald E. Hoenig, ME
Frederic J. Hoerr, AL
Guy S. Hohenhaus, MD
Tom Holder, MD
John P. Huntley, NY
Mark W. Jackwood, GA
Eric L. Jensen, AL
Hailu Kinde, CA
Daniel J. King, GA
Patrice N. Klein, MD
Stanley H. Kleven, GA
Spangler Klopp, DE
Paul E. Knepley, PA
Kyle Kohlhagen, IN
Michael D. Kopp, IN
Shannon M. Kozlowicz, NC
David C. Kradel, PA
Ulysses J. Lane, NC
Hiram N. Lasher, DE
Dale C. Lauer, MN
Chang-Won Lee, OH
Randall L. Levings, IA
David J. Ligda, IN
Jose A. Linares, TX
Mary J. Lis, CT
Martha A. Littlefield, LA
Howard M. Magwire, MD
Jerry D. Maiers, NC
Edward T. Mallinson, MD
Sarah J. Mason, NC
MaryAnn T. McBride, NC
Andy McRee, NC
Hugo Medina, MN
Thomas R. Mickle, GA
Andrea Mikolon, CA
Andrea M. Miles, NC
Ricardo A. Munoz, ME
Donald S. Munro, PA
Lee M. Myers, GA
Thomas J. Myers, DC
Jill A. Nezworski, MN
Steven H. Olson, MN
Robert L. Owen, PA
Kristy L. Pabilonia, CO
Richard E. Pacer, MD
Mary J. Pantin-Jackwood, GA
James E. Pearson, IA
Jewell G. Plumley, WV
Kelly R. Preston, TX
James T. Rankin, Jr., PA
Willie M. Reed, IN
George D. Ritter, DE
Charles S. Roney, GA
A. Gregorio Rosales, AL
Michael L. Rybolt, DC
Y. M. Saif, OH
John P. Sanders, WV
David D. Schmitt, IA
Jack A. Shere, NC
H. L. Shivaprasad, CA
Marilyn M. Simunich, ID
Richard D. Slemons, OH
Joe Starcher, WV
Philip Stayer, MS
Bruce N. Stewart-Brown, MD
David L. Suarez, GA
David E. Swayne, GA
David L. Suarez, GA
Hilary S. Thesmar, DC
H. Wesley Towers, DE
Deoki N. Tripathy, IL
Susan C. Trock, NY
Don W. Waldrip, GA
Doug Waltman, GA
Gary L. Waters, MT
James A. Watson, MS
Michael J. Wood, VT
Ching-Ching Wu, IN
Ernest W. Zirkle, NJ
Committee on Transmissible Diseases of Swine
Chair: Mark Engle, Hendersonville, TN
Vice Chair: Harry Snelson, Burgaw, NC

Paul L. Anderson, MN
John K. Atwell, NC
Carter Black, GA
Philip E. Bradshaw, IL
Becky L. Brewer-Walker, OK
Corrie C. Brown, GA
Tom Burkgren, IA
Max E. Coats, Jr., TX
James E. Collins, MN
Gene A. Erickson, NC
J. Kieth Flanagan, FL
James M. Foppoli, HI
Nancy A. Frank, MI
Michael J. Gilsdorf, DC
Thomas J. Hagerty, MN
Ned C. Hahn, IL
Gregg Hawkins, TX
Michael E. Herrin, OK
Sam D. Holland, SD
Ken Horton, TX
Elizabeth A. Lautner, IA
James W. Leafstedt, SD
Donald H. Lein, NY
Bret D. Marsh, IN
David T. Marshall, NC

Chuck E. Massengill, MO
MaryAnn T. McBride, NC
James D. McKean, IA
Sandra K. Norman, IN
Gary D. Osweiler, IA
Richard E. Pacer, MD
Kristine R. Petrini, MN
Kurt D. Rossow, MN
Mo D. Salman, CO
David D. Schmitt, IA
Jeff Schnell, IA
Rick L. Sibbel, IA
Dennis Slate, NH
James E. Stocker, NC
Paul L. Sundberg, IA
Paul O. Ugstad, TX
Lyle P. Vogel, IL
Max Waldo, NE
Patrick Webb, IA
Margaret A. Wild, CO
Larry L. Williams, NE
Nora E. Wineland, CO
Paul Yeske, MN
Pam Zaabel, IA

Committee on Tuberculosis
Chair: Kathleen M. Connell, Olympia, WA
Vice Chair: Michael S. VanderKlok, Lansing, MI

John B. Adams, VA
Bruce L. Akey, NY
Joan M. Arnoldi, WI
Daniel R. Baca, TX
Lowell R. Barnes, IN
Derek J. Belton, NZ
Warren Bluntzer, TX
Bob H. Bokma, MD
Steven R. Bolin, MI
Richard E. Brimmeyer, CA
Becky L. Brewer-Walker, OK
Shane A. Brookshire, GA
Charles S. Brown, NC
Charles E. Brown, II, WI

Scott W. Bugai, TX
Erika A. Butler, ND
John R. Clifford, DC
Thomas F. Conner, OH
Robert A. Cook, NY
Ed Corrigan, WI
Daniel T. Crowell, NV
Donald S. Davis, TX
Jere L. Dick, MD
Phillip T. Durst, MI
Michael T. Dutcher, WI
Reta Dyess, TX
Anita J. Edmondson, CA
Dee Ellis, TX

34
Committee on Tuberculosis (continued)

Steven R. England, NM
Donald E. Evans, KS
John R. Fischer, GA
Dave E. Fly, NM
James M. Foppoli, HI
W. Kent Fowler, CA
Nancy A. Frank, MI
Bob Frost, CA
Tam Garland, MD
Michael J. Gilsdorf, DC
Velmar Green, MI
Jennifer L. Greiner, IN
Thomas J. Hagerty, MN
Steven L. Halstead, MI
Beth Harris, IA
William L. Hartmann, MN
Burke L. Healey, NC
Del E. Hensel, CO
Bob R. Hillman, TX
E. Ray Hinshaw, AZ
Donald E. Hoenig, ME
Sam D. Holland, SD
Fred Huebner, IA
Dennis A. Hughes, NE
John P. Huntley, NY
Carolyn Inch, CAN
Billy G. Johnson, AR
Jon G. Johnson, TX
Susan J. Keller, ND
Karl G. Kinsel, TX
Terry L. Klick, OH
Paul Kohrs, WA
Maria A. Koller-Jones, CAN
Steve K. Laughlin, OH
Maxwell A. Lea, Jr., LA
Jay C. Lemmermen, FL
Thomas F. Linfield, WY
Sharon L. Lombardi, NM
Konstantin Lyashchenko, NY
Stephen Maddox, CA
Daniel M. Manzanoares, NM
Bret D. Marsh, IN
Chuck E. Massengill, MO
John Maulsby, CO
George L. Merrill, NY
Robert M. Merrill, CO
Andrea Mikolon, CA

Michael W. Miller, CO
Michele A. Miller, FL
Henry I. Moreau, LA
Donald P. O'Connor, WI
Dustin P. Oedekoven, SD
Bruno Oesch
Kenneth E. Olson, IL
Mitchell V. Palmer, IA
Janet B. Payeur, IA
Kristine R. Petrini, MN
Michael R. Pruitt, OK
Anette Rink, NV
Nancy J. Roberts, OK
Nancy J. Robinson, MO
Enrique A. Salinas, MEX
Mo D. Salman, CO
Bill Sauble, NM
Shawn P. Schafer, MN
Galen H. Schalk, MI
Tom A. Scheib, WI
David D. Schmitt, IA
Stephen M. Schmitt, MI
Andy Schwartz, TX
Charly Seale, TX
Sarah B. S. Shapiro Hurley, WI
Les C. Stutzman, NY
George A. Teagarden, KS
Cleve Tedford, TN
Tyler C. Thacker, IA
David Thain, NV
Charles O. Thoen, IA
Kenneth J. Throlson, ND
Paul O. Ugstad, TX
Ray Waters, IA
Scott J. Wells, MN
Diana L. Whipple, IA
Dave Whittlesey, CO
Richard D. Willer, AZ
Delwin D. Wilmot, NE
Kyle W. Wilson, TN
Ross Wilson, TX
George O. Winegar, MI
Josh L. Winegarner, TX
David W. Winters, TX
Jill Bryar Wood, TX
Glen L. Zebarth, MN
Committee on Wildlife Diseases
Chair: John R. Fischer, Athens, GA
Vice Chair: Stephen M. Schmitt, Lansing, MI

Wilbur B. Amand, PA
Marianne Ash, IN
Keith E. Aune, MT
Daniel R. Baca, TX
John R. Behrmann, PA
Warren Bluntzer, TX
Charles S. Brown, NC
Kristina Brunjes, KY
Scott W. Bugai, TX
Erika A. Butler, ND
Robert A. Cook, NY
Walter E. Cook, WY
Joseph L. Corn, GA
Todd Cornish, WY
Daniel T. Crowell, NV
Donald S. Davis, TX
Thomas J. DeLiberto, CO
Leslie A. Dierauf, WI
Mark L. Drew, ID
Tim J. Feldner, MT
Bob Frost, CA
Frank Galey, WY
Robert F. Gerlach, AK
Paul Gibbs, FL
Kirsten Gilardi, CA
Colin M. Gillin, OR
Dean Goeldner, MD
Gregg Hawkins, TX
Donald E. Hoenig, ME
Sam D. Holland, SD
David L. Hunter, MT
Kevin Keel, GA
Susan J. Keller, ND
Karl G. Kinsel, TX
Patrice N. Klein, MD
Terry L. Klick, OH
Terry J. Kreeger, WY
Thomas F. Linfield, WY
Jim R. Logan, WY
Phillip M. Mamer, ID
Kristin Mansfield, WA
Chuck E. Massengill, MO
Leslie McFarlane, UT
Robert G. McLean, CO
Daniel G. Mead, GA
Robert M. Meyer, CO
Michael W. Miller, CO
Bruce L. Morrison, NE
Mitchell V. Palmer, IA
Glenn E. Plumb, WY
Kelly R. Preston, TX
Michael R. Pruitt, OK
Thomas J. Roffe, MT
Shawn P. Schafer, MN
D. J. Schubert, NJ
Sarah B. S. Shapiro Hurley, WI
Jonathan M. Sleeman, VA
David E. Stallknecht, GA
Joe Starcher, WV
Cleve Tedford, TN
Charles O. Thoen, IA
John “Brad” Thurston, IN
Kenneth Waldrup, TX
Diana L. Whipple, IA
Dave Whittlesey, CO
Margaret A. Wild, CO
Richard D. Willer, AZ
Jill Bryar Wood, TX
Taylor Woods, MO
Glen L. Zebarth, MN
II. 2007 Annual Meeting Proceedings

A. USAHA/AAVLD President’s Reception and Dinner
B. USAHA/AAVLD Scientific Session
C. USAHA Scientific Papers
D. USAHA Membership Meeting
E. Committee Business
   1. Committee Reports
   2. Time-Specific Scientific Papers
   3. Related Papers
F. Other Reports
   1. 2007 USDA-ARS Research Review
II.A. USAHA/AAVLD PRESIDENT’S RECEPTION AND DINNER

UNITED STATES ANIMAL HEALTH ASSOCIATION
(USAHA)

AMERICAN ASSOCIATION OF VETERINARY LABORATORY DIAGNOSTICIANS
(AAVLD)

PRESIDENTS’ RECEPTION AND DINNER
Sunday, October 21, 2007

SPONSORED BY IDEXX LABORATORIES

BARBARA POWERS, AAVLD and
LEE MYERS, USAHA,
PRESIDING
II.A. USAHA/AAVLD PRESIDENT’S RECEPTION AND DINNER

INVOCATION

Don Hoenig

MEMORIAL SERVICE

James Leafstedt

Let us honor our members who have passed away since the 110th Annual Meeting. In their death we are again reminded of the shortness and uncertainty of human life and the frailty of the ties that bind us to this earth. We recall with deep affection their friendship and with great respect, their contributions to our common life. We lift up our hearts to God on their behalf that they may find rest in the other world to which they have been called.

Let us remember John B. Healy and Norman O. Olson

Please bow for a moment of silent prayer.

Our deep sympathy and affectionate goodwill we express to their families. We pray that God may give them the blessing of peace.
II.A. USAHA/AAVLD PRESIDENT’S RECEPTION AND DINNER
RECOGNITION OF PRESIDENTS’ DINNER SPONSOR

IDEXX Laboratories, Bill Goodspeed
Welcome to Nevada. Nevada is delighted to host the 111th United States Animal Health Association meeting. I would like to thank both Dr. Thain and Dr. Rink for providing this opportunity to give the welcoming address. It is an honor and privilege to do so. I would like to take a moment to welcome Dr. Phillip LaRussa, Nevada’s new state veterinarian.

Nevada has been the fastest growing state in the nation for the past several years. The Nevada State Demographer’s office predicts that the population of Nevada will double in the next 20 years. The population of Las Vegas alone is expected to double from two to four million people in the next 10 years. We have five to 7,000 new people move into Las Vegas every month. Yet, agriculture is still the foundation of the state. The value of Nevada livestock production in 2005 was $308,162 million dollars. Eighty one point seven percent of the land in Nevada is rangeland, 13.2% is cropland, leaving only five percent of the landmass in Nevada for other uses. In addition, over 80% of the land mass is federally owned, requiring a great deal of cooperation between state and federal entities in order to make agriculture
II.A. USAHA/AAVLD PRESIDENT’S RECEPTION AND DINNER

sustainable. Nevada also faces the challenge of being the driest state in the nation, highlighting the fortitude and ruggedness of ranchers and farmers in the state. Given the challenges, Nevada, like the other states continues to experience the virtual explosion of the global market. With the ever expanding global market come added risks that must be addressed to ensure consumer protection and confidence as well as industry safety and security. It is so imperative the sound science continue to be the basis and forefront of protecting our nation’s animal health.

Thank you for selecting Nevada for your 2007 annual meeting. Again, welcome to the Silver state.
Good evening. I’m sorry I’m unable to be with you tonight, but I appreciate the opportunity to say a few words. First and foremost, thank you for your dedication to animal health issues. The increasingly global nature of the animal agriculture marketplace presents many opportunities for our producers. But it also creates challenges for our animal health. Now, more than ever, your work is critical. The U.S. Department of Agriculture is proud to partner with the United States Animal Health Association and the American Association of Veterinary Laboratory Diagnosticians to protect animal health. We’re addressing the
II.A. USAHA/AAVLD PRESIDENT’S RECEPTION AND DINNER

challenges facing us in a number of ways. First, we’re committed to the National Animal Health Laboratory Network (NAHLN). This network was established five years ago. It has since become a backbone of our surveillance and emergency response. It provides nationwide, standardized surveillance for high-priority diseases, such as BSE and Avian Influenza. It also gives us a capacity to test a large number of samples that would be required in the event of an outbreak situation. This network helps demonstrate to our trading partners that we can rapidly respond to diseases. It also shows that we have a method in place to verify that we are free of reportable diseases.

Another top USDA priority is the National Animal Identification System (NAIS). NAIS is designed to facilitate swift and effective disease response. Although this system is still being developed, we’ve made clear and significant progress. More than 420,000 premises in the United States are now registered, and 14 database systems are beginning to track individual animals. As more animal tracking databases come on-line, and the volume of animal movement records grow, animal health officials will have the important tools for conducting animal disease traceback. We’ve also developed a business plan that includes specific, measurable strategies that integrates NAIS and existing national animal health programs that we’ve built with you and our industry partners. We’ll be sharing a preliminary draft with you and the NAIS species working groups. We appreciate your review, and your prompt feedback.

The National Animal Health Laboratory Network and NAIS are just two ways we’re using science and technology to protect animal health. On a global scale, we believe in international accepted science-based standards for animal health. We think it is appropriate to establish worldwide trade based on these standards. We’ve made a commitment to work toward that goal, and we expect our trading partners to do the same. We took a major step forward in May, when the OIE formally classified the United States as a controlled risk country for BSE. I'll continue to press our trading partners to align their own import regulations with OIE guidelines, and give us full market access for our live cattle, beef and beef products, regardless of age.

In closing, all of the topics I have raised benefit from the established partnerships between our department and your organizations. I look forward to our continued collaboration as we
II.A. USAHA/AAVLD PRESIDENT’S RECEPTION AND DINNER

strive to protect the health of our nation’s livestock. Thank you for your time, and your commitment.
Welcome to the annual meeting of AAVLD and USAHA. This is indeed a very special meeting for us in AAVLD as we celebrate our 50th anniversary. This past Saturday morning, we had wonderful presentations by Robert Crandell, Larry Morehouse and Vaugh Seaton telling us of the beginnings of AAVLD and how we have progressed since then. This was followed by a number of informative presentations about the current and future directions of diagnostic veterinary medicine.

And how appropriate is it, as we celebrate our 50th anniversary, that this year is the first year that we have changed our accreditation procedure to meet new standards. While we have always had high standards to meet accreditation, we are now raising the bar even higher to meet standards based on OIE and ISO 17025. So this year is the first year that we are auditing laboratories to that level. We are very proud of the accomplishments of our AAVLD laboratories meeting this new challenge as we need to ensure all of our clients and users,
II.A. USAHA/AAVLD PRESIDENT’S RECESSION AND DINNER

including you in the audience, that our laboratories are providing quality and timely results. Now that we have successfully accomplished our goal, the next step is to communicate to you, the users of our laboratories, that we have met these standards, that we do have the quality results and why this is important to all of us. We also need to communicate to you the effort that goes behind providing these quality results.

It is also very appropriate to note that this year is the fifth year of the existence of the National Animal Health Laboratory Network (NAHLN), a partnership between USDA and AAVLD. Under the very able leadership of Barb Martin, the NAHLN has progressed tremendously within the past five-years and we just finished a 5-year review of the NAHLN, an effort coordinated by Terry McElwain. While the NAHLN has progressed tremendously in the past 5-years of its existence, it still has a long ways to go. Most importantly, we still do not have full funding for the NAHLN and we are lacking a specific line item in USDA’s budget to meet our funding needs.

This past year has been quite a busy one for AAVLD. Most notably was the response that we coordinated to the melamine and cyanuric acid pet food toxicity cases. The toxic agents then spilled over into agriculture feed. With the leadership of Wilson Rumbeia, we organized a survey of cases of pet food toxicity and then analyzed the results which were presented at this meeting. Our journal, Journal of Veterinary Diagnostic Investigations, was the first journal to publish the pathologic and toxicologic findings of this toxicity from work done at AAVLD laboratories. One good outcome, if there could be a good outcome of this incident, was that not only were we able to organize and coordinate a response, but it also pointed out the need for toxicology in the NAHLN. Therefore, with the leadership of Steve Hooser, we formed a work group to address the need for toxicology in the NAHLN. This work group is moving rapidly and has already has developed a white paper, a budget, a mission and vision statement, and is working on the rest of the charges provided to them.

A number of other initiatives and work groups have been formed this past year, including Aquaculture in the NAHLN led by Kevin Snekvik, in response to viral hemorrhagic septicemia. A work group, led by Paul Hauer, evaluating how we do proficiency testing by National Veterinary Services, has made tremendous progress in a short period of time working to standardize and make transparent to us how the proficiency test process is put
II.A. USAHA/AAVLD PRESIDENT’S RECEPTION AND DINNER

together, administered and evaluated. We also have a work group on issues regarding chronic wasting disease testing for the farmed elk industry, but more progress is needed on this.

These are just some of the many initiatives that are currently ongoing. In addition, we continue with our other activities and partnerships with USAHA and USDA. For the first time, we have a formal memorandum of understanding with USAHA for the organization of our joint annual meeting. It was most informative and enjoyable for me to attend the OIE meetings in Paris this past May and AAVLD is most appreciative to USDA to be able to have representation at this most important meeting. Finally, but not least, we have strengthened our relationship and communications with USAHA and USDA. We are all working together for the same cause and that is improvement and protection of animal health, ensuring our country of a safe food supply through animal agriculture and protecting public health. I wish to thank you all for the opportunity to serve as president of AAVLD.
AAVLD Awards  
Donal O'Toole  
Past President, AAVLD  

**Lifetime Membership** is awarded to any member of the AAVLD who has made an outstanding contribution to veterinary diagnostic laboratory medicine or to the Association. This year we honor five individuals with this award.  
Dr. Emmett Braselton  
Dr. Jim England  
Dr. Tony Van Dreumel  
Dr. Dan Gould  
Dr. Bruce Akey  

**Graduate Student Awards**  
**Best Oral Presentation** was presented to Dr. Joshua Daniels for Consolidation of virulence and antimicrobial resistance genes on plasmids of *Salmonella* Dublin.  
**Best Poster Presentation** was presented to Dr. Akinyi Nyaoke for Species identifications of *Exophiala* from investigations of phaeohyphomycosis in aquaria.  

**AAVLD Travel-Trainee Awards** are based on competitive applications from eligible graduate students. This year, two individuals were selected.  
Dr. Dodd Sledge  
Dr. Joshua Daniels  

**AAVLD Pathology Committee Award** was presented to Dr. Joshua Webster  

**AAVLD/ACVP Award** was presented to Dr. Jamie Bush.  

**Journal of Veterinary Diagnostic Investigation Manuscript Awards**  
Each year, AAVLD honors two papers judged to be the best of those published that year in the *Journal of Veterinary Diagnostic Investigation* (JVDI). The journal is an important centerpiece of AAVLD activity and recognition of those who excel in informing their colleagues about new knowledge is a strong endorsement of the scholarship of AAVLD members.  

**Best Full Manuscript, JDVI**  
This award is presented to Todd E. Cornish, et. al., Wyoming State Veterinary Laboratory for the manuscript, Comparison of ear notch immunohistochemistry, ear notch
II.A. USAHA/AAVLD PRESIDENT’S RECEPTION AND DINNER

antigen-capture ELISA, and buffy coat virus isolation for detection of calves persistently infected with bovine viral diarrhea virus.

**Best Brief Communication, JDVI**

This award is presented to Steven B. Kleiboeker, et. al., University of Missouri, for the manuscript, Simultaneous detection of North American and European porcine reproductive and respiratory syndrome virus using real-time quantitative reverse transcriptase-PCR.

**Pioneers in Virology Award**

This award is presented to Dr. Janice M. Miller, National Animal Disease Center, USDA-Agriculture Research Service.
One EP Pope Award is made annually to recognize a person who made a noteworthy contribution to the AAVLD and to advancing the specialty of veterinary diagnostic medicine. It is the highest award of our organization. On this, our first half century, it is appropriate it goes to a foot-soldier. By foot soldier I mean someone who willingly does much of the hard work of the organization behind the scenes, modestly and effectively. Without people like her the AAVLD could not function. This is not the most vocal member of our organization, but it is one of most thoughtful and hardworking. When asked to present this award, I was struck by how difficult it was to find information about her on the web. She is not someone who seeks publicity or awards.

The person we recognize this year has been head of her diagnostic laboratory since 2003. Before that, she was section head of bacteriology in the same laboratory. She worked as a research microbiologist in the medical nutritional field for seven years before returning to obtain DVM degree. She subsequently received her doctorate in veterinary preventive medicine from the Ohio State University.

Her work for the AAVLD includes serving on the AAVLD accreditation committee, a role that has become increasingly onerous as we migrated to standards consistent with those of the World Organization for Animal Health (OIE), and as more laboratories sought accreditation. Indeed, recently she visited my laboratory as part of an accreditation team. Those of you who have gone through an accreditation visit since the development of new standards will know what a nail-biting experience it can be. I and my staff were relieved and pleased to find how professional, observant, helpful and competent she was as a member of the team. Indeed, those are her primary strengths. We recognized immediately she volunteers for this work not to spot problems in other laboratories, but to help them become better. Her service on the committee is driven by one thing, to help move diagnostic laboratories to a higher standard, and to ensure they are recognized internationally.

Other services she made to the organization are working on the executive committee, chairing the AAVLD laboratory directors’ committee, serving on the editorial board of the Journal of Veterinary Diagnostic Investigation, and representing state
laboratories on the National Animal Health Laboratory Network’s steering committee. She was a founding member of the Johne’s committee in USAHA, and chaired the Johne’s serology quality control subcommittee. She also served on committees for the National Institute of Animal Agriculture. She met these commitments while running Ohio’s large and busy animal disease diagnostic laboratory. She maintained national accreditation of the ADDL, which was first accredited in 1997. She has seen the addition of her laboratory to the NAHLN, and to its participation in the Food Emergency Response Network. She helped integrate her state’s official analytical toxicology laboratory for horse racing into her laboratory. Several large capital improvement projects, such as a large laboratory addition, including a new necropsy laboratory, and the purchase of an alkaline hydrolysis unit have taken place under her leadership or with her strong support.

I am delighted to announce that this year’s recipient is Dr. Bev Byrum. Dr. Byrum and her husband Jim Byrum have two sons. Jamie is an MBA student at the OSU Fisher School of Business and Eric is a medical student at the OSU College of Medicine. I have not met either Jamie or Eric, but one of the few times when Dr. Byrum surprised me was when we got on the subject of American football. She is alarmingly enthusiastic about the sport, something that developed from her passionate support of her sons as college football players.

Veterinary diagnosticians are, I suppose, fools. We have grown up professionally in a culture where responsibilities are heavy, standards are high, the hours long. Much of what we do is somewhat invisible to policy makers until an animal disease emergency arrives, which it surely does and sometimes in surprising ways. As scientific public servants, we seek to ensure a safe and healthy food supply, and to deal with the day to day work while preparing for The Big One, such as a foot and mouth disease outbreak. People like Dr. Byrum could, if they were so inclined, have had a successful and remunerative career in private industry or as a researcher. Instead, she elected to devote her time, determination and optimism to the science and art of veterinary public health. I, and other members of my organization, are grateful for that. We are honored to have Bev as a colleague. We recognize her quiet dedication and hard work today. Bev, on behalf of our association, thank you for what you have done.
II.A. USAHA/AAVLD PRESIDENT’S RECEPTION AND DINNER

E.P. Pope Award
Presented to Dr. Beverly Byrum
AAVLD wishes to recognize this individual for over 30 years of service. Dr. Alex Ardans is invaluable and has dedicated years of service to help AAVLD become what it is today. From all of us, we thank you, Alex.

Dr. Alex Ardans was presented with a special award as retiring Secretary/Treasurer for AAVLD
USAHA President’s Remarks
Lee Myers

Twelve months ago at this meeting when I received the gavel as President of the United States Animal Health Association, I said the upcoming year would be one of “moving to pastures anew”. And, indeed, it has been a year of new initiatives and transitions.

The Association has a new Executive Director, Ben Richey, and a new office in St. Joseph, Missouri. This was no small feat considering the decades of proceedings, records, and memorabilia that had accumulated over time in the Richmond office. Many thanks go to the USAHA staff, J Lee Alley, and Dick McCapes for sifting through boxes, archiving historical proceedings, and driving office supplies and equipment cross-country. The transition has gone smoothly and we are fully operational in the new office with new association management. We appreciate the Under Secretary, Bruce Knight, taking time from his busy travel schedule to visit our St. Joseph office.

We have been collaborative partners in enhancing our nation’s laboratory capacity. I have not been prouder of the USAHA than when I represented the association at the dedication ceremony for the National Centers for Animal Health’s new High Containment Large Animal Facility in Ames, Iowa this summer.
I recognize that many of you had put forth great efforts to help accomplish this monumental achievement, and I was pleased that the USAHA was publicly commended on the podium with the Secretary of Agriculture for being a major factor in achieving the modernization plan.

Also this summer, I seized the new opportunity to testify before the U.S. House of Representatives Homeland Security Committee about food defense and post-harvest preparedness. In accordance with direction from the membership in the 2006 USAHA Resolution, I urged Congress to appropriate funding to states for the development of animal emergency management plans and implementation of sustainable animal emergency response capabilities. Agriculture and food defense has received less than 2 percent of the non-defense budget over the last five years and USAHA is on record requesting that Congress place safe and secure food as a top priority.

We are building new bridges with federal agency partners. The USAHA Executive Committee and the leadership of the newly established Center for Zoonotic, Vectorborne, and Enteric Diseases in the Centers for Disease Control have made a good start in developing new partnerships and collaborations in the spirit of the one health, one medicine concept.

I also had the pleasure of serving on the search committee for the new Director of the Plum Island Animal Disease Center. This speaks highly as to the confidence that the Department of Homeland Security has in the input, opinion and feedback of USAHA in selecting leadership for this facility that is so vital for researching and detecting animal diseases of high consequence.

I must thank my fellow colleagues on the Executive Committee for supporting another first in this organization that is celebrating its 111th year. As the first female President of the USAHA, I am deeply grateful for the full acceptance, respect and collegiality of the Executive Committee.

In closing, I am extremely pleased that my husband, Dr. Billy Myers, has accompanied me to this meeting. As a large animal practitioner, he keeps me grounded and reminds me of the real world of farm practice. Thank you, Billy, for being my biggest supporter and advisor.

As I turn over the gavel to our new President, Jim Leafstedt, continue to expect the USAHA to explore new pastures, provide a forum for active debate, and serve as the national leader in developing solutions for complex animal health issues.
II.A. USAHA/AAVLD PRESIDENT’S RECEPTION AND DINNER

At this time, I wish to take a moment, on behalf of USAHA to recognize and congratulate the American Association of Veterinary Laboratory Diagnosticians on their 50th Anniversary. Barbara, please join me at the podium. We present you with this plaque to commemorate your special occasion, and the invaluable partnership our organizations share.
II.A. USAHA/AAVLD PRESIDENT’S RECEPTION AND DINNER

USAHA MEDAL OF DISTINCTION AWARD

The USAHA Medal of Distinction is awarded annually to recognize one or more distinguished USAHA members who have demonstrated outstanding leadership, provided exemplary service, and have made significant contributions to the advancement of the Association.

The USAHA Executive Committee has selected an individual that has worked tirelessly to improve animal health and advance our organization for decades. It is my great pleasure to present the USAHA Medal of Distinction to J Lee Alley.

J Lee grew up on an Alabama Polled Hereford farm. The senior Alley also had a mercantile store, a drug store, and just in case, a funeral home. You might say the Alleys had all the bases covered! With his family’s influence, J Lee couldn’t have missed a career in animal health/production agriculture if he tried.

J Lee and his younger brother Lawrence spent their childhood working on the farm and raising show steers for their 4-H Club projects. One of their prize steers won the Grand Championship at the 1946 Birmingham, Alabama State Steer Show.

In 1950, J Lee attended Auburn University to study veterinary medicine where he was President of Blue Key, Treasurer of Alpha Psi, and a member of the Junior American Veterinary Medical Association, among other leadership positions.

After receiving his veterinary degree in 1956, J Lee began his veterinary career in Auburn as a USDA District Veterinarian. He worked with veterinarians, livestock producers and poultry producers throughout the southeastern region of Alabama. In 1959 he moved to East Lansing, Michigan to work as Brucellosis Epidemiology specialist and attend Michigan State University to increase his knowledge in Epidemiology. Three years of the Michigan winters was enough for his thin blood and it was back “South” for this southern boy.

From 1962 to 1967, he headed to Nashville, Tennessee and the post of Regional Epidemiologist. He met the love of his live, Eleanor Langston, married in 1967, and moved back to Auburn where J Lee served as the USDA Regional Epidemiologist over thirteen states.

In 1969 J Lee joined the Cooperative Extension Service and was in charge of Livestock Disease Prevention and Continuing Education for Alabama Veterinarians.
In 1971, J Lee vaccinated the first equine in Alabama against Venezuelan Equine Encephalitis.

Seven years later, he became the USDA Brucellosis Coordinator for Alabama and in 1979, accepted the appointment of State Veterinarian of the State of Alabama. Under J Lee’s guidance the State of Alabama became Hog Cholera Free, Tuberculosis Free and Pseudorabies Free. Alabama received Brucellosis Free status in 1998.

J Lee has been involved with the United States Animal Health Association since 1964, serving on the Executive Committee, Board of Directors, and Chairman of many Committees, including Parasitic and Hemoparasitic Diseases, Government Relations, Nominations and Resolutions, Brucellosis, Animal Health Information Systems, and Professional Oversight.

He was elected President of the United States Animal Health Association in 1991.

Spanning a 22 year career as State Veterinarian of Alabama, J Lee received numerous awards in recognition of his work in the animal industry, including a certificate of Appreciation for serving on the Secretary’s Advisory Committee on Foreign Animal and Poultry Disease. J Lee received the initial USAHA’s President’s Award in 2005.

Following Dr. John Shook’s retirement as Secretary of the USAHA for 20 years, J Lee has served faithfully in this position since 1999.

On January 2008, he will officially retire from one more job - one more time! His hobby has also been his work, but Eleanor says he is going to need a good lesson on how to relax and spend more quality time with his family.

His three beautiful grandchildren want and need more time with their Granddaddy, but I am told that they are willing to share him with USAHA whenever we need him.

The USAHA thanks you, J Lee and Eleanor, for your dedicated service to USAHA for more than 40 years, and counting! Congratulations, Dr. Alley.
This year, we are pleased to honor a second individual with this coveted award. This individual is familiar to each and every one of us and has worked diligently behind the scenes on the behalf of both AAVLD and USAHA.

It is my distinct pleasure to present the USAHA Medal of Distinction to Linda Ragland.

Every person attending this annual meeting should know this person’s name and face. And, odds are, Linda knows your name and face as well. Linda Ragland has remained the dedicated individual through the years as the names and faces of the USAHA officers have changed.

Although no one is exactly sure when Linda joined the USAHA staff, some of the old timers estimated 1974 was her start. I believe that made her about 10 years old at the time, right Linda?

Linda has been a vital part of our association for more than 30 years. She has worked with many of our past secretaries, numerous presidents, thousands of members, and seen a few
co-workers come and go. I would not fathom the number of membership dues, committee reports and USAHA News Alerts she has processed over the years. And each one with detail and passion for our organization that you would want from your administrator.

By our best calculations, this is Linda’s 33rd annual meeting. I’m sure there’s a few of you in the room that have been to more, but I would venture to guess that Linda would be hard to beat in terms of hours invested into the smooth operation of the USAHA Annual Meetings. I’ve been told she has a few favorite meeting locations—we would likely have the meeting in San Diego each year if it was up to her. She works tirelessly behind the scenes to ensure our meetings run like clockwork, and are enjoyable for everyone, spouses included.

For those of you that know Linda, she is a tiny bit of a worry wart. Actually, Linda is a big worry wart. Whether it’s balancing the books, updating the web site, or planning the meeting, her meticulous attention to detail has nurtured this Association.

Linda has established lasting friendships over the years with many of our members. I know she still gets calls from Dr. John Shook, among others, just to catch up on USAHA news. It’s that personable and kind-hearted touch that makes her contributions so enjoyable for all of us.

I am sure the past year of transition has been most difficult for Linda. Not only has she helped to transfer the records of USAHA and train our new executive director, she helped to archive historical data for the Association and ship the office halfway across the U.S. The administrative transition could not have gone more smoothly, in great part due to Linda’s calm manner and methodical approach.

Linda will be retiring at the end of this year. She will have more time with her family, especially the grandkids. And more time for her husband Clyde, who has supported Linda at USAHA all these years.

I received an email recently that I think sums up how we all feel about Linda:

“I want to express that Ms. Ragland has been a joy to work with over the years. When I first came to Wildlife Services in early 2002, Linda Ragland was the first person at USAHA I had contact with in getting my Deputy and Associate Deputy Administrator ready for the annual conference. Every year thereafter, she

62
II.A. USAHA/AAVLD PRESIDENT’S RECEIPT AND DINNER

has always been very helpful, resourceful, and professional in assisting and guiding me. I hope, and am quite sure, that when she retires, USAHA will give Linda the grandest retirement function that she so greatly deserves. One fit for a Queen. I am saddened that I will be losing my contact and friend, but look forward to working with whomever will be replacing Linda at USAHA, although she is irreplaceable!” - Dawn Johnson, USDA,APHIS, WS

I could not have said it better myself. Linda, tonight is your night. All these years you’ve managed to avoid being at the podium. Well tonight, you’re not off the hook so easily. Please help me express our deep gratitude to Linda Ragland as the recipient of the 2007 USAHA Medal of Distinction.
II.A. USAHA/AAVLD PRESIDENT’S RECEPTION AND DINNER

USAHA Special Recognition

Of the many people that help manage and administer USAHA and the annual meeting, there is one individual I would like to recognize this evening.

This person has been actively involved in the association for a number of years. Following his retirement in 1997, he came on board to assist Neal Black with the communications and information management for USAHA.

Larry Mark has served 10 years with USAHA. Among his accomplishments include strengthening the media presence of USAHA, as well as establishing and overseeing the first web site for the association.

Larry, you have been an asset to USAHA and we appreciate your service. If you could make your way up, we wish to present you with this plaque to recognize your 10 years of service. I would also be remiss if I didn’t mention if wife and assistant, Mary. Thank you, Larry.
Dr. Powers and I would like to present a Joint Presidents’ Award this evening to a special individual that has been of great benefit and support to both the AAVLD and USAHA. This evening, it is our pleasure to present a Joint Presidents’ Award to Dr. Ron DeHaven.

Dr. DeHaven has more than two decades of experience with the Animal Plant Health Inspection Service (APHIS) and gained national prominence in 2003 and 2004 when chronic wasting disease and bovine spongiform encephalopathy were making headlines. Dr. DeHaven became the public face of the nation’s response to BSE following the discovery of the disease at just before Christmas in 2003 in the United States.

He also led the campaign that eradicated exotic Newcastle disease in the Southwest – the first major foreign animal disease in the United States in 20 years – in one-third the time and with half the costs as the prior outbreak. The successful year-long eradication campaign involved 5,500 people and $175 million in emergency funding.

Dr. DeHaven received the President’s Rank Awards for his leadership, the Secretary’s Honor Award twice, and awards from many other professional organizations for his service in this capacity.

Prior to being selected APHIS administrator, Dr. DeHaven served as deputy administrator for APHIS’ Veterinary Services program and deputy administrator for the Animal Care Unit of APHIS. Prior to starting work at APHIS, Dr. DeHaven was commissioned into the U.S. Army Veterinary Corps and served in the U.S. Army Reserves and National Guard.

Dr. DeHaven has often represented the United States in delicate and often difficult trade negotiations. As the former U.S. Chief Veterinary Officer and U.S. delegate to the OIE, he routinely used his diplomatic skills as he facilitated agreements that are science-based. He was instrumental in building consensus that led to the current OIE BSE chapter.

He has routinely found creative solutions to issues confronting the agency – solutions that are within the bounds of our regulations, financially sound and politically feasible. In order to, to enact them, he built coalitions within the federal government, with state and local partners and with industry officials.
Additionally, AAVLD wishes to thank Dr. DeHaven for his support and involvement with diagnosticians. Particularly, we thank him for his leadership on the establishment of the National Animal Health Laboratory Network, something that is vital to protecting the food supply in this country.

Dr. DeHaven now serves as executive vice president of the American Veterinary Medical Association.
Candidates for the APHIS Administrator’s award must demonstrate their support for APHIS, our programs and animal health through various avenues. This can include research, regulation development, strategic planning, and program review.

But we also seek those individuals who challenge conventional thinking or approaches. Those who can see and appreciate the contributions of government in the advancement of animal health in the United States and the world, and who also see and appreciate the limitations in existing programs and methods. More importantly, they must have the appetite and zeal to roll up their sleeves and assist in making improvements.

This year’s APHIS Administrator’s award recipient has demonstrated repeatedly his appreciation of government’s contribution, his appreciation of its limitations, and his passion for trying to make it better.

Dr. Francois Elvinger is an Associate Professor of Veterinary Epidemiology at the Virginia-Maryland Regional College of Veterinary Medicine, Virginia Polytechnic Institute and State University.

He holds a Veterinary degree from the Hanover Veterinary School in Hanover, Germany and a PhD from the University of Florida’s Department of Dairy Science.

He has a diploma from the American College of Veterinary Preventive Medicine and also the European College of Veterinary Public Health.

He is a member of the American Veterinary Medical Association, the Virginia Veterinary Medical Association, the American Association of Veterinary Laboratory Diagnosticians, the Association of Teachers of Veterinary Public Health and Preventive Medicine, the United States Animal Health Association, and the European Society of Veterinary Epidemiology and Preventive Medicine.

Dr. Elvinger’s contributions to animal health improvements in the United States are focused upon information management, animal disease surveillance and the appropriate responses to the identification of disease.

Dr. Elvinger served as chair of the Committee on Animal Disease Reporting of AAVLD from 1994 to 1997. He was also a
member of the Committee on Animal Disease Surveillance and Animal Health Information of the USAHA during the same time period.

He coordinated a workshop titled “Identification and Consolidation of Existing Data Sources and Standardization of Disease Definitions and Reporting” in 1995 and was on the National Animal Health Reporting System subcommittee in 1996. This workshop was the genesis of the National Animal Health Reporting System or NAHRS.

NAHRS is a joint effort of USAHA, AAVLD, and APHIS. NAHRS was designed to provide data from chief State animal health officials on the presence of OIE reportable diseases in commercial livestock, poultry, and aquaculture species. It is intended to be one part of a comprehensive and integrated animal-health surveillance system and has become invaluable in APHIS’ ability to report the accurate status of animal health in the United States. Dr. Elvinger has served as the co-Chair of the NAHRS steering committee from 1998 to the present.

Dr. Elvinger also serves as co-chair of the AAVLD Epidemiology Committee and the joint USAHA and AAVLD committee on Animal Health Information Systems.

Since its inception in 2004, Dr. Elvinger has served as the chair of the National Animal Health Surveillance Steering Committee. This Steering Committee represents stakeholders and includes representatives from livestock and poultry industries, state animal health agencies, diagnostic laboratory organizations, academic institutions, private practitioner organizations, and relevant Federal agencies.

The NAHSS Steering Committee is charged with guiding APHIS’ National Surveillance Unit in the design, planning, and implementation of efficient and accurate surveillance for relevant animal diseases. It is in this capacity that Dr. Elvinger’s leadership, vision and passion for making things right has most benefited animal health in the 21st century.

Dr. Elvinger has demonstrated over many years his commitment to the improvement of livestock and poultry health and his willingness to work within the framework of governments at the state and national levels to bring those improvements to fruition.

Please help me in congratulating this year’s APHIS Administrator Award recipient Dr. Francois Elvinger.
II.A. USAHA/AAVLD PRESIDENT’S RECEPTION AND DINNER

Francois Elvinger, with APHIS-VS
Deputy Administrator John Clifford.
National Assembly Award
Jim Watson
President, National Assembly of State Animal Health Officials

The National Assembly Award is presented each year by the National Assembly of State Animal Health Officials. The Award is presented to an individual that is active in the field of state regulatory veterinary medicine and animal health, and continues to make significant contributions to this nation’s animal health programs.

The 2007 recipient of the National Assembly Award is Dr. Bob Hillman. Dr. Hillman is the Texas State Veterinarian, and held this position since 2003.

Hillman graduated from Texas A&M Vet School in 1971. He entered private practice in Northwest Texas and Southern Idaho during the 70’s. In 1981, went to work for The Idaho State Department of Agriculture and served as Assistant State Veterinarian for nine years. In 1990, he became State Veterinarian and Administrator of the Division of Animal Industries for the Idaho State Department of Agriculture. In April of 2003, Dr. Hillman moved back to Texas to accept the position of State Veterinarian and Executive Director of the Texas Animal Health Commission.

Hillman served as President of the U.S. Animal Health Association in 2001. He is currently the Chair of the USAHA Committee on Livestock Identification and serves on the Secretary’s Advisory Subcommittee for the National Animal Identification System.

Dr. Hillman received the 2005 APHIS Administrator’s Award for Animal Health at the United States Animal Health Association Meeting in Hershey, Pennsylvania.

It is my pleasure to present Dr. Hillman with the 2007 National Assembly Award.
II.A. USAHA/AAVLDPRESIDENT’S RECEPTION AND DINNER

Bob Hillman
II.A. USAHA/AAVLD PRESIDENT’S RECEPTION AND DINNER

THANKS TO SPONSORS
USAHA 111TH ANNUAL MEETING

AginfoLink
Allflex USA, Inc.
Colorado Serum Company
Computer Aid, Inc.
Global Animal Management
GlobalVetLink, LC
IDEXX Laboratories
Merial
Prionics, USA
Reindeer Owners and Breeders Association
Safe Supply of Affordable Food Everywhere (SSAFE)
II.A. USAHA/AAVLD PRESIDENT’S RECEPTION AND DINNER

Invitation to 2008 Meeting in Greensboro

David Marshall

On behalf of the United States Animal Health Association (USAHA) and the American Association of Veterinary Laboratory Diagnosticians (AAVLD), we’d like to thank you Director Rise for the gracious welcome to the State of Nevada. I personally have thoroughly enjoyed my last few days here in the Reno area, and have come to realize why Reno has earned the name of “the biggest little city in the world”.

It is truly my honor to invite all 50 states and the world to Greensboro, North Carolina for next year’s 112th annual USAHA and 51st annual AAVLD meetings. The event will be held at the beautiful Sheraton Greensboro Four Seasons Hotel and it’s adjoining Koury Convention Center, the largest complex of its type between Washington, D.C. and Atlanta, and one that has distinguished itself for exceptional facilities and service, and one that prides itself in its attention to detail. Many of you will remember this facility hosting our annual meeting in 2004, and might agree that the facility and meeting rooms are on par with
any site where we have met previously.

Despite this year’s abnormal record breaking temperatures and ongoing drought, late October in North Carolina typically is both beautiful and temperate, and Greensboro is a vibrant city of a quarter million in the heart of the state with many area attractions. From the complex itself, to the adjoining Four Seasons premier shopping complex, to our planned spouse and guest itinerary to local attractions, our department and staff promise to offer you a brand of Southern hospitality to which many of you have become accustomed.

Why North Carolina? For one, despite our expanding urbanization, we remain one of the top animal agriculture states in the nation. Of our $8 billion dollars of farm cash receipts generating over $63 billion dollars of related agribusiness economic activity, livestock and poultry now comprise approximately 61 percent of that figure. In fact, it has only been within the past seven years that animal agriculture has surpassed crops in agricultural economic impact to the state. We currently rank second in the nation in swine production, second in turkey production, third in poultry and egg cash receipts, and fourth in broiler production. That in addition to our large and diverse equine population and significant beef, dairy, and small ruminant industries. We feel all these factors will provide a perfect backdrop for a scientific meeting conducive learning and information exchange.

Again, thanks for the opportunity to invite you and your colleagues to North Carolina in 2008. It will be our honor to host this meeting and look forward to your visit. Please feel free to contact me or any of my staff if we can be of service between now and the meeting next October. Thank you.
II.B. USAHA/AAVLD SCIENTIFIC SESSION
EXAMINING THE ROLES OF USAHA AND AAVLD CONCERNING MAJOR ANIMAL DISEASES

MONDAY, OCTOBER 22, 2007

Co-Chairs:
Jim Leafstedt, USAHA, President-Elect
Grant Maxie, AAVLD, President-Elect

Moderator: Will Hueston
University of Minnesota
Safe Supply of Affordable Food Everywhere (SSAFE)

CONTROL OF VIRAL HEMORRHAGIC SEPTICEMIA VIRUS (VHSV) OF FISH

P. Gary Egrie
Veterinary Medical Officer, Aquaculture Specialist
Animal and Plant Health Inspection Service

While the title of this talk does not distinguish control efforts between wild and farmed fish populations, the purpose of the VHS Federal Order that Animal and Plant Health Inspection Service (APHIS) issued was primarily driven to prevent the spread of VHS from wild to aquacultured populations. Current surveillance evidence of the VHS epizootic has shown that the disease is restricted to wild fish populations in the Great Lakes watershed.

However, APHIS recognizes that the health of farmed and wild aquatic animal populations are linked, and at times resources may need to be applied for activities not traditionally thought to be the purview of an agriculturally based agency in order to appropriately structure Federal regulations. The intent is to protect farmed populations while minimizing the impact of those regulations on farmers, and to address pathogen vectors not easily controlled by regulatory actions.
When speaking of Salmonella in poultry, several categories of disease should be considered:

1) Those that are devastating to the production of poultry,
2) Those that cause disease in people but not in poultry,
3) Those that may cause disease in poultry and/or people and,
4) Those that cause little or no disease in poultry or people.

The reason to categorize these is to examine the incentives that apply for the control of each group. Salmonella biovar Pullorum (Pullorum disease) and Salmonella serovar Gallinarum (Fowl Typhoid) fall into the first group. The National Poultry Improvement Plan (NPIP) was established in 1935 specifically to set programs to control S. Pullorum and hence pullorum disease. Because these two strains were ovarian transmitted and could result in mortalities as high as 50 percent in progeny, the success of the entire poultry industry depended on controlling these diseases. Serological diagnostic tests were discovered that made the monitoring of these two species possible. The macroscopic tube agglutination test was described in 1913, which could detect carriers of the organism and the stained antigen whole blood test was described in 1931 that made testing for the infection fast and simple. With these tools and the cooperation of the rapidly growing poultry industry, the infection rate of S. Pullorum and S. Gallinarum was lowered from 15 percent to essentially zero percent in just a few years. This is an example of high incentive economic reason to control a disease as well as a successful cooperative disease control program for animal health.

Some of the paratyphoids, or motile serotypes, of Salmonella may exist with no signs of disease in poultry but cause illness if transferred to people. These are difficult to control since the poultryman might not even know that he had such an infection in his birds. The most common scenario for human infection is with contaminated carcasses of broilers or turkeys exiting the processing plant. Many times, the production flock will have shown no signs of disease and the bacteria will be found only when bird washes are conducted by the Quality Analysis crew.
II.B. USAHA/AAVLD SCIENTIFIC SESSION

at the plant. The incentive for controlling this group is obvious from a public health standpoint, and research is ongoing to help identify these scenarios and eliminate those bacteria that might enter the human food chain. Processing plant procedures for reduction of pathogens on processed poultry is common place in the commercial industry. More emphasis is currently being placed with on-farm procedures that can help prevent the pathogens from ever entering the flock, resulting in less bacterial load entering the plant.

*Salmonella* serovar Enteritidis (SE) causes disease in people but may or may not cause disease in poultry. However, when SE became associated with commercial eggs a few years ago, the incentive to control this disease in the egg industry became very high. It was found that SE could exist in the internal organs of the laying hen and then be transmitted into the egg, much like the transmission of Pullorum disease and Fowl Typhoid. A program to eliminate the infection in layer breeder hens was needed so an SE clean category was added to the NPIP in 1989 and with testing and vaccination of the parents, the incidence of SE in commercial layers dropped dramatically. Meat-type breeder chickens followed suit shortly thereafter, and the SE monitored program was implemented. All meat-type multiplier flocks are now placed on the pullet farm SE free. It is up to the production company to use best management practices to keep them that way.

Those salmonellas that cause no disease in poultry or people present a different incentive to control than the others. Since the Food Safety Inspection Service (FSIS) currently does not speciate those isolates found on broiler carcasses at processing, producers do not always know if these isolates are of public health concern. However, the isolation percentages allowed by FSIS are decreasing, and the incentive is rising to control all *Salmonella* species in poultry. As often happens, the primary breeders lead the way in controlling all species of *Salmonella* and most of the multiplier breeding stock is being supplied to the production companies free of all *Salmonella* species. There is still some infection that occurs in the multipliers after they arrive in the hands of the production companies, and this is the next area of incentive to control that will need to be strengthened. Much new information is becoming available regarding the control of the paratyphoids in production units, and NPIP programs such as U.S. *Salmonella* Monitored and U.S. Sanitation Monitored have been established to aid in their control.
II.B. USAHA/AAVLD SCIENTIFIC SESSION

So the question remains, “will we ever eliminate Salmonella from poultry”? Ever is a superlative term and cannot be reasonably answered. Will we control some Salmonella? We already are. With programs like the NPIP and FSIS we have a healthier bird and a cleaner meat and egg supply than we would otherwise. The better question is whether we need to eliminate Salmonella or just control those species of concern. With our increasing knowledge of competitive exclusion, we find that some bacteria can colonize the GI tract and prevent colonization of other, perhaps more virulent, species. There is even some speculation that our increased control of all Salmonella species in the primary breeders has contributed to an increasing infection rate of SE in multiplier birds, especially in the meat bird sector. This is not to say that we should decrease our control of Salmonella in general but rather that we concentrate on those species that cause problems, both economically and from a public health aspect. We should concentrate on best management practices that discourage all bacterial infections but place them in the scheme of production and processing where the infections of concern exist.

In summary, the NPIP has been an effective program for controlling certain types of Salmonella in the poultry industry. However, the industry remains fragmented as to the species that each sector emphasizes. Control of Salmonella can, and will, be done in the poultry industry. Elimination of Salmonella is probably not feasible or necessary. The control of Salmonella for each sector of the industry will depend on the incentives that exist for them, whether self imposed, public demand or regulatory.
II.B. USAHA/AAVLD SCIENTIFIC SESSION

CONTROL AND ERADICATION OF SCRAPIE FROM THE U.S.

Cindy Wolf
University of Minnesota

Historical Overview

In the fall of 2001, the National Scrapie Eradication Program (NSEP) was revamped. This was an Industry and Government-partnered effort. Key components included: Mandatory ID when sheep are in commerce or exhibited; Regulatory Scrapie Slaughter Surveillance (RSSS) for Detection of Infected sheep; and Removal of genetically susceptible sheep from infected flocks.

The Backbone of NSEP is mandatory ID. The industry and program goal is to eradicate Scrapie by end of 2010. To date, Real Progress has been made through Regulatory Slaughter Surveillance, Flock Investigations and Better Adoption of Tag Use, market driven, compliance activities and multiple benefits of ID. This is a true example of what can be accomplished when program funding is nearly adequate.

The program has demonstrated proof of progress. As a result of industry support and hard work by State and Federal regulatory personnel, there has been:

- From FY 2006 to FY 2007, there has been a 34 percent* decrease in positive black face sheep sampled at slaughter (.44 to .29 percent)
- 38 percent* fewer new infected flocks in FY 2007 compared to FY 2006
- All 50 States have met consistent state ID requirements, some are utilizing interim measures

*based on test results/statuses posted before October 10, 2007.

For FY07, RSSS Investigations, there were a total of 57 positives confirmed before Sept. 30 2007. Forty-three were successfully traced back to flock of origin, resulting in 34 newly discovered Infected or Source flocks. There were four positives untraceable—three of those with no official ID. Currently, there are 10 pending. In all, a net of greater than 75 percent were successful tracebacks.
II.B. USAHA/AAVLD SCIENTIFIC SESSION

Current Status

Current key program components include: ID Requirements; Regulatory Slaughter Surveillance; Ongoing research of key questions; Application of research findings, i.e. genotyping and its use, IHC, third eyelid biopsy, rectal biopsy; Indemnity; and Ongoing information dissemination

However, there are program components still needed. These include: Better antemortem test: easily obtainable biopsy, blood test or other fluid; continued indemnity; compliance by all stakeholders; consistency in states’ procedures of tracing forward and back; continued funding of research issues; additional ways of finding infected sheep and goats; and continued program support

Support of increased federal funding is also a major factor. It is estimated that the industry faces a several million dollar shortfall annually for what is needed to accomplish eradication. Additionally, enforcement of compliance is crucial.

The American Association of Veterinary Laboratory Diagnosticians (AAVLD) can play an important role by conducting enzyme-linked immunosorbent assay (ELISA) tests that are affordable, provide rapid turn-around time, and add benefits of genotyping and strain determination as well as validation to minimize level of false negatives

The industry would benefit from discounted fees for submissions to veterinary diagnostic laboratories if National Animal Identification System (NAIS) Premises Identification Number (PIN) or Scrapie Flock/Herd Number included.

For reference, a list of currently approved genotyping labs is available at: http://www.aphis.usda.gov/animal_health/animal_diseases/scrapie/app-labs-genotype-test.shtml. There are currently nine labs approved, and provide rapid turnaround time, low cost, easy to test.

Regarding scrapie in goats, there is a probability of lower prevalence, but would point to the need for increased surveillance. We need to examine more adult goat heads in veterinary diagnostic laboratories.
II.B. USAHA/AAVLD SCIENTIFIC SESSION

There is a new wrinkle to the genetic puzzle. Identification of non-classical scrapie strain(s) in the U.S. has been documented. Published characteristics from the European Union (EU) include:

- Lower prevalence within affected flocks
- Age more variable
- Different clinical presentation
- Role of codon 141
- Neuroanatomical distribution of lesions and PrP\textsuperscript{d}
- Characteristic Western Blot electrophoresis pattern
- Possible spontaneous etiology


![Bar graph showing ages of scrapie-positive sheep with respect to scrapie type.]


![Bar graph showing manner of death of scrapie-positive sheep with respect to scrapie type.]

There are three codons of the PrP gene are of main importance for classical scrapie susceptibility:

- 136
  - A=alanine
  - V=valine
- 154
  - R=arginine
  - H=histidin
- 171
  - Q=glutamine
  - R=arginine
  - H=histidin

- \( A_{136} \) \( R_{154} \) \( R_{171} \): resistant
- \( V_{136} \) \( R_{154} \) \( Q_{171} \): susceptible
- \( A_{136} \) \( F_{141} \) \( R_{154} \) \( Q_{171} \) or \( A_{136} \) \( H_{154} \) \( Q_{171} \): common w/Nor98

The recto-anal mucosa associated lymphoid tissue (RAMALT) Biopsy is a straightforward procedure, referenced to Gonzalez et al. Vet Rec 156:846-847 (2005). There is no anesthesia or sedation required. The procedure is outlined as follows:

- Obtain relatively large samples of follicle-containing mucosa (up to 120 to 130 mg), potentially allowing use of high throughput techniques for abnormal PrP detection
- Procedure reports no adverse effects:
  - bleeding is occasional and minimal
  - any post-procedure discomfort is undetectable, i.e. animals keep eating and behaving normally
  - Postmortem examination of the rectal mucosa of sheep from which biopsies had been taken 10 to 15 days before indicated uncomplicated healing.
- Biopsies can be carried out repeatedly on the same sheep without detrimental effects for the sheep or the number of follicles.

Figure 1 (next page) Typical high frequency (HF) and low frequency (LF) filtered tachygrams on which a fast Fourier transformation is done to give estimates of heart rate variability (HRV) in different frequency bands. The reduced HRV is indicated by the flatter lines in the infected sheep. Glover, D G et al. Gut 2007;56:1329-1331
Figure 1
Bovine viral diarrhea virus (BVDV) is recognized as a cause of substantial production and economic loss to the cattle industry in the United States. Losses are associated with a range of clinical entities and include reproductive and respiratory as well as secondary disease from BVDV-induced immune suppression. Reduced pregnancy rates in cows have been documented in herds with persistently infected (PI) calves present, and modeling including pregnancy rate loss, increased death loss and reduced weaning weight suggests about $15-25 cost per female if PI calves are present at the cow/calf level. Mixed results as to effects of PI animal presence in feedlots have been found, although BVDV in feedlots is regarded as a major pathogen. Persistent and transient (acute) infections are components of BVDV disease. PI calves are born as a result of infections at approximately 1.5 to 4 months gestation and as progeny of PI females. PI BVDV animals are the primary reservoir of the virus in populations and shed high amounts of virus to other contacts and the environment. Elimination and prevention of PI BVDV animals in cattle herds are critical components for controlling BVDV.

Organizations including the Academy of Veterinary Consultants (AVC), American Association of Bovine Practitioners (AABP), and the National Cattlemen’s Beef Association (NCBA-Cattle Health and Well-Being Committee) have endorsed the need for higher levels of effective BVDV control. Additionally, the United States Animal Health Association (USAHA) passed a resolution in 2006 supporting the livestock industries in adopting measures to control and target eventual eradication of BVDV from North America. Discussions by organizations have focused primarily on control strategies and education as the primary focus of efforts. 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.
Biosecurity, biocontainment, vaccination to prevent birth of PI calves and surveillance plans to assess herd BVDV status are generally recognized as the fundamental components of BVDV control plans. Control strategies embraced by all interests, including scientific disciplines, veterinary practitioners, and cattle producers with broad participation will enable successful control at levels targeted by the industry as a whole. Diagnostic laboratories have developed excellent tests for PI BVDV identification and are offering testing services. Use of scientifically valid, cost effective surveillance is needed for better detection of BVDV-infected herds.

The cattle industry is involved at various levels with BVDV control. Goals related to BVDV control are evolving and may or may not include eradication as an ultimate target. Control plans must be effective and economically beneficial to present and changing production systems. Participation by all aspects of the industry will expedite accomplishment of goals related to control of BVDV.
II.B. USAHA/AAVLD SCIENTIFIC SESSION

CONTROL AND ERADICATION OF PORCINE REPRODUCTIVE AND RESPIRATORY SYNDROME VIRUS

Scott Dee DVM MS PhD Dipl:ACVM
Professor, Department of Veterinary Population Medicine
University of Minnesota College of Veterinary Medicine

It is indeed an honor to be selected to participate in this prestigious meeting and represent the University of Minnesota swine medicine faculty. My presentation will focus on the 4 main objectives assigned by the program committee co-chairs which include:

1. A review of the current science of the disease
2. What is the status of the development of solutions to eradicate the disease?
3. What tools are absent which could facilitate eradication?
4. What role can the AAVLD and USAHA play in assisting the process?

However, before we begin, I would like to provide a brief overview of the disease of porcine reproductive and respiratory syndrome, or “PRRS” as it is known throughout the global swine industry.

Overview

Porcine reproductive and respiratory syndrome (PRRS) clinically emerged on the North American and European continents in the late 1980’s. PRRS is caused by porcine reproductive and respiratory syndrome virus (PRRSV), an enveloped, single-stranded positive-sense RNA virus classified in the order Nidovirales, family Arterividae, and genus Arterivirus. Arterividae possess the ability to produce persistent infections, induce a prolonged viremia and undergo genetic change through mutation and recombination, limiting the efficacy of conventional control methods, such as vaccination. Clinical signs of PRRS include third trimester abortion, high levels of stillborn piglets and mummified fetuses, elevated pre-weaning and post-weaning mortality, along with reduced growth performance. PRRS has been estimated to cost the U.S. swine industry 560 million dollars per year, with 88 percent being attributed to the post-weaning period (Neumann and others, JAVMA 2007). The inability to successfully control PRRS across all farms via conventional
means, along with the excessive cost of the disease has led to thoughts regarding the potential for eradication. In 2006, the American Association of Swine Veterinarians took the first step and published a position statement that “Eradication of PRRS from the North American pig population is the long-term goal”. With this statement, the swine veterinary profession has drawn a “line in the sand” and has made it clear that the industry cannot afford to live with PRRS. While it is not yet clear how this goal will be achieved or how long it will take, it is clear that “status quo” is no longer an option. With this in mind, we can now move forward and deal with the 4 stated objectives:

A review of the current science of the disease
At this time, while a great deal of knowledge exists about the PRRS virus, a great deal more still needs to be learned. For example:

1. The entire genome has been sequenced, but the specific sites that code for virulence and protective immunity are as of yet unknown.
2. Long-term persistent infection has been reported, but its mechanism and the ability to detect carriers remains unclear.
3. Multiple components of the immune response to PRRSV have been identified; however, the role of the cellular and humoral responses in providing protection is not well understood.
4. Several routes of transmission have been identified and the ability to prevent spread between populations has recently been validated.

What is the status of the development of solutions to eradicate the disease?
Multiple methods to combat PRRS are available, including vaccines, methods of eradication and protocols of biosecurity. Commercially available vaccines are either killed or modified live preparations. Recent investigations into the potential for the use of modified live vaccines in eradication programs indicated that while they do prevent transmission and reduce clinical disease, they do not prevent re-infection eliminate the virus from the body of the pig (Cano and others, Vaccine 2007). Therefore, their role in eradication programs remains to be seen. In contrast, eradication protocols, such as depopulation-repopulation, test
and remove and herd closure are time-tested, validated methods for successfully elimination PRRSV from infected populations. Recently validated protocols of biosecurity, including air filtration have been validated experimentally and favorable results are being reported from the field. In addition, voluntary attempts at regional eradication efforts are underway in many states, including Minnesota, Missouri, and Georgia and a great deal of success has been achieved. In conjunction with these efforts, teams of producers, practitioners, academicians and industrial partners are banding together to explore the potential for wide-scale eradication. These groups have been established at the continental level (AASV North American PRRS Eradication Task Force), the provincial level (Ontario Swine Health Advisory Board) and at the state level (Minnesota PRRS Eradication Task Force). It is exciting to see these unified, collaborative efforts coming forward and providing leadership to the swine industry and veterinary profession.

What tools are absent which could facilitate eradication?

Since the possibility of differential vaccine development is unknown and is clearly a long-range venture, another tool which is sorely needed and is already in the process of development in the AASV PRRS eradication risk assessment tool. A gift from Boehringer-Ingelheim to the AASV, this tool is a computer-based assessment of interior and exterior risk factors organized in the form of a questionnaire that is administered to producers by trained veterinarians. The tool allows vets and their clients the ability to compare its level of risk to other farms in the database and the farm’s improvement in its biosecurity program and the impact these efforts have on reduction of its internal/external risk score. At this time, the tool has been focusing on the breeding herd; however, plans to launch a web-based version in 2007 as well as to initiate development of a grow-finish version of the tool are underway.

What role can the AAVLD and USAHA play in assisting with the process?

Perhaps the most important role any governmental organization can play is to insure that PRRS does not become a regulatory disease. This would truly cripple the industry and eliminate all chance for garnering wide-scale producer support for PRRS eradication. In my opinion, based on the way
II.B. USAHA/AAVLD SCIENTIFIC SESSION

the North American industry has developed into an “industry on wheels” following the wide-scale adaptation of multi-site production, resulting in the continuous movement of pigs across state, provincial and continental borders attempting to prohibit movement by issuing a quarantine would do irreparable harm to countless producers. Therefore, I suggest that governmental agencies serve as a source of funding and technical expertise in areas which their personnel excel and are well-trained, such as coordinating regional surveillance, the implementation of eradication pilot projects and producer/veterinarian education.

In conclusion, the take-home messages from this lecture are:
1. PRRS is an economically significant disease of swine
2. A voluntary, science-based eradication program is the only option for the North American industry.
3. Producer support of PRRS eradication is essential for success.
4. Governmental agencies can play an important role by collaborating with the AASV and NPB in an effort to achieve the long-term goal.

If these basic principles are practiced, the chances of successful PRRS eradication will be significantly improved. Thank you very much, once again for the opportunity to join you today.
II.B. USAHA/AAVLD SCIENTIFIC SESSION

THE CONTROL OF EQUINE INFECTIOUS ANEMIA (EIA) SHOULD TAKE SOME NEW DIRECTIONS

C.J. Issel
Gluck Equine Research Center
University of Kentucky

T.R. Cordes
National Coordinator for Equine Programs
USDA-APHIS

S. Halstead
Michigan Department of Agriculture

Introduction

Horse owners in the United States pay over $50 million each year to test for equine infectious anemia (EIA). What return are they getting for their money? How concerned should they be about EIA? This article attempts to put EIA in a contemporary perspective and offers suggestions for an improved benefit/cost ratio for continued and improved/expanded surveillance testing. Our message essentially paraphrases a homily as follows: It is better to have tested and found a positive than never to have tested at all. In our opinion, if any stigma is associated with EIA, it should be applied to owners of untested horses, not those who own test-positive ones that are safely quarantined 200 yards from other equids.

National testing statistics for EIA have been prepared annually since 1972 by the USDA from reports filed by individual states. These numbers are presented on the following website and can be analyzed by a number of parameters: http://www.aphis.usda.gov/animal_health/animal_diseases/eia/web-mapping.shtml. The basis for improved testing for EIA have been presented earlier and is present by internet search from the following USAHA site: www.usaha.org/meetings/2004/2004_USAHA_Proceedings.pdf

II.B. USAHA/AAVLD SCIENTIFIC SESSION

EIA as an Infection/Disease

Equine infectious anemia (EIA) is also known as swamp fever." The name invokes fear in many, especially those who have never experienced the disease but who have grown up with horses. The disease is caused by the equine lentivirus—equine infectious anemia virus (EIAV). It causes a persistent, incurable infection in equid hosts and is diagnosed by presence of antibodies against the virus in the Coggins test and approved ELISA test formats.

Testing for EIA and removal of EIAV carriers since 1972 has reduced the chance of encountering infected horses. In 2007, according to statistics compiled by the USDA, in the United States just over two million samples were tested and 120 test-positive horses were reported (0.006%).

This article is written to put EIA in perspective and to discuss options/give suggestions for modifying our approach to control of this infection/disease, especially in the Western States where EIA is rare and where routine testing for EIA occurs at lower rates.

The authors represent 34 years of research on EIA (Issel), and over 40 years of collective practical experience and wisdom gained through veterinary practice and as state/federal animal disease regulatory officials (Halstead-Michigan and Cordes-USDA).

Readers are referred to the USDA web site where more detailed information can be found in downloadable brochures and control guides (published as Uniform Methods and Rules), and video order forms: http://www.aphis.usda.gov/vs/nahss/equine. A new DVD video on EIA is being produced by USDA for release in 2008.

The Threat

With the advent of the Coggins test in 1972, we were for the first time able to diagnose EIA accurately. Initially EIA was diagnosed at high rates on farms and facilities where clinical cases had been suspected before Coggins testing was available. Once the initial waves of testing subsided, the majority of new cases found were without overt clinical signs of disease: no episodes of fever, anemia, depressed attitude, dramatic weight loss, dependent edema, or decreased platelet counts, often leading to death, typical of the so-called swamper with the chronic form of the disease.
Since 1980, the vast majority of new cases reported in the U.S. have been inapparent carriers. Probably two major factors led to this change: selection against the virulent strains of EIAV by removal, usually destruction, of the diseased horse, and reduction in the transmission of EIAV by people who had indiscriminately used contaminated needles and syringes.

Test-Positive Equids

Because the EIAV mutates at a high rate and virus levels in the blood of infected horses change through time, the risk of transmission from any one EIAV-infected horse cannot be predicted with accuracy, either by direct observation or with highly accurate laboratory tests. This is especially true if you are trying to predict the future. Because of the aforementioned and the fact that all infected horses remain infected for life, disease control officials assume that all EIAV-infected equids pose the same high risk for transmission, regardless of their clinical status or history.

The high potential for transmission is often realized when the inapparent carrier horse is chemically immunosuppressed (dexamethasone treatment) or physically stressed. Horses that have been clinically quiescent for years can be provoked by such treatments to release immune control on virus replication. The result is a dramatically higher level of EIAV in the circulation (often 100,000 fold higher within days of such treatment). These spikes in virus release might be accompanied by acute clinical signs of disease, especially fever, which might be of short duration and missed without daily temperature recordings.

In the absence of man, transmission of EIAV is via mechanical transfer of blood between horses by contaminated mouthparts of blood-feeding insects that have been interrupted in their feeding on an infected host. In contrast to West Nile virus, EIAV does not replicate in the vectors. Horse flies and deerflies are the most efficient vectors, and the chance that they will transfer the infection is directly related to the level of virus in the blood.

During the inapparent stage of infection, virus levels are generally low and the chance of transmission is lower than during periods of disease. When a horse is immunosuppressed, EIAV is found in dramatically higher levels.

During acute signs of EIA, a single horse fly has been shown to transmit the infection from the horse with fever to a susceptible one. Although the process is not very efficient,
II.B. USAHA/AAVLD SCIENTIFIC SESSION

horses rarely encounter individual blood-feeding vectors. When horses encounter thousands of vectors daily, the risk increases proportionally.

Management

Control efforts have included segregation of test-positive horses (a distance of 200 yards is considered adequate to break transmission by blood-feeding insects) and recommendations to humanely destroy the animals. Often, owners of test-positive equids do not have the physical facilities to safely segregate the individuals and meet requirements imposed by animal disease regulatory bodies in their states.

Field studies have demonstrated a spectrum of results when test-positive equids are segregated. In some cases when test-positive equids are gathered without knowledge of their past history, clinical signs of EIA are seen within months and morbidity and/or mortality prompts the recommendation to destroy the EIAV carriers. In other cases, groups of inapparent carriers have been kept for years without presentation of clinical signs of EIA and with normal expected reproductive and athletic performance, in most cases limited because of the conditions of quarantine.

Thus, with proper management and strict adherence to maintaining a 200-yard separation from other equids, some test-positive equids can have long, productive lives, if given the chance. Most owners, however, do not have the physical facilities, patience, and dedication needed to establish and maintain such quarantine sites, and many state regulations do not currently permit them.

An exception is a quarantine site permitted under rules in the state of Florida: The FRIENDS Ranch. This not-for-profit group was established initially under a different name in the 1970s and has grown to the point where, at last count, 45 test-positive horses are maintained, adopted, and sponsored by individuals. The horses are used on the quarantine site for recreation and in limited in-house competitions/events. As of January 2007, they had an additional 15 test-negative horses on the site, and none of them have acquired the infection. One such horse (One-eyed Red) was in contact with the positive band for more than 10 years and died as an aged test-negative horse. (The FRIENDS Ranch website is: http://www.eiahorses.org.)

EIA is one of easiest infectious diseases of horses to control. Test for antibodies, segregate those that are positive and
II.B. USAHA/AAVLD SCIENTIFIC SESSION

the problem is solved, especially if you retest contacts after 60 days to cover the expected incubation time (from exposure to first positive antibody test.) Control is simplified because the only known reservoirs of the infection are persistently infected equids, and all infected equids develop antibody against the virus that we can detect with accuracy in serologic tests, the AGID (or Coggins) test, and ELISA tests.

We have the tools to better control or eradicate EIA in the United States. All that would be needed is to test every equid today, segregate the positives, then quarantine and retest all equids exposed to the positives (within the previous 60 days) 60 days later. Continue until all exposed equids prove test-negative. While this is not practical on the national scale, this same approach can be used to render stables, communities, regions, et al, free of the infection.

The Quandary

Taken together, the risks posed by the test-positive horse can be effectively managed by maintaining spatial barriers (200 yards). In spite of this, most agencies recommend destruction of the test-positive horse, in part because many owners who have the option and decide to keep the EIAV carrier receive negative feedback from other owners for keeping the infected horse and follow recommendations to euthanatize within a few years anyway.

We have put that into words as: the psychological risk of keeping the EIAV-infected carrier far exceeds the biological risk. In fact, a quantitative risk assessment comparing untested and safely quarantined horses tells us that the risk of acquiring EIA from an untested horse in the U.S. today is about 100,000,000 times greater than from a quarantined test-positive EIAV carrier 200 yards away.

It is our hope that increased knowledge will help horse owners understand the manageable risks associated with EIA, and encourage additional testing to define the remaining reservoirs of infection. Once identified, they can be safely managed.

Today, surveillance testing of apparently normal horses could result in a positive test that can be fatal for a lack of practical options. For some owners this is sufficient justification not to test. If owners are serious about control of EIA, states/regions might need to provide viable options for safe management of test-positive EIAV carriers, especially if it would lead to better identification of untested reservoir populations.
II.B. USAHA/AAVLD SCIENTIFIC SESSION

Need for Accurate Numbers

We estimate that owners have paid in excess of $700 million since 1980 to test for EIA. The number of test-positive equids reported annually by the states to the USDA has been on a gradual downward trend since 1980, when there were 4,635 positive horses identified. In subsequent years the numbers of positive horses dropped to a low of 120 in 2007.

For comparison, from 1974 to 1976, over 10,000 positives were reported each year. Since testing statistics were first compiled, over 100,000 positives have been reported in the United States.

Although the numbers give trends from which useful data can be gleaned, they do not represent accurate rates of infection expected in the general population. The results are biased toward negative because the same negative horses are tested each year, often required for entry to competitions, to cross state lines, etc. It is not surprising then that many of the new cases of EIA are found on individual premises where testing has not previously occurred. Such previously untested reservoirs represent a major challenge that must be addressed in future EIA control strategies. For example, from 2003-2004, all cases reported from Nevada were on one ranch. Such anomalies of distribution have been reported each year and explain unexpected increases in reported numbers.

From the above data, various stories could be told, but their accuracy would be questioned because the samples are not representative of the population at risk. For example, in Nevada in 2003, 0.18 percent of reported samples were positive, a misleading estimate of the expected infection rate in the state. If the positive cases on the one ranch are deducted, not one of the samples from Nevada was positive.

The point is this: statistics can be misleading, especially if they are based on inaccurate data collection. When accurate numbers for the population at risk are known and when testing is performed using an unbiased scientific method of sampling, then reliable data are generated and we can speak with authority and precision. This point is discussed further below.

Costs for Testing

From a distance, the testing statistics look compelling. Numbers of test-positive horses have decreased from 10,000 per year to less than 200 per year while the number of horses tested has nearly quadrupled. The rate of positives has gone from
II.B. USAHA/AAVLD SCIENTIFIC SESSION

1.7 percent in 1975 to 0.006 percent in 2007, nearly a three hundred-fold reduction. The risk of encountering an EIAV-infected equid in the mobile and tested horse population is virtually zero today. We have attained this position at great expense to individual horse owners. Today it could be argued that testing the same negative horses each year does not protect our horses against EIA, does not effectively address the untested reservoir of EIA, and is greatly in excess of the risk.

This is probably best exemplified by reviewing reported testing data from 11 states in the Northeast (Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, Pennsylvania, New Jersey, Delaware, Maryland). We have estimated that owners there have paid almost $1.5 million to find each test-positive equid over the last six years (from 2001-2007).

In 2006, if the 66 cases found on a single premises in Minnesota and the 0 on one other premises in Mississippi are subtracted from the statistics, over $50,000,000 was paid by owners to find 101 new cases of EIA in the U.S., nearly $500,000 to find each new positive horse.

Can We Do Better?

We can, and we must, if we wish to maintain the confidence of owners. In 2004, the U.S. Animal Health Association passed resolutions forwarded from the Infectious Diseases of Horses Committee that urge the creation of formal Cooperative Programs between states and regions with the USDA for development of more effective programs to protect equids against EIA. For example, if the states in the Northeast region changed their testing requirements from 12 months to 36 months and waived additional testing for movement between those 11 states, testing costs would drop substantially at no additional risk for EIA. If at the same time a negative test was required for each change of ownership, the public would be protected better than they are today and at lower costs.

New Positives: Where and Why?

Analyses of testing results from each state until now have not been published. If we knew where and how most new cases of EIA have been found, that knowledge could be used to improve the benefit/cost ratio. Several years ago, Dr. Bob Harbison was monitoring testing statistics in Arkansas after an annual test and
a “change of ownership” test were required. His analysis, which has not been published, suggested that the majority of new cases were found when previously untested horses were sold. Similar results have been seen in Texas since their change of ownership requirement was adopted.

Year after year, such new foci of infection are discovered throughout the United States. A thorough analysis of testing and epidemiologic data should be performed by state and by region across the United States to generate sound data that could be applied to improve future control efforts.

New National Thrusts:

In 2004, the USDA was requested to begin development of a National Cooperative Control Program for EIA that is to be based on addressing the professed needs of states and regions. As alluded to above, if state and regional animal disease regulators found that horse owners in their area widely supported reduced testing and that analysis indicated that such a change would not increase the risk of EIA, then the USDA could be empowered to help establish and monitor such a plan with the hope of additional financial support for other perceived needs for the control of EIA in the area. It is our intention to assist the educational and other support needs for this program development.

The entire control program for EIA is based on accuracy of test results. Today, in addition to the Coggins test we have approved ELISA laboratory tests for EIA that are less subjective and whose results are less dependent on interpretation than in the Coggins test. By combining the powers of the ELISA tests and the Coggins test, more accurate results are possible. Because of this, the state of Oklahoma requires that all private laboratories who test horses in Oklahoma for EIA use ELISA tests, and forward any positive samples to the state laboratory where confirmation testing using ELISA and Coggins tests are performed. By adopting this strategy (originally proposed as a national three-tier laboratory system), Oklahoma feels they are more accurately reporting the status of the horses tested.

Our goal is to continually review and capitalize on the strengths and advantages of the approved diagnostic tests for EIA for most accurate test results possible, improving on the excellent results provided by the Coggins test over the last 35 years.
II.B. USAHA/AAVLD SCIENTIFIC SESSION

Regional Arrangements

Until now, each state has controlled EIA according to its own priorities. Few interstate agreements have existed. One, between Oregon and Washington, permits the movement of equids between them without having to meet the EIA import testing requirements imposed on equids moving from other states. In other words, these state disease regulators assume that the risk of EIA in both states is equivalent and in-state requirements should be applied to equids in both states. In order to accurately estimate the risk of EIA needed to develop such agreements, most states would require statistical analyses to establish accurate estimates of the expected rate of EIA in their state and surrounding states. Once such estimates are available, we think owners of horses would choose local, state, and regional programs that are effective in reducing the risk of EIA and that are cost-effective. There would be tremendous cost savings to owners if regional control programs for EIA were adopted. When coupled with adjustment of testing intervals (generally reduction to every 2-3 years depending on accurate risk estimates), savings to owners annually could easily exceed $25 million!

National Control Program

Scientists and disease regulators are convinced that effective control of EIA must utilize the most accurate techniques for the diagnosis of the infection in practical and cost-effective strategies supported by owners of equids in their regions.

Thus, in areas where the risk of EIA is low and where a high percentage of horses have been tested, analysis of data might support regional programs that would reduce routine testing and increase the level of testing at those points considered at highest risk, e.g., at change of ownership. Once agreements are made with strong industry support, funds from the USDA could help initiate, monitor, and sustain such efforts.

In areas where testing is not required except for entry into the state, owners and regulators might decide that testing should be recommended/required for all changes of ownership. If analyses indicate that this is a high-risk point, funds might be applied to help sponsor such testing.

The only federal EIA regulation today applies to movement of test-positive equids across state lines, where both federal and state permits are required. The request to the USDA to establish the cooperative control program indicates that no additional
II.B. USAHA/AAVLD SCIENTIFIC SESSION

national requirements will be added. States and regions could agree to area-wide requirements and the USDA could help enforce them, but USDA would only add requirements if uniform nation-wide support for such new rules existed.

**Action Plan Needed**

When presented with the facts, regulators of animal diseases are placed in a difficult position. They realize that 35 years of testing has placed our equine industry in an enviable position – the risk of acquiring EIA in the U.S. today is nearly zero. As a result, regulators are cautious about adopting “relaxed” rules concerning EIA without demonstrated support from owners, even if the changes are expected to save dollars and lead to improvements which lead to finding the sources for continued transmission of EIA.

Stated another way, there is a tremendous opportunity for owners to have their voices heard and make changes in the control of EIA in their areas. Once cooperative agreements are made, region-wide programs might lead to more effective control of EIA at lower cost to owners, which we think is long overdue.
II.B. USAHA/AAVLD SCIENTIFIC SESSION

A SUCCESSFUL MODEL TO CONTROL A NON-PROGRAM DISEASE: JOHNE’S

John B. Adams
Past Co-Chair, National Johne’s Working Group

Overview

It is becoming clear that U.S. Animal Health Association (USAHA) is a valuable forum and umbrella national organization under which major voluntary animal health initiatives can be developed and implemented to address emerging animal disease threats. Following the model that has been created by the National Johne’s Working Group (NJWG), under the oversight and policy direction of the USAHA Committee on Johne’s Disease, major progress has been made to create the administrative and laboratory support infrastructure necessary to begin to control Johne’s Disease, a complex animal disease threat to both the large and small ruminant populations of the U.S.

Over a period of approximately 12 years, volunteer representatives of the cattle industries, academia, allied industry groups and organizations, USDA and State Animal Health Officials have collaborated through the NJWG to develop effective Johne’s producer education and communications initiatives, research, laboratory certification and testing support, as well as administrative oversight at the federal level. The result has been the enactment of a national voluntary cattle herd risk assessment and negative status testing program with uniform standards that are now in place in the majority of U.S. states and territories. This has been an industry driven initiative from the beginning which is so necessary to maintain momentum in the development of a national voluntary initiative and to maintain funding at the federal and state levels to assure adequate implementation of voluntary program standards.

As federal funding for animal health programs is diminished, it becomes increasingly necessary for industry to be able to work collaboratively with other stakeholders in the animal community to develop and implement effective voluntary animal disease control program initiatives. USAHA has proven to be a valuable forum at the national level which has enabled the dairy and beef cattle industries of the U.S. to effectively begin to address and control an emerging cattle disease of major economic significance.
II.B. USAHA/AAVLD SCIENTIFIC SESSION

There are a number of emerging disease issues to consider when attempting to establish any form of a national voluntary control initiative, including:

- Potential Public & Animal Health Impact(s)?
- Status of Disease in U.S. /Economic Impact?
- Will affected Industry Support Organized Action?
- Potential Resource Support?
- Who and How to Organize a Control Program?
- What Will Be Major Goals and Objectives?

As we reference the voluntary control model created by the NJWG, we begin with the approximate timeframe for addressing Johne’s disease as a recognizable emerging disease issue in the U.S. In the early 1990’s, there was a growing awareness that something needed to be done to control Johne’s disease in dairy industry. Uncertainty existed regarding the public health impact in the scientific community, but there was growing producer concern over the economic impact of the disease on a within herd basis. More herds were becoming infected and there was growing fear that disease could be either a direct or indirect cause of Crohn’s Disease in humans.

In 1995, an editorial appeared in Hoard’s Dairymen basically suggesting that there was a direct link between Johne’s disease in cattle and the possibility of Crohn’s Disease in humans. The alarm bells went off in the dairy industry, and something needed to be done to address this potential time bomb. The National Milk Producers Federation (NMPF) decided to work through the NMPF Animal Health Committee to seek USAHA support to form a “National Johne’s Working Group” that could bring together expertise from academia, State animal health authorities, USDA, American Veterinary Medical Association (AVMA), American Association of Bovine Practitioners (AABP), Extension and the entire livestock industry to address Johne’s Disease “on a continuing basis” and to develop a broad base of support for a Voluntary National Johne’s Control program.
II.B. USAHA/AAVLD SCIENTIFIC SESSION

NMPF set major goals and objectives for addressing Johne’s disease, which included:

- Seek USAHA Leadership Approval;
- Seek NCBA Approval;
- Seek Minor Species Involvement;
- Develop collaboration between all parties, but resolve to keep the effort industry driven; and
- Involve USDA and academia in a meaningful way to keep the effort science based and to gain federal support to initiate a voluntary cattle industry control program.

In 1995 the National Johne’s Working Group (NJWG) was created. The NJWG was established as a subcommittee of the Committee on Johne’s disease of the United States Animal Health Association. It was originally, and remains at this time, comprised of people from government agencies, animal agricultural organizations, professional organizations and academic institutions. The National Johne’s Working Group leadership was established as:

Co- Chairs:
- John Adams, National Milk Producers Federation
- Gary Weber, National Cattleman’s Beef Association
- Robert Whitlock, Past Chair Johne’s Committee USAHA

Membership of NJWG included 70 voting members, USAHA Officers on mailing list, and 15 corresponding members. Organizations represented on the NJWG include:

- American Veterinary Medical Association
- American Association of Bovine Practitioners
- American Association of Veterinary Laboratory Diagnosticians
- United States Animal Health Association
- Veterinary Extension Services
- State Veterinarians
- State and National Diagnostic Laboratories

Government Agencies included USDA-APHIS and USDA-ARS. Animal Agriculture Organizations included, American Farm Bureau Federation, Holstein Association, Livestock Conservation Institute (now National Institute of Animal Agriculture), National Milk Producers Federation and National Cattleman’s
II.B. USAHA/AAVLD SCIENTIFIC SESSION


The NJWG established several subcommittees, including: Education; Economic Impact of Paratuberculosis; Johne’s Control Committee; Research Status and Priorities; Laboratory Certification; Herd Certification; Serology QC Committee; Small Ruminants Committee; Validation of Check Tests; Certificate of Veterinary Inspection (Health Certificate). Additionally, Dr. Ken Olsen continues to serve as treasurer for the NJWG.

The NJWG Mission Statement was approved by the USAHA Committee on Johne’s Disease in 1995, and reads as follows:

- NJWG will serve as a resource to assess any potential association between Johne’s and human health.
- NJWG will develop and coordinate implementation of a National Johne’s Program.
- This program will help protect the public and animal health, reduce economic burden upon producers and develop a uniform approach for control, herd certification, and eventual eradication of this insidious and costly disease in the USA.

Key objectives included:

- NJWG will evaluate information suggesting M.paratuberculosis is a zoonotic pathogen and assess the likelihood that animals serve as a reservoir of infection.
- NJWG will evaluate the potential for the organism to contaminate foods of animal origin.
- NJWG will identify and encourage research needed, develop a strategy for a control and herd certification program.
- NJWG will evaluate the domestic and international economic impacts of Johne’s disease and develop recommendations for updating currently suggested good management practices which can be employed by producers to prevent entry and spread of the infection in livestock populations.
- NJWG will develop a set of policy objectives and goals to enhance development and implementation of the strategy for a Johne’s disease control & herd certification program.
II.B. USAHA/AAVLD SCIENTIFIC SESSION

The NJWG identified an initial major hurdle; i.e., how to resolve different positions in the scientific community regarding a possible relationship between Johne’s and Crohn’s disease. It was ultimately agreed, however, that regardless of the outcome of that debate, the NJWG should continue to advance efforts to control Johne’s Disease to minimize the economic impact on the livestock industry.

Another Major Hurdle was an unanticipated conflict within USAHA over the role and relationship of the NJWG to the Johne’s Committee of USAHA. This was clarified to permit the NJWG to function as a Subcommittee of the Johne’s Committee. The NJWG would develop the so-called “nuts and bolts” (criteria, standards and guidelines) for the control program with the Johne’s Committee providing overall direction, policy and oversight. The NJWG had to address other major hurdles:

- Resources—where was the funding going to come from to support even a voluntary program?
- How to keep the pressure on Congress to provide increased funding to build the necessary infrastructure?
- How to continue to keep producer interest in supporting the control program and participate?

Through the organizational structure created by the NJWG, a comprehensive operational disease control program model was developed with Co-chairs representing beef, dairy and academia. The coordinated involvement and participation of Chair and Vice Chair of the USAHA Committee on Johne’s disease was also very important in creating a success voluntary control program effort.

The subcommittees within NJWG became more organized and focused on specific objectives:

- Education/ Producer Outreach
- Laboratory/ Check Testing
- Minor Species/Education and research
- Program Standards
- Demonstration Herd Project
- Research/Both basic and applied
- State Programs Committee
- Herd Certification Committee
- Economics Committee

The Education Subcommittee created Johne’s Disease informational brochures, targeting both producers and
II.B. USAHA/AAVLD SCIENTIFIC SESSION

veterinarians, respectively. These were distributed across America.

The State Programs Committee became actively involved, holding monthly conference calls, with participation of 40-60 persons, lasting approximately one hour. Key areas of concern were quantified as follows:

<table>
<thead>
<tr>
<th>Areas of Concern</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of Funds</td>
<td>1</td>
</tr>
<tr>
<td>Testing Accuracy</td>
<td>8</td>
</tr>
<tr>
<td>Confidentiality</td>
<td>4</td>
</tr>
<tr>
<td>Positive Herd Dilemma</td>
<td>3</td>
</tr>
<tr>
<td>Lack of Interest</td>
<td>3</td>
</tr>
<tr>
<td>Interstate Movement</td>
<td>3</td>
</tr>
<tr>
<td>Fear of “Blacklist”</td>
<td>2</td>
</tr>
</tbody>
</table>

The NJWG Herd Certification Committee developed “U.S. Voluntary Johne’s Disease Herd Status Program for Cattle.” This was approved at USAHA in 1998. Two meetings were held at Riverdale, Maryland. Seven persons served for one year. This Subcommittee also developed “Minimum Recommendations for Administering and Instituting State Voluntary Johne’s Disease Programs for Cattle,” which was approved at USAHA in 1999.

The National Voluntary Johne’s Herd Classification Program featured the following components:

1. Voluntary- No government mandates
2. Flexible- Herd owners can elect to stay at any level
3. Low cost-
   - Partial herd testing when possible
   - Low cost test as often as possible
4. Scientifically Sound
   - based on herd level diagnostics

The Laboratory Certification Committee developed guidelines for national check tests for fecal cultures & ELISA Serology administered by the National Veterinary Services Laboratory (NVSL).
II.B. USAHA/AAVLD SCIENTIFIC SESSION

<table>
<thead>
<tr>
<th>Year</th>
<th>No. of Labs Requesting Sample Sets for Fecal Culture</th>
<th>No. of Labs Requesting Sample Sets for ELISA Serology</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>1996</td>
<td>23</td>
<td>23 (5)</td>
</tr>
<tr>
<td>1997</td>
<td>28</td>
<td>16</td>
</tr>
<tr>
<td>1998</td>
<td>42</td>
<td>56</td>
</tr>
<tr>
<td>1999</td>
<td>51</td>
<td>62</td>
</tr>
<tr>
<td>2000</td>
<td>51</td>
<td>75</td>
</tr>
<tr>
<td>2001</td>
<td>52</td>
<td>92</td>
</tr>
</tbody>
</table>

Approximate numbers

Prepared by RH Whitlock, University of Pennsylvania

The NJWG Research Subcommittee established priorities for research, provided updates on Johne’s research projects, directed milk pasteurization studies and other collaborative research. The Subcommittee also became the “Research Advisory Committee for NJWG & Johne’s Committee”.

The NJWG Economics Committee was involved in the Dairy National Animal Health Monitoring System (NAHMS), conducted in 1996. Results from the study indicated $245 loss per cow in the herd, including 10 percent clinical. Total costs were estimated at $200 - $250 Million per year to the dairy industry. Data is needed about Economic benefit to herds that participate in the Status Program & herds that participate in a Control program.

Currently, a number of organizations remain active in the NJWG.

Agencies & Associations Represented (30):
- American Association of Bovine Practitioners
- American Association Veterinary Laboratory Diagnosticians
- American Sheep Industry
- American Farm Bureau Federation
- American Veterinary Medical Association
- California Department of Food and Agriculture
- Holstein Association
- National Institute of Animal Agriculture (LCI)
- National Milk Producers Federation
- National Cattleman’s Beef Association
- North American Elk Breeders
- Small Ruminant Association
II.B. USAHA/AAVLD SCIENTIFIC SESSION

- State Veterinarians
- USDA / ARS / NADC
- USDA - Cattle Diseases
- USDA - National Program Staff
- USDA / APHIS / Veterinary Services
- USDA / APHIS / VS - NAHMS Program
- United States Animal Health Association
- Universities: Cornell, Connecticut, Iowa, Missouri, Oregon, Pennsylvania, Rutgers, Texas A & M, Colorado, Ohio, Minnesota, Wisconsin
- Veterinary Extension Services
- Companies/Corporations, including: Allied Monitor; B-D Biosciences; BIOCOR Animal Health; BioStar Research; IDEXX Laboratories; ImmunCell; Trek Diagnostics and Pharmacia-Upjohn.

The National Johne’s Working Group conducted a five-year review with a look at the path forward. The review was requested by the president of USAHA. The goal was to assess the efforts of the NJWG, assess the relationship to the USAHA Committee on Johne’s disease and chart a path forward. The review took place October 20, 2000 in Birmingham, Alabama.

In evaluating the path forward, the committee leadership identified the following items:

Short Term Objectives:
1. CD ROM on Educational Materials
2. ELISA QC as a Requirement for “Approval”
3. Fecal Culture QC Required for “Approval”
4. Certificates of Veterinary Inspection (Health Certificates)
5. Criteria for Herds to Vaccinate for Johne’s Disease
6. Applied Research in Johne’s Disease
7. National “Program Standards” for JD in Cattle

Mid- Term Objectives:
1. Indemnity Program for Dairy Cattle
2. “Approved” Serologic Tests for Small Ruminants
3. Funding for Diagnostic Laboratory Infrastructure
4. National Web Site (APHIS) Listing of All Status Herds
5. Defined Training Program for State JD Epidemiologists
6. Funds for Applied Research in Johne’s Disease
7. Coordinated Approach to Johne’s Research
II.B. USAHA/AAVLD SCIENTIFIC SESSION

Longer Term Objectives:
1. Indemnity Program for Beef Cattle
2. “Approved” Serologic Tests for Camelids
3. Status Programs for other Ruminants & Camelids
4. $$ Premiums for Milk & Meat from Animals at low risk for Johne’s Disease (Status Herds)
5. Begin Eradication of Johne’s Disease

The review also identified major accomplishments of the NJWG, including:
1. Greater awareness about Johne’s disease
2. Voluntary Johne’s disease Status Program for Cattle
3. ELISA & Fecal Check Tests for Johne’s disease
4. Program Recommendations for States
5. National Johne’s Coordinator-Mike Carter
6. Increased Funding for USDA/APHIS “Johne’s disease”
7. Dedicated Volunteers on the NJWG
8. Greater awareness about Johne’s disease
9. Program Recommendations Infected Cattle Herds with Johne’s disease
10. USAHA Resolution for a National Johne’s Coordinator-Mike Carter
11. Increased Funding for Johne’s disease by USDA/APHIS & ARS
12. Laboratory Quality Control: Pilot project collecting data, five labs

Most importantly there have been a number of individuals within USAHA and USDA who have helped to make this program happen.
- Walter Stemler, Producer, NMPF Animal Health Committee from Waterloo, IL (Deceased)
- Dr. Robert Whitlock, University of PA Veterinary School of Medicine –major force behind success of NJWG– continues to serve as one of three original C0-Chairs.
- Dr. Wesley Towers, Past President of USAHA and former State Veterinarian of Delaware who endorsed the original formation of NJWG in 1995.
- Dr. Michael Carter, first and only USDA National Johne’s Program Coordinator
- All NJWG Committee Chairs and Vice Chairs and members
II.B. USAHA/AAVLD SCIENTIFIC SESSION

As an original Co-Chair of the NJWG, I want to personally acknowledge and thank Dr. Whitlock for his enormous contributions toward the successful development and administration of the National Johne's Working Group. Without his dedication to the mission and objectives of the NJWG, we would not have progressed to the point where we are today with a viable voluntary National Johne’s Control Program for the cattle industry in the United States. I would also like to personally acknowledge and thank the many other members of the NJWG, USAHA Johne’s Committee and the leadership of USAHA for working collaboratively and providing countless hours of volunteer effort to advance our common understanding of how best to control Johne’s disease in the nation’s cattle herds. Let us continue this monumental and important voluntary animal health initiative to address Johne’s disease as it affects other ruminant species and may the progress to date serve as a model for others to address emerging animal health diseases on a voluntary basis.
The rapid diagnosis of avian influenza virus (AIV) during a poultry outbreak is critical for a timely control program\(^1\). Any delays in diagnosis or response to an outbreak allows the virus to spread making eradication increasingly difficult. The other key to the rapid control of an outbreak is an eradication plan that is prepared for implementation. Eradication plans typically include how quarantines and animal movement controls will be used, how the birds will be humanely euthanized, how the carcasses will be disposed of, surveillance methods, and where the funds to pay for both the indemnity and control costs will come from. Timely control requires both a rapid diagnosis and an effective coordinated response.

The diagnosis of avian influenza can be made by a variety of methods, including by clinical signs, serologic methods, and by direct virus detection methods. Clinical signs with highly pathogenic avian influenza can be a valuable tool for presumptive diagnosis in chickens and turkeys, but none of the lesions are pathognomonic and the etiology must be confirmed by diagnostic tests\(^2, 3\). For some species, including ducks and wild birds, disease expression is extremely variable and clinical disease is a less reliable indicator of infection. Serologic diagnostic tests are widely used for trade purposes to show freedom of infection from mainly low pathogenic avian influenza. However, serology is of little value for HPAI because most birds die before producing antibody. Even in surviving birds the time for an antibody response to develop causes a considerable delay of diagnosis that allows the virus to continue to spread.

Currently, the most useful diagnostic tests are ones that can directly detect the virus, either live virus, antigen, or nucleic acid. Three common direct diagnostic tests for avian influenza are virus isolation, antigen capture immunoassays, and molecular diagnostic tests\(^4-8\). Each test has different advantages and disadvantages as will be described below. Other diagnostics tests, include sequencing, are available that can aid in the characterization of avian influenza viruses.
II.C. USAHA SCIENTIFIC PAPERS

Virus isolation remains a valuable tool for the diagnosis of avian influenza, especially for the diagnosis of avian influenza on the index case. Virus isolation allows for the biological characterization of the virus as well as allowing for full sequence analysis of the isolate. However, virus isolation requires several days to weeks for a diagnosis, a readily available supply of embryonating chicken eggs, and a biosecure laboratory facility for isolation of highly pathogenic avian influenza (9). Virus isolation remains critical for virus characterization and it is still required in the U.S. before an outbreak is officially reported, but virus isolation has major limitations for providing a rapid diagnosis to aid in control of an outbreak.

The antigen capture tests are also widely used for the diagnosis of avian influenza. Almost all of the available tests were originally designed for human use to identify type A influenza virus. Because the monoclonal antibodies used for these tests are to conserved epitopes, most of these tests are able to identify both human and avian influenza virus. Recently, a veterinary licensed antigen capture immunoassay has also become available in the U.S. The primary advantage of these tests is the speed for diagnosis, less than 30 minutes, with the need for little additional equipment to perform the test. The primary disadvantage of antigen capture tests is much lower sensitivity as compared to virus isolation or some of the molecular diagnostic tests like real-time RT-PCR. The antigen capture tests appear to give similar results to VI and RRT-PCR when testing birds that are sick or dead from avian influenza, but they can miss birds that are clinically normal but infected. All though the tests were summarized as a group, major differences in performance exist between them(8). Since most of the tests were originally designed for human use, few of the tests have been tested extensively for veterinary application. The validation of antigen capture tests for poultry samples remains an important consideration to assure acceptable levels of performance.

The last major class of diagnostic tests are the molecular diagnostic tests, that includes traditional reverse transcription-PCR (RT-PCR), real-time reverse transcription-PCR (RRT-PCR), nucleic acid sequence based amplification (NASBA), and other techniques. However, in the United States the RRT-PCR method has become the molecular diagnostic standard for detection of avian influenza virus. The RRT-PCR procedure has been adopted by the Animal and Plant Health Inspection Service (APHIS) and
II.C. USAHA SCIENTIFIC PAPERS

has been deployed in 49 state laboratories in the National Animal Health Laboratory Network (NAHLN). The test is designed for diagnosis in two steps. The first step is the identification of any type A influenza virus based on detection of the conserved matrix gene. If the matrix test is positive, then further testing to determine if the isolate is of the H5 or H7 subtype is performed$^{(4)}$. Although any positive samples are further evaluated by sending them to the National Veterinary Services Laboratory, the emphasis is on detection of H5 and H7 subtype positive samples. The RRT-PCR test has three main advantages. First, RRT-PCR provides for a rapid diagnosis with results available in as little as three hours. Additionally, the widespread availability of the AI RRT-PCR test in the NAHLN allows samples to be tested rapidly in regional labs, which helps reduce transit time for samples. The second advantage is the sensitivity is similar to virus isolation for most samples types. The sensitivity and validation will be discussed in more detail later. The third major advantage is the potential for greatly increased throughput during an outbreak. The ability to test large numbers of samples is critical if diagnostic testing is going to identify infected flocks with the increased surveillance that occurs during an outbreak. The use of robotics also has the potential to increase throughput in the NAHLN system. The primary disadvantage of RRT-PCR is the initial cost of the real-time PCR equipment, which remains much higher than a traditional PCR machine.

The validation of the matrix RRT-PCR test used in the U.S. for is the primary advantage that this test has over the many other molecular diagnostic tests that have been described. The term validation is not clearly defined for molecular diagnostics tests, but can be summarized by comparison testing with a performance or “gold” standard for a specific species and sample type. For serologic tests, a total of 300 positive and 1000 negative samples of known status are compared. Issues of repeatability of the test in different laboratories and the ability to identify diverse isolates should also be considered. The matrix RRT-PCR test has been evaluated in several studies in the U.S. and abroad.

The matrix test was originally validated with tracheal swabs in chickens and turkeys and was shown during the Virginia H7N2 low pathogenic AI outbreak to be both sensitive and specific. Since the matrix test was originally adopted, additional research to expand species and sample types have been conducted. The primary issue for performance from other types of samples or
species is the RNA procedure, which is affected by RNA extraction efficiency and the presence of PCR inhibitors. For example, Trizol reagent is considered to have good RNA extraction efficiency from many types of samples, and works well with tracheal or oropharyngeal swabs. However, with cloacal or tissue samples, Trizol can also co-purify PCR inhibitors that can result in false negative reactions\(^{(10)}\). A single RNA extraction procedure is unlikely to provide acceptable results with every type of sample. Validation should be clearly defined as fitness for purpose. This fitness for purpose should include both the species and sample type to assure that accurate results are being obtained. This same caveat also holds for the antigen capture tests or any other new diagnostic test that becomes available. Some level of comparison testing needs to be performed to assure that accurate results are being obtained for the intended purpose.

Recent studies have looked at doing some comparison testing for avian influenza in different sample types. For example, a comparison of oropharyngeal and tracheal swabs was performed with chickens infected with several different AI viruses. In comparing the cycle threshold values on a real-time PCR machine, no significant difference was seen with these two types of samples providing evidence that oropharyngeal swabs can be substituted for tracheal swabs without reducing performance\(^{(10)}\). However, cloacal swabs were found to be problematic with current RNA extraction methods. Cloacal swabs from wild ducks seem to have a high proportion of samples that had PCR inhibitors that created concerns of false negatives. Alternative methods are being developed to handle both cloacal and tissue samples to remove the PCR inhibitors during the extraction process.

Molecular diagnostic tests are still relatively new tests that are just know being widely used for the diagnosis of infectious disease. Technological improvements are likely to result in better sensitivity, increased ease of use, and increased throughput. Recent efforts have included the development of dried down reagents and an internal control to identify false positives have recently been published\(^{(11)}\). The use of robotics using magnetic bead reagents are also being increasingly used in the NAHLN. Improvements in enzymes and other reagents are likely to become commercially available. Efforts to assure that any changes to the official protocol provide performance similar or better than the official protocol must be made. Currently, the official APHIS protocol provides some flexibility for making
changes to the official test, but labs that make changes must have supporting data showing equivalency data. The one area that changes cannot be made to is in the primers and probe, since this determines the specificity of the primer set. Any change in probe and primers would need to be revalidated to assure that the sensitivity and specificity has not been changed.

Molecular diagnostic test are the future for infectious disease diagnostics. Efforts are needed to increase the standardization of diagnostic to assure test performance between laboratories and especially the NAHLN. However, because of rapid technological advances, diagnostic tests will likely continue to change. The principles of validation and an improved understanding of minor and major changes to official protocols need to be developed to facilitate the use of these new tools.

References:


II.C. USAHA SCIENTIFIC PAPERS

PRIOCHECK® TRICHINELLA AB, A NEW HIGHLY SENSITIVE AND SPECIFIC ELISA FOR THE DETECTION OF ANTIBODIES AGAINST TRICHINELLA SPP. IN SERUM AND MEAT JUICE OF PIGS

Patrik Buholzer, Paul C. Price, Daniel Zwald, Tina Haupt-Gerber, Weldy Bonilla and Alex J. Raeber
Prionics AG

Abstract

Trichinellosis is a zoonotic disease which is found throughout the world and is caused by the nematode Trichinella. The PrioCHECK® Trichinella Ab is a diagnostic kit based on ELISA technology for the detection of antibodies directed against Trichinella spp. in serum and meat juice samples of pigs and was developed for surveillance, monitoring and certification purposes. The PrioCHECK® Trichinella Ab follows a four step protocol, consisting of sample preparation, sample incubation, conjugate incubation, and detection. The excretory/secretory antigen (E/S antigen) as the major antigenic protein complex is coated on the ELISA plate. Serum or meat juice samples are incubated on the plate. A peroxidase (POD) labelled anti-pig antibody is used for the detection of antibodies bound to the E/S antigen. Color development using TMB substrate measured optically at a wavelength of 450 nm shows the presence of antibodies directed against Trichinella spp. We have performed an in-house validation study using 464 Trichinella negative and 59 Trichinella positive serum samples from pigs. The diagnostic status of the samples was confirmed by artificial digestion or standard E/S ELISA from reference laboratories. Based on these serologically confirmed samples, the PrioCHECK® Trichinella Ab showed a sensitivity and a specificity of 100%. There was no cross reactivity observed with commonly found pig parasites such as Ascaris, Trichuris, Hyostrongylus and Strongyloides. We conclude that the PrioCHECK® Trichinella Ab ELISA represents a valuable tool for monitoring, surveillance and certification purposes as suggested in the regulation EC 2075/2005 and according to the US Trichinae certification program.

Introduction

Trichinellosis is a zoonotic disease which occurs worldwide and is caused by the nematode Trichinella. The roundworm
II.C. USAHA SCIENTIFIC PAPERS

*Trichinella* infects many carnivorous and omnivorous animal species, including domestic pigs. At present, eight species and three genotypes are recognised in the genus *Trichinella*. Although all *Trichinella* species are infective for humans, the species which are of main importance in the tampered and subarctic zones of Europe and USA are *T. spiralis*, *T. britovi*, *T. pseudospiralis* and *T. nativa*. *T. spiralis* is of main concern because domestic pigs show a high susceptibility for this species. *T. britovi* is mainly found in wildlife and *T. pseudospiralis* which is distributed throughout the world can also infect birds. The latter species does not encapsulate, and might not be detected using trichinoscopy. *T. nativa* is mainly found in arctic carnivores and is largely cold-resistant and thus this species survives even if meat is frozen for a longer period of time.

In the European Union, *Trichinella* infections can be found in pigs raised in small holdings in areas of traditional agriculture with insufficient control measures but occasional cases also occur in holdings with good farm management practices in place. Humans can get infected with *Trichinella* by eating raw or insufficiently cooked meat. In the last two decades, on average 90 human cases were reported per year by the EU member states. Under the European Commission (EC) Directive 2075/2005/EC all pigs slaughtered for human consumption have to be tested for *Trichinella* by the artificial digestion method. This method allows testing of pools of up to 100 samples of 1 gram tissue from diaphragm by enzymatic digestion of the muscle tissue surrounding the larvae followed by microscopic detection of the parasite. The sensitivity of this method is in the order of 3 larvae per gram of muscle tissue. The costs of carcass testing in the EU were estimated to be US$ 572 million in 1997 and they will likely increase as a result of increased testing programs and an enlarged European Union. An alternative to the costly testing of each individual animal at slaughter is to certify herds or regions as *Trichinella* free or as of negligible risk by regular monitoring of herds for Trichinellosis which may include serologic tests.

Several serological techniques have been developed for detection of anti-*Trichinella* antibodies. The enzyme-linked immunosorbent assay (ELISA) is most often described for animal samples, is easily adaptable for high throughput analysis and can be used for both blood and meat juice samples. Furthermore, with a sensitivity in the order of 0.01 larvae per gram of tissue, the indirect ELISA has been described to have a better sensitivity.
II.C. USAHA SCIENTIFIC PAPERS

than the routine artificial digestion method \(^8\).

The PrioCHECK\(^\circledast\) Trichinella Ab, is a newly developed ELISA based on the excretory/secretory (E/S) antigen from \textit{T. spiralis} muscle larvae for the detection of \textit{Trichinella} infections in serum and meat juice samples of pigs. In validation studies, the assay showed a sensitivity and specificity of 100.0%. Infected animals which contained larvae loads as low as 0.02 larvae per gram of muscle tissue could be detected by this ELISA. No cross reactivity was detected with commonly found parasite infections such as \textit{Ascaris}, \textit{Trichuris suis}, \textit{Oesophagostomum}, \textit{Strongyloides} and \textit{Hyostrongylus}.

Material and Methods

Serum samples

The serum samples analysed in this study were either collected in the field or obtained from experimentally infected animals and were kindly provided by Dr. Karsten Nöckler (Federal Institute for Risk Assessment (BfR); Berlin, Germany), Dr. Ray Gamble (Animal Research Service (ARS), USA), Dr. Kitty Maasen (Animal Science Group, Lelystad, the Netherlands) and Dr. Bruno Gottstein (University of Berne, Switzerland). A total of 216 serum samples originated from finishing pigs that tested negative with at least 10 gram of tissue of the diaphragm and were also found negative by serology using a standard ELISA from a reference laboratory \(^8,2\). In addition, 196 serum samples from finishing pigs and 46 sows were obtained from a Swiss slaughterhouse during routine slaughter and were tested negative with 1 gram of muscle tissue from diaphragm. The 59 positive serum samples were originally diagnosed as positive by artificial digestion and were also found positive by serology using a standard ELISA from a reference laboratory \(^8,2\). Serum samples from pigs experimentally infected with \textit{Trichuris suis}, \textit{Oesophagostomum}, \textit{Strongyloides}, \textit{Hyostrongylus}, \textit{Oesophagostomum/Hyostrongylus} and \textit{Salmonella typhimurium} and from pigs experimentally infected with different doses of \textit{T. spiralis}, \textit{T. pseudospiralis} or \textit{T. britovi} larvae were kindly provided by Dr. Karsten Nöckler (Federal Institute for Risk Assessment (BfR); Berlin, Germany). Briefly, groups of three specific pathogen-free (SPF) pigs were infected with 20,000 or 1,000 larvae of \textit{T. spiralis}, with 20,000, 1,000 or 200 larvae of \textit{T. pseudospiralis} and with 20,000, 1,000 or 200 larvae of \textit{T. britovi} and
serum samples were obtained from individual animals at different time points following experimental infection as described previously.

**ELISA assay**

The PrioCHECK® Trichinella Ab ELISA (Prionics AG, Schlieren-Zürich, Switzerland) was performed according to the instructions provided by the manufacturer. Briefly, serum samples were diluted 50-fold and meat juice samples 5-fold in the Sample Diluent. A 100 µl-aliquot of the diluted sample was incubated on the E/S antigen coated Test Plate for 30 minutes at 22±3°C. The plate was washed four times with 300 µl Wash Fluid working solution. Then, 100 µl diluted Conjugate was added to the wells of the plate. The plate was incubated for 30 minutes at 22±3°C, washed four times with 300 µl Wash Fluid working solution and 100 µl of the chromogen (TMB) substrate were added to each well of the plate. The plate was incubated for 15 minutes at 22°C±3°C. Then the color reaction was stopped by addition of 100 µl Stop Solution to the wells of the plate and following a short shaking, the plate was read at 450 nm. The optical densities were expressed as percentage of the Positive Control sera on the plate (PP, percentage positivity). Results obtained above or equal to the cut-off of 15 PP were considered as positive. Results obtained below the cut-off of 15 PP are negative.

**Spiked meat juice samples**

Meat juice was obtained from muscle tissue of the diaphragm which was frozen overnight at -22°C. After thawing at room temperature, the meat juice was collected and either used directly or frozen in aliquots until further use. Spiking studies were performed to assess the analytical performance of the PrioCHECK® Trichinella Ab assay (Prionics AG, Schlieren-Zürich, Switzerland) on meat juice samples. Negative meat juice samples were spiked with *T. britovi* and *T. spiralis* serum at dilutions ranging from 1:10 to 1:1,600.

**Experimental haemolysis**

Haemolysed blood was obtained by treatment of negative heparinized blood with three cycles of freeze-thaw to lyse the erythrocytes. The haemolysed blood sample was then serially diluted in negative and positive serum samples and measured with the PrioCHECK® Trichinella Ab assay (Prionics AG, Schlieren-Zürich, Switzerland).
II.C. USAHA SCIENTIFIC PAPERS

Data analysis

The analysis of the data was performed with the statistical software MedCalc (MedCalc Software, Mariakerke, Belgium). Cut-off values were calculated by receiver operator characteristics (ROC) analysis.

Results

The PrioCHECK® Trichinella Ab is a new ELISA developed for the detection of antibodies to Trichinella in serum and meat juice samples of pigs. The performance of the ELISA was assessed with 464 negative and 59 positive serum samples for which the infection status was confirmed either by the artificial digestion method or by an ELISA from an EU reference laboratory (Table 1). The cut-off value of the PrioCHECK® Trichinella Ab was determined by ROC analysis (Table 2). At a cut-off value of 14.24 PP the ELISA showed a diagnostic sensitivity of 100% (95% confidence interval: 93.9 -100%) and diagnostic specificity of 100% (95% confidence interval: 99.2 -100%) (Table 3). Based on these results the cut-off of the PrioCHECK® Trichinella Ab was set at 15 PP.

The analytical sensitivity of the PrioCHECK® Trichinella Ab was determined by serial two-fold dilutions of four confirmed Trichinella positive serum samples to a final dilution of 819,200-fold. To determine the detection limit of the assay, a cut-off of 15 PP corresponding to an OD_{450} of 0.3 was used based on the positive control sample with a mean OD_{450} of 2.0. As shown in Figure 1, the limit of detection of the PrioCHECK® Trichinella Ab was determined at a dilution of 600-fold for the T. pseudospiralis serum and at a dilution of 10,000-fold for the T. britovi serum. Furthermore, detection limits of the PrioCHECK® Trichinella Ab were estimated with regard to the larval densities as determined by artificial digestion of at least 10 gram muscle tissue from diaphragm of pigs experimentally infected with various doses of Trichinella larvae. As shown in Table 4, the serum sample S5 from a pig infected with 20,000 larvae of T.britovi showed about 75 PP in the PrioCHECK® Trichinella Ab assay and 0.02 larvae per gram by the artificial digestion method which represents the sample with the lowest muscle larvae burden in this study.

The specificity of the PrioCHECK® Trichinella Ab was further evaluated with regard to other parasites commonly found in pigs. Serum samples from pigs experimentally infected with Trichuris suis, Oesophagostomum, Strongyloides, Hyostrongylus,
**II.C. USAHA SCIENTIFIC PAPERS**

*Oesophagostomum* / *Hyostrongylus* and *Salmonella typhimurium* were tested in the assay. All potential cross reactive serum samples were clearly negative in the PrioCHECK® Trichinella Ab ELISA demonstrating that the assay is highly specific for the detection of antibodies against *Trichinella* (Figure 2).

In order to determine the earliest time point following infection at which the PrioCHECK® Trichinella Ab ELISA is capable to detect antibodies, sera from pigs experimentally infected with 20,000 and 1,000 larvae of *T. spiralis*, with 20,000, 1,000 and 200 larvae of *T. pseudospiralis* and with 20,000, 1,000 and 200 larvae of *T. britovi* were analysed with the PrioCHECK® Trichinella Ab ELISA. Serum samples which were obtained before infection and at 5, 10, 15, 20, 25, 30, 40, 50 and 60 days post infection were analysed. As shown previously with a standard ELISA from an EU reference laboratory, seroconversion is not only dependent on the amount of larvae used to infect pigs but also on the species of *Trichinella*. Following infection of pigs with 20,000 and 1,000 *T. spiralis* larvae, antibodies to *Trichinella* were detected as early as 20 days and 30 days, respectively. In contrast, infection of pigs with the same number of *T. britovi* or *T. pseudospiralis* larvae resulted in a delay in the seroconversion of 10 to 20 days and thus antibody titers in serum were only detectable at 30 days and 50 days, respectively (Figure 3). At the lowest dose of 200 larvae per gram, seroconversion was not observed until 60 days post infection with *T. britovi* and *T. pseudospiralis*. These results are in good agreement with the results obtained on the same samples with an ELISA from an EU reference laboratory.

In addition to blood serum samples, extracts of muscle tissue referred to as meat juice or tissue serum is often used as an alternative matrix for serologic diagnosis by ELISA methods. Therefore, the analytical sensitivity of the PrioCHECK® Trichinella Ab assay on this matrix was evaluated by spiking experiments with meat juice samples. Negative meat juice specimens were spiked with positive serum from *T. spiralis* and *T. britovi* in dilutions ranging from 1:10 to 1:1,600 and were tested with the PrioCHECK® Trichinella Ab ELISA. As shown in Figure 4, *T. spiralis* and *T. britovi* spiked meat juice samples were tested positive up to a dilution of 1:800 and 1:1,600, respectively. At this final dilution the OD$_{450}$ values for the *T. spiralis* and *T. britovi* spiked meat juices were 0.27 and 0.42, respectively.

To assess the effect of haemolysis in serum on the performance of the PrioCHECK® Trichinella Ab ELISA, spiking
II.C. USAHA SCIENTIFIC PAPERS

experiments with haemolysed blood were performed. To that purpose, a Trichinella negative serum was diluted with haemolysed blood up to a concentration of 50% of haemolysed blood and each sample was spiked with a constant volume of a positive serum to keep the analyte concentration in the sample constant. The result from these studies showed that haemolysis up to 50% has no influence on assay performance (results not shown).

Discussion
The recently implemented EC regulation 2075/2005/EC lays down rules for the inspection of fresh meat for the presence of *Trichinella*. Under this regulation all pig carcasses have to be tested as part of the post-mortem examination by the pooled artificial digestion method. Serological methods are considered useful for monitoring purposes once they are validated by a Community Reference Laboratory. Further, the Regulation states that serological tests are not suitable for the detection of *Trichinella* infection in individual animals intended for human consumption. Testing of all pigs can be reduced for holdings or categories of holdings that are recognized as *Trichinella*-free. The frequency of testing for those holdings will be based on the outcome of a risk assessment. Monitoring of *Trichinella*-free holdings may include serological methods, once these methods have been validated. A pilot program for certifying herds as *Trichinella*-free was evaluated in the US and the voluntary trichinae certification program for US pork proposed by APHIS has recently been published in the Federal Register (9 CFR Parts 149, 160, and 161). Under this program, serological methods, such as ELISA are used to determine and monitor the *Trichinella* infection status in herds.

The PrioCHECK® Trichinella Ab is an ELISA using the excretory-secretory (E/S) antigen form *T. spiralis* for detecting anti-*Trichinella* antibodies in serum and meat juice of pigs. Validation studies with 464 negative and 59 positive serum samples from pigs showed a diagnostic sensitivity and specificity of 100%. The PrioCHECK® Trichinella Ab was able to detect infected pigs with larvae load as low as 0.02 larvae per gram. Furthermore, the ELISA assay is able to detect *Trichinella* infections in pigs with different *Trichinella* species, like *T. spiralis*, *T. britovi* and *T. pseudospiralis* but shows no cross reactivity with other pig parasites such as *Trichuris suis*, *Oesophagostomum*,
II.C. USAHA SCIENTIFIC PAPERS

*Strongyloides, Hyostrongylus, Oesophagostomum/Hyostrongylus* and *Salmonella typhimurium*. The PrioCHECK® Trichinella Ab ELISA was further evaluated with regard to its sensitivity to detect seroconversion in experimentally infected SPF pigs. With an infectious dose of 1000 larvae of *T. britovi* and *T. pseudospiralis* seroconversion was detected at 50 days post-infection whereas the reference ELISA was able to detect seroconversion not before 60 days post-infection suggesting that the PrioCHECK® Trichinella Ab ELISA is at least as sensitive as the reference ELISA.

This validation study shows that the PrioCHECK® Trichinella Ab ELISA is a valuable tool for monitoring, risk-based surveillance programs and certification purposes of *Trichinella* infections in pigs. The implementation of a certification program leads to reduction of the overall production costs while at the same time assuring a high level of farm hygiene.

**Acknowledgements**

The authors wish to thank Dr. Karsten Nöckler at the Federal Institute for Risk Assessment (BfR); Berlin, Germany, Dr. Ray Gamble from the Animal Research Service (ARS), USA, Dr. Kitty Maasen at the Animal Science Group, Lelystad, the Netherlands and Dr. Bruno Gottstein at the University of Berne, Switzerland, for supplying us with serum samples.

**Tables and Figures.**

**Table 1.** Serum samples used for the determination of the diagnostic specificity and sensitivity of the PrioCHECK® Trichinella Ab ELISA. *(Confirmed by a standard ELISA from an EU Reference Laboratory 8, 2)*

<table>
<thead>
<tr>
<th>Sample Class</th>
<th>Confirmed by</th>
<th>Confirmed by</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. of Samples</td>
<td>serology w/</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ELISA</td>
</tr>
<tr>
<td>Positive samples</td>
<td>59</td>
<td>Yes</td>
</tr>
<tr>
<td>Negative samples from finishing pigs</td>
<td>216</td>
<td>Yes</td>
</tr>
<tr>
<td>Negative samples from finishing pigs of Swiss slaughterhouses</td>
<td>196</td>
<td>No</td>
</tr>
<tr>
<td>Negative samples from sows of Swiss slaughterhouses</td>
<td>46</td>
<td>No</td>
</tr>
<tr>
<td>Potential cross-reactive samples</td>
<td>6</td>
<td>Yes</td>
</tr>
</tbody>
</table>
II.C. USAHA SCIENTIFIC PAPERS

Table 2. ROC analysis of the PrioCHECK® Trichinella Ab ELISA.

<table>
<thead>
<tr>
<th>Cut-off Value</th>
<th>Sensitivity</th>
<th>Specificity</th>
</tr>
</thead>
<tbody>
<tr>
<td>[PP]a</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.43</td>
<td>100 (93.9 – 100.0)</td>
<td>98.8 (97.2 – 99.5)</td>
</tr>
<tr>
<td>4.41</td>
<td>100 (93.9 – 100.0)</td>
<td>99.3 (97.9 – 99.8)</td>
</tr>
<tr>
<td>10.93</td>
<td>100 (93.9 – 100.0)</td>
<td>99.8 (98.8 – 100.0)</td>
</tr>
<tr>
<td>14.24</td>
<td>100 (93.9 – 100.0)</td>
<td>100 (99.2 – 100.0)</td>
</tr>
<tr>
<td>19.94</td>
<td>98.3 (90.9 – 99.7)</td>
<td>100 (99.2 – 100.0)</td>
</tr>
<tr>
<td>22.44</td>
<td>96.6 (88.3 – 99.5)</td>
<td>100 (99.2 – 100.0)</td>
</tr>
</tbody>
</table>

a Percentage positivity

Table 3. Diagnostic sensitivity and specificity of the PrioCHECK®
Trichinella Ab ELISA on samples with Trichinella infection status
confirmed either by a reference ELISA or artificial digestion.

<table>
<thead>
<tr>
<th>PrioCHECK® Trichinella Ab</th>
<th>Status</th>
<th>Infected</th>
<th>Uninfected</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>59</td>
<td>0</td>
<td>59</td>
<td></td>
</tr>
<tr>
<td>Negative</td>
<td>0</td>
<td>464</td>
<td>464</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>59</td>
<td>464</td>
<td>523</td>
<td></td>
</tr>
</tbody>
</table>

Sensitivity 100% (93.9 – 100.0)
Specificity 100% (99.2 – 100.0)
II.C. USAHA SCIENTIFIC PAPERS

**Table 4.** Results with the PrioCHECK® Trichinella Ab ELISA on serum samples from pigs infected with different doses of three different *Trichinella* species.

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Species</th>
<th>Infectious dose</th>
<th>Percentage positivity</th>
<th>Larvae per gram</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td><em>T. britovi</em></td>
<td>1’000 larvae</td>
<td>22.44</td>
<td>0.24</td>
</tr>
<tr>
<td>S2</td>
<td><em>T. britovi</em></td>
<td>1’000 larvae</td>
<td>19.94</td>
<td>n.d</td>
</tr>
<tr>
<td>S3</td>
<td><em>T. britovi</em></td>
<td>1’000 larvae</td>
<td>52.23</td>
<td>0.06</td>
</tr>
<tr>
<td>S4</td>
<td><em>T. britovi</em></td>
<td>20’000 larvae</td>
<td>65.41</td>
<td>12.9</td>
</tr>
<tr>
<td>S5</td>
<td><em>T. britovi</em></td>
<td>20’000 larvae</td>
<td>75.31</td>
<td>0.02</td>
</tr>
<tr>
<td>S6</td>
<td><em>T. britovi</em></td>
<td>20’000 larvae</td>
<td>86.97</td>
<td>15.0</td>
</tr>
<tr>
<td>S7</td>
<td><em>T. britovi</em></td>
<td>60’000 larvae</td>
<td>128.97</td>
<td>1.65</td>
</tr>
<tr>
<td>S8</td>
<td><em>T. spiralis</em></td>
<td>30’400 larvae</td>
<td>50.40</td>
<td>330</td>
</tr>
<tr>
<td>S9</td>
<td><em>T. spiralis</em></td>
<td>1’000 larvae</td>
<td>70.78</td>
<td>21.4</td>
</tr>
<tr>
<td>S10</td>
<td><em>T. spiralis</em></td>
<td>1’000 larvae</td>
<td>61.19</td>
<td>11.6</td>
</tr>
<tr>
<td>S11</td>
<td><em>T. spiralis</em></td>
<td>1’000 larvae</td>
<td>91.55</td>
<td>80.8</td>
</tr>
<tr>
<td>S12</td>
<td><em>T. spiralis</em></td>
<td>20’000 larvae</td>
<td>89.48</td>
<td>209.2</td>
</tr>
<tr>
<td>S13</td>
<td><em>T. spiralis</em></td>
<td>20’000 larvae</td>
<td>59.74</td>
<td>207.5</td>
</tr>
<tr>
<td>S14</td>
<td><em>T. spiralis</em></td>
<td>20’000 larvae</td>
<td>78.45</td>
<td>45.8</td>
</tr>
<tr>
<td>S15</td>
<td><em>T. pseudospiralis</em></td>
<td>1’000 larvae</td>
<td>31.81</td>
<td>0.24</td>
</tr>
<tr>
<td>S16</td>
<td><em>T. pseudospiralis</em></td>
<td>1’000 larvae</td>
<td>17.16</td>
<td>0.08</td>
</tr>
<tr>
<td>S17</td>
<td><em>T. pseudospiralis</em></td>
<td>1’000 larvae</td>
<td>35.98</td>
<td>n.d</td>
</tr>
<tr>
<td>S18</td>
<td><em>T. pseudospiralis</em></td>
<td>20’000 larvae</td>
<td>57.36</td>
<td>24.4</td>
</tr>
<tr>
<td>S19</td>
<td><em>T. pseudospiralis</em></td>
<td>20’000 larvae</td>
<td>60.70</td>
<td>19.0</td>
</tr>
<tr>
<td>S20</td>
<td><em>T. pseudospiralis</em></td>
<td>20’000 larvae</td>
<td>51.14</td>
<td>10.1</td>
</tr>
<tr>
<td>S21</td>
<td><em>T. pseudospiralis</em></td>
<td>60’000 larvae</td>
<td>60.90</td>
<td>75.0</td>
</tr>
</tbody>
</table>

* a Percentage positivity
* b Larvae per gram as determined by artificial digestion of 10 gram muscle tissue
* c no larvae could be detected in the digested muscle tissue specimen
II.C. USAHA SCIENTIFIC PAPERS

Figure 1. Determination of the analytical sensitivity of the PrioCHECK® Trichinella Ab ELISA.
Serial dilutions of sera from pigs either experimentally infected with Trichinella species or from natural infections. PS1 ♦: T. britovi, experimental infection; PS2 ■: T. spiralis, experimental infection; PS3 ▲: T. spiralis, natural infection; PS4 ●: T. pseudospiralis, experimental infection. A cut-off of 15 PP corresponding to an OD$_{450}$ of 0.3 was used based on the positive control sample with a mean OD$_{450}$ of 2.0.
II.C. USAHA SCIENTIFIC PAPERS

Figure 2. Analysis of serum samples from pigs infected with *Trichuris suis*, *Oesophagostomum*, *Strongyloides*, *Hyostrongulus*, *S. typhimurium* and a mixed infection of *Oesophagostomum* and *Hyostrongulus*.

A) $OD_{450nm}$ values obtained with the PrioCHECK® Trichinella Ab ELISA for potential cross reactive serum samples. B) Enlarged graph shows that all potential cross reactive serum samples tested negative.
II.C. USAHA SCIENTIFIC PAPERS

Figure 3. Analysis of seroconversion samples collected at different time points after infection of pigs with different doses of larvae of *T. spiralis*, *T. pseudospiralis* and *T. britovi*. ♦ *T. spiralis* (20,000 larvae), ■ *T. spiralis* (1,000 larvae), ▲ *T. pseudospiralis* (20,000 larvae), x *T. pseudospiralis* (1,000 larvae), Δ *T. pseudospiralis* (200 larvae), ● *T. britovi* (20,000 larvae), □ *T. britovi* (1,000 larvae), ◊ *T. britovi* (0 larvae).

Figure 4. Determination of analytical sensitivity of the PrioCHECK® Trichinella Ab ELISA with spiked meat juice samples. Spiked: Negative meat juice samples spiked with *T. britovi* (A) and *T. spiralis* (B) serum in the dilution range of 1:10 to 1:1600. Serum: Serial dilutions from 1:50 to 1:6,400 of the positive serum sample used for the spiking experiment. Bars represent mean values and standard deviation of quadruplicate measurement.
II.C. USAHA SCIENTIFIC PAPERS

References


II.C. USAHA SCIENTIFIC PAPERS


II.C. USAHA SCIENTIFIC PAPERS

EFFECTS OF CULTURE CONDITIONS ON INTERFERON-\(\gamma\) PRODUCTION IN WHOLE BLOOD CULTURES FROM MYCOBACTERIUM BOVIS-INFECTED CATTLE

Irene Schiller, Roland Hardegger, Annika Kyburz, Alex Raeber, Bruno Oesch
Prionics AG

Ray Waters, Mitchell Palmer, Tyler Thacker, Brian Nonnecke
National Animal Disease Center

Martin Vordermeier
Veterinary Laboratory Agency
Great Britain

Abstract

The cell-mediated immune response to antigens of \textit{M. bovis} is currently used in the form of the delayed hypersensitivity test in skin or, in vitro, by the production of IFN-\(\gamma\) by T-cells in whole blood culture. The analysis of various parameters of the IFN-\(\gamma\) test is done in view of potential simplifications in order to streamline the assay procedure. Here we show that the culture temperature needs to be 33°C or higher and that there is no need to use incubation in the presence of \(\text{CO}_2\). Furthermore, various plate formats are shown to be feasible. The produced IFN-\(\gamma\) was stable at 4°C for 28 days as well as after repeated freeze-thaw cycles. It is therefore conceivable to start the stimulation part out in the field allowing for a more efficient testing procedure.

Introduction

BOVINE tuberculosis (TB), caused by \textit{Mycobacterium bovis}, has an important and adverse effect on socioeconomic, public health and on the trade in animals and animal products (Buddle et al., 2003). The eradication of bovine TB in cattle is based on the detection and slaughter of infected animals. The standard test for the detection of TB is the intradermal tuberculin test. The BOVIGAM® interferon (IFN) \(\gamma\) assay (Wood et al., 1990; Prionics AG, Schlieren, Switzerland) constitutes a laboratory-based TB test and is widely used complementary to the tuberculin skin test (De la Rua-Domenech et al., 2006) as it offers national TB control/eradication programs and industry an additional tool.
II.C. USAHA SCIENTIFIC PAPERS

with which to curtail the spread of TB in cattle and other Bovidae. The assay consists of a first step culturing whole blood with antigens and stimulating leucocytes to produce IFN-\(\gamma\) which is quantified by ELISA in a second step (Wood et al., 1990). The IFN-\(\gamma\) assay measures the cell-mediated immune response (CMI) and critically depends on the culture conditions.

Whole blood culture conditions for the IFN-\(\gamma\) production have been previously established as a routine laboratory procedure (Rothel et al., 1992). Pre-culture conditions, mainly delays in setup, have been found to reduce IFN-\(\gamma\) responses from infected cattle influencing sensitivity and specificity (Vordermeier et al., 2006; Waters et al., 2007). The time from blood sampling to the start of the stimulation has found to be critical (De la Rua-Domenech et al., 2006). It would therefore be advantageous if conditions could be found to allow stimulation out in the field.

In this study we show that stimulation temperature can be as low as 33°C and that carbon dioxide (\(CO_2\)) is not needed for pH stabilization. Furthermore we show equivalency of various plate formats which will further increase the flexibility and ease of handling. The final objective of this study was to optimize and standardize assay conditions of the BOVIGAM\textsuperscript{®} IFN-\(\gamma\) assay, thus increasing its possible contribution as a reliable tool for control and eradication of bovine TB.

Materials and Methods

Experimentally infected cattle

Male, TB-free, Holstein Friesian calves \((n = 5)\) were housed according to institutional guidelines at the National Animal Disease Center, Ames, IOWA (NADC) in a biosafety level 3 (BL-3) facility. Calves received \textit{M. bovis} strain 95-1315 by aerosol at 6 months of age as described previously (Waters et al., 2003). Blood samples were collected for this study 4 months after infection.

TB-negative cattle

Cattle of various breeds (Swiss Brown, Holstein Friesian, Red Holstein, and Jersey; \(n = 70\)) were kept in a Swiss farm. They were from 2 to 9 years old.

Culture conditions

Blood samples were collected in heparinized tubes and cultures were set up within 5hrs after blood collection. 250 \(\mu\)l of
whole blood per well were established in 96-well microtitre plates (Techno Plastic Products AG, Trasadingen, Switzerland, flat bottom, polystyrene) and stimulated by the addition of antigens. The supernatants were harvested after 24hrs of culture at 37°C and 5% CO₂ in a humidified incubator. For the comparison of culture plates we used 24-well (Techno Plastic Products AG, Trasadingen, Switzerland, flat bottom, polystyrene) plates with 1.5 ml of whole blood per well and 48-well (Becton Dickinson, Franklin Lakes, NJ USA, flat bottom, polystyrene) plates with 1 ml of whole blood per well additionally to 96-well plates. Antigens consisted of PPD-B and PPD-A (Prionics AG) at 20 µg/ml, a recombinant fusion protein of ESAT-6 and CFP-10 (rESAT-6: CFP-10; Waters et al. 2004; a kind gift from Dr. C. Minion, Iowa State University) at 5 µg/ml or PBS alone (no stimulation). For non-specific stimulation, pokeweed mitogen (PWM, Sigma) was used at 5 µg/ml and staphylococcal enterotoxin B from Staphylococcal aureus (SEB, Sigma) at 1 µg/ml.

**IFN-γ ELISA**

The IFN-γ concentration in culture supernatants was measured using the BOVIGAM® ELISA kit (Prionics AG, Schlieren, Switzerland). Optical density was determined at 450 nm (OD₄₅₀). A positive result was defined as: OD₄₅₀ PPD-B minus PPD-A >= 0.1 and OD₄₅₀ PPD-B minus Nil > 0.1 as defined in the package insert. For recombinant antigens, OD₄₅₀ minus Nil >= 0.1 was considered positive.

**Results**

Parameters for the culture conditions of the IFN-γ assay have been defined (Rothel et al., 1992). We have performed the stimulation at different temperatures as well as in vessels of different geometry. Furthermore we also analyzed the requirement of pH stabilization by carbon dioxide (CO₂).

It is our intention to simplify the stimulation part of the IFN-γ by being able to start the simulation out in the field using for example portable incubators. Often it is however difficult to control the temperature very precisely. It is therefore of importance to know what the minimal required temperature is. Figure 1A shows the results of stimulating with various antigens/mitogens at 37, 33, 29, 25 and 22°C in 5 experimentally infected cattle. Stimulation was equally efficient at 37 and 33°C using bovine and avian PPD, recombinant antigen ESAT-6 : CFP-10 as well as a non-specific
II.C. USAHA SCIENTIFIC PAPERS

mitogen (pokeweed) indicating that the different types of mitogens behave similarly. We observed as expected quite some variation from animal to animal as indicated by the size of the error bars while the IFN-\(\gamma\) assay itself showed less than 10% variation (results not shown). A significant reduction of the stimulation efficiency was seen at 29°C, and no stimulation was observed at 25 and 22°C. At all the temperatures the control without stimulation was low and did not vary significantly.

In contrast to the temperature, the vessel geometry did not change the stimulation (Figure 1B). All formats (24-, 48-, and 96-well plates) showed high production of IFN-\(\gamma\) upon stimulation with either ESAT-6:CFP-10 or pokeweed mitogen and a low background level in the non-stimulated cultures. We can not exclude small variations in the stimulation efficiency of the different plate geometries but we think that the variation between individual animals might mask this and therefore should not influence the outcome of the diagnosis.

The whole blood culture in the presence or absence of CO\(_2\) did not alter the production of IFN-\(\gamma\) (Figure 2). In using different amounts of Staphylococcus enterotoxin B (SEB) as a mitogen in 70 TB-free cattle, we simulated various levels of stimulation. The average as well the spread of the stimulation at the lower SEB concentration were equal with and without CO\(_2\) suggesting that the presence of carbon dioxide is not needed under the culture conditions used.

IFN-\(\gamma\) produced under these culture conditions was analyzed for its stability (Figure 3) which determines the time in which the ELISA part of the assay has to be carried out. Surprisingly, IFN-\(\gamma\) was stable for at least 4 weeks at 4°C (Figure 3A). Obviously we had made sure that the sample remained sterile. We would expect degradation if there was bacterial growth in the sample. As an alternative, the sample can be frozen and thawed at a later time for analysis. Five such freeze thaw cycles did not alter the amount of IFN-\(\gamma\) detected in the ELISA (Figure 3B). There was a slight reduction of the OD from fresh to 1day at 4°C. Even though this reduction was not statistically significant, it might represent a real effect which might at a low level of IFN-\(\gamma\) production influence the outcome. We will need to analyze this in more detail using field samples with stimulation at different levels. Nevertheless, these results suggest that the assay is very robust and allows for centralized test performance after stimulation.
Discussion and Conclusions

The aim of our studies was to analyze various parameters of the cell-mediated immunoassay for tuberculosis diagnosis (BOVIGAM®) in order to sharpen it as a tool for eradication of bovine tuberculosis.

The variation of culture conditions has shown us the potential to simplify the assay... Incubation in 96-well culture plates will allow for automation of handling. Previous use of 96-well plates indicated excellent stimulation (Vordermeier et al. 2002) yet it had not been compared to the culture conditions prescribed in the original test by Rothel et al. (1992). Since there is no need for CO₂ during culture, the stimulation might be done decentralized with the only condition that the incubation temperature needs to be kept above 33°C. The stability of the produced IFN-γ would then allow for shipping to a centralized lab for rapid automated routine analysis.

We therefore conclude that an appropriate setup in the field might allow the start of the stimulation followed by transport of the sample to a centralized assay laboratory. We will now explore different possibilities with the veterinarians and their services as to the practicability and efficiency of different solutions.

References


II.C. USAHA SCIENTIFIC PAPERS


Whole blood samples from 5 experimentally infected cattle were cultured under standard conditions with variations either of the culture temperature (A) or the vessel geometry (B) as indicated. Stimulation was performed with purified protein derivative from M. bovis (PPD-B) and M. avium (PPD-A), a recombinant ESAT-6: CFP-10 fusion protein (E:C), Pokeweed mitogen (PWM) and PBS as a control (NIL). Duplicate samples from 5 TB-infected animals were analyzed and data are presented as mean optical density (OD) values of all animals. The large variation (as indicated by the error bars) is due to the variation of the response between the individual animals.
Effect of culture environment on IFN-\(\gamma\) response. Whole blood samples from TB-negative cattle were cultured with and without CO\(_2\) atmosphere at 37°C. Stimulation was performed with staphylococcal enterotoxin B (SEB) at 1 and 0.1 µg/ml and PBS. Duplicate samples for individual treatments and individual animals were analyzed and data are presented as mean optical density (OD) values of responses of 20 animals.
II.C. USAHA SCIENTIFIC PAPERS

Figure 3
A. 5 Day Storage

Effect of plasma storage on IFN-γ values. Plasma collected from TB-negative cattle after stimulation with staphylococcal enterotoxin B (SEB) at 1, 0.1 and 0.01 µg/ml and PBS. Plasma samples were analyzed directly after collection, after one day storage at 4°C and after storage at -80°C with one up to five freeze and thaw cycles (A). Additionally, plasma samples were analyzed after prolonged storage at 4°C for up to 28 days (B). Duplicate samples for individual treatments and individual animals were analyzed and data are presented as mean optical density (OD) values of responses of 5 animals.
II.C. USAHA SCIENTIFIC PAPERS

A VISUAL DNA CHIP FOR IDENTIFICATION OF DIFFERENT GENOTYPES OF FOOT-AND-MOUTH DISEASE VIRUS

Chu-Hsiang Pan, Ming-Hwa Jong, Parn-Hwa Chao
Animal Health Research Institute
Taiwan

Lu-Yuan Liu
DR. Chip Biotechnology Inc.
Taiwan

Ping Wu, Gordon B. Ward, Brenda C. Donahue, Mary A. Kenny, and Ming Y. Deng
Foreign Animal Disease Diagnostic Laboratory
National Veterinary Services Laboratory

Foot-and-mouth disease (FMD) is a highly contagious viral disease that has a great potential for causing severe economic loss in susceptible cloven-hoofed animals. FMD virus (FMDV) is a member of the genus *Aphthovirus* in the family of Picornaviridae. There are seven serotypes of FMDV: A, O, C, Asia 1, and South African Territories (SAT) 1, 2, and 3. Infection with any one serotype does not confer immunity against another. Within the serotypes, many subtypes can be identified. It is difficult to differentiate genotypes of FMDV in a routine diagnosis unless an analysis of nucleic acid sequences is conducted. In this study, we developed a visual DNA chip for subtyping FMDV. Sixty-three synthesized FMDV genotype-specific oligonucleotide probes (20~30 mers) were spotted and immobilized on a single polyvinylchloride (PVC) chip to capture specific targets in the specimen. RNA of cell culture-grown virus was extracted with a QIAamp Viral RNA Mini Kit (Qiagen Inc., Valencia, CA) and subjected to a single-tube reverse transcription-polymerase chain reaction (RT-PCR) for FMDV. Both the forward and reverse PCR primers were biotinylated. A 5-µl portion of the product of the RT-PCR was used for a hybridization conducted on the oligonucleotide probe-immobilized PVC chip. A biotin-avidin alkaline phosphatase indicator system and NBT (Nitro blue tetrazolium chloride)/BCIP (5-Bromo-4-chloro-3-indolyl phosphate, toluidine salt) substrates were used in the
colorimetric development. Perfectly matched probe-target hybrid, if present, forms a visible blue-purple precipitate on the PVC chip. Hybridization patterns of different genotypes of FMDV on the PVC chip were then observed and interpreted visually. With this method, sixty-three different genotypes of FMDV could be identified including O/TAW/97, O/TAW/99, O₁/Campos, O₁/Manisa, A5, A12, A22, A24, A30, C1, C3, Asia 1, SAT 1, SAT 2 and SAT 3 subtypes. No cross-reaction was observed with other viral agents causing vesicular diseases such as vesicular stomatitis virus or swine vesicular disease virus. This diagnostic tool is potentially useful for rapid detection and identification of different genotypes of FMDV. It is simple and rapid. No sophisticated equipment is needed.
Johne’s disease is caused by *Mycobacterium avium* subspecies *paratuberculosis* (MAP) which infects the mesenteric lymph nodes and intestines of ruminant species. Adults transmit these bacteria to their fetus in utero or young via colostrum, milk and fecal contamination. This disease does not respond to treatment, so control depends on eradication. Since many large western sheep flocks graze on open range, there is further concern about the livestock-wildlife-human interface.

This diagnostic testing was initiated to accurately identify positive animals and their offspring for elimination from the flocks/herds. Because an individual sheep and goat has little economic value, we are searching for the most accurate but cost-effective means to identify a Johne’s positive animal. Range sheep are rarely confined, thus there are few opportunities for sampling during the year. Therefore, we attempted to set up our sampling protocol to find the best samples, the most convenient time and the most cost effective method for Johne’s disease flock/herd-level prevalence testing.

Three antimortum tests for detecting *M. avium paratuberculosis* positive animals are being compared: the bovine serology ELISA test (IDEXX Herdchek) using 0.250 S/P cutoff on sheep and goat serum, plasma and milk samples; culture of feces, tissues, and buffy coats from EDTA blood tubes, milk and colostrum; and, the Johnin intradermal skin test for status of cell-mediated immune response to the MAP infection. An increased sediment inoculum is being used on two culture media: BACTEC™ MGIT™ para TB liquid media with the fluorometric manual read method; and, Herrold’s Egg Yolk Agar (HEYA) with or without Mycobactin J (to determine if the isolate is MAP or the MAP bovine strain).

Our samples are coming from two cooperator producers. One is a 4000 ewe range flock, and one is a 20 doe farm herd. We have ELISA tested 130 samples from adults and young. At
II.C. USAHA SCIENTIFIC PAPERS

this stage of testing, we have found that the sera, plasma or milk from adults with S/P results greater than 0.400 are all culture positive. Also, the serum sample S/P results from positive dams’ lambs or doelings range from 0.400 to 1.500 until colostral antibodies wane at four months of age. We have cultured 100 samples from adults from tissues and feces of both the farm herd and range flock animals. We see growth in two weeks from positive tissues and multibacillary feces; and within 10 months from fecals from very low shedders. None of the MAP isolates grow on the initial HEYA media. The isolates are confirmed as MAP by subculture from MGIT acid-fast positive tubes to HEYA. Two paucibacillary does with serum S/Ps of 2.0 to 3.0 have been identified. These clinical animals were fecal culture positive but with few acid-fast bacteria in their tissues. The Johnin intradermal skin test agrees with the serology results early in infection, but this test becomes negative as the animal becomes clinical. The Johnin test is more easily used on a farm goat herd than a large range sheep flock. At certain times, milk is a more easily collected sample than serum, plus the milk pellet can be cultured. The ELISA is the most sensitive test for both the serum and milk samples from adults and serum from offspring less than three months of age.

As we identify individual positive animals, owners donate these animals. The animal is eventually euthanized, necropsied, and any lesions are sampled for culture and histopathology. Johne’s is only one cause of wasting in small ruminants; we also test for other diseases. The sheep flock is positive for OPP virus; the goat herd is negative for CAE virus. Fecal samples are also tested for intestinal parasites. Generally, MAP positive animals tend to have high parasite loads that never clear after repeated anthelmintic treatments.
Contrary to what is observed in chickens where infection with highly pathogenic avian influenza (HPAI) viruses produce fatal disease, the Asian H5N1 HPAI viruses have changed from producing mild respiratory infections in ducks to some strains causing systemic disease and death. In order to further understand the difference in pathogenicity observed between chickens and ducks in their response to infection with H5N1 HPAI viruses, we studied the clinical disease, gross and microscopic lesions, the tissue distribution of viral antigen, and the cytokine profile in 2-week-old white Pekin ducks and White Leghorn chickens inoculated intranasally with four different strains of Asian origin H5N1 HPAI viruses: A/Ck/HK/220/97, A/Egret/HK/757.2/02, A/Ck/Indonesia/7/03 and A/duck/Vietnam/203/05. Chickens inoculated with all four of these viruses were severely depressed the day after inoculation and died with a mean death time (MDT) between 1.6 and 2 days post inoculation (dpi). None of the ducks inoculated with A/Ck/HK/220/97 died, contrary to all ducks inoculated with A/Egret/HK/757.2/02 or A/duck/Vietnam/203/05 which died, with MDT’s of 5.5 and 3.9 dpi respectively. Six of ten ducks inoculated with A/Ck/Indonesia/7/03 died. Sick ducks were depressed and presented neurological signs. Microscopically, lesions and presence of viral antigen in tissues was similar in all the infected chickens and the ducks infected with A/Egret/HK/757.2/02, A/Ck/Indonesia/7/03 and A/duck/Vietnam/203/05, the severity of the lesions correlating with viral replication in tissues. Lesions in the lung were more severe in chickens, and virus replication was observed in vascular endothelial cells which were not observed in the ducks. These differences may explain in part the differences in pathogenicity observed between the chickens and the ducks when inoculated with the same viruses.

No difference in body temperature was found between control chickens and chickens inoculated with any of the four viruses. Conversely, an increase in body temperature was
observed in the ducks infected with A/Egret/HK/757.2/02, A/Ck/Indonesia/7/03 and A/duck/Vietnam/203/05, and this increase was proportional to virulence of the viruses. Innate responses differed also between chickens and ducks. In general, cytokine expression in chickens was suppressed following infection when compared to controls. Understanding the mechanisms for cytokine induction and suppression following HPAI infection will provide insights into the pathogenicity of AIV in different avian species.
PRELIMINARY EVALUATION OF THE POTENTIAL SHEDDING OF *MYCOBACTERIUM BOVIS* BY COYOTES AND RACCOONS

S. R. Johnson, M. R. Dunbar, A. R. Berentsen, 
National Wildlife Research Center 
Wildlife Services, APHIS

L. Martinez, R. L. Jones 
Microbiology, Immunology and Pathology 
Colorado State University

R. Bowen, P. Gordy 
Biomedical Sciences 
Colorado State University

Bovine tuberculosis (bTB) is endemic in white-tailed deer (*Odocoileus virginianus*) in the northeast corner of Michigan’s Lower Peninsula. At least seven wildlife species have been found positive for bTB in that area. In addition to white-tailed deer, bTB has been found in black bears (*Ursus americanus*), bobcats (*Felis rufus*), coyotes (*Canis latrans*), raccoons (*Procyon lotor*), red fox (*Vulpes vulpes*), and North American opossums (*Didelphis virginiana*). Each animal infected with bTB has the potential to be a transmission host to other animals, depending on whether or not the animal sheds the infectious organism, *Mycobacterium bovis*. Previous research indicates bTB prevalence in coyotes as high as 33% in the endemic area and raccoons as high as 4.7%. These species, especially raccoons, often frequent cattle feed areas and therefore could serve as an infectious source for cattle. The USDA, Wildlife Services, National Wildlife Research Center (NWRC) is conducting three studies to examine the shedding potential in coyotes and raccoons: one captive study and two field studies.

In the captive study, four coyotes were orally inoculated with 1.0 X 10^5 CFU/ml of *M. bovis*. Samples being taken consist of oral and nasal swabs and feces. All three samples are being cultured. Fecal samples are also being tested by polymerase chain reaction (PCR) and by exposing guinea pigs to the coyotes’ feces. As of June 2007, this study has been ongoing for 12 weeks. To date culture results consisting of pre-inoculation samples and Day 17 samples have been negative. No effect has
been observed on the guinea pigs. Near the end of the study at approximately 16 weeks, coyotes and guinea pigs will be necropsied and tested for *M. bovis* infection.

In the field, coyotes and raccoons are being trapped in select counties in northern Michigan. Oral/nasal swabs, fecal and tissue samples are being collected. Histology and standard culture techniques are being performed at the USDA, National Veterinary Services Laboratory (NVSL) on all tissue samples. The associated oral, nasal and fecal samples of tissue samples positive under histopathology or culture at NVSL are being cultured at the Microbiology, Immunology and Pathology lab at Colorado State University using modified culture technique. The fecal samples are also being tested by PCR at NWRC. As of June 2007, 49 coyotes have been sampled from three counties. Of these, four coyotes were *Mycobacteriosis* compatible under histopathology and of the 21 samples for which culture results are available, one concurred with the histopathology results and two additional samples were found *M. bovis* positive, despite being negative under histopathology. The related swabs and fecal samples are currently being cultured. As of June 2007, 42 raccoons have been sampled. Histopathology results on these raccoons were negative for bTB, but culture results are still pending.

Although still too early to reach any concrete conclusions, culture results from the captive study suggest that coyotes do not shed *M. bovis* within a 17 day incubation period. It is apparent from the field study that there are coyotes infected with bTB in the endemic area of Michigan. The final findings will provide information on the transmission risk of coyotes and raccoons, and thus their role in the spread of bTB.
II.D. USAHA MEMBERSHIP MEETINGS

FIRST MEMBERSHIP MEETING
MONDAY, OCTOBER 22, 2006
11:45-12:45 p.m.
Lee M. Myers, Presiding

STATE OF THE ASSOCIATION
Lee M. Myers
President

It is my pleasure as President to report on the state of the Association. The Association is fiscally sound and satisfying its mission of developing solutions to complex animal health issues.

As mentioned in my remarks last evening, the previous 12 months have been filled with new initiatives and the transition of association management. Our new executive director, Ben Richey, is doing a fantastic job of supporting the membership, program committees, the Board of Directors, and Executive Committee.

USAHA continues to engage in the activities of our public and private partners. The Executive Committee has had meetings throughout the year with leadership in USDA, APHIS, DHS, CDC,
II.D. USAHA MEMBERSHIP MEETINGS

AVMA, AAC, AAVLD, and others.

The USAHA committees are the lifeblood of our organization, and the Executive Committee this last year renewed their commitment to track progress on resolutions passed by USAHA general membership. In fact the Government Relations Committee meeting in Washington in February of last year was built around the USAHA resolutions. Our association’s resolutions are one of the major deliverables of our Annual meeting, and the Executive Committee will continue to utilize these resolutions as the formal expression of priorities of our association.

Looking forward, the Executive Committee will be planning the development of a strategic planning process. The last long range plan of 1997 served us well to get us to this point. USAHA has met the goals outlined in the 1997 long range plan – we now have an Executive Director to enhance management of our growing association, we have developed a year round presence with Executive Committee and program committees remaining active throughout the year, we have enhanced communications and information flow through the USAHA website and news alerts. The USAHA news alerts travel the globe every morning, and each one of us owe Karen Conyngham a rounding applause for concisely summarizing the animal health news of the day.

In an effort to remain the dynamic and cutting edge association, the USAHA leadership will be looking on the horizon to determine what USAHA should look like in 10 years to 20 years.

I have thoroughly enjoyed my term as President and appreciate your support and display of confidence.
Thank you Dr. Myers. Good afternoon, everyone. It is my pleasure to stand before you as your executive director, and share some thoughts with you from the past year.

First, I thank each of you for your support, input and cooperation with me in my first year on staff with USAHA. It has been an excellent challenge for me, one I have thoroughly enjoyed. I am happy to report that we have relocated the USAHA headquarters from Richmond, Virginia to St. Joseph, Missouri, just north of Kansas City. The transition has been fairly seamless, and I have been pleased with the move. We were able to do so within the allotted budget, leaving our reserves intact. I could not have done my job without the outstanding work of Linda Ragland and J Lee Alley. They have provided guidance and direction for me, in my learning of the ways of USAHA. And their work with the transition is due much credit for it being a success. I wish to thank the Executive Committee for their patience and direction with me over the past year. It has been a pleasure working with each of you.

Additionally, I would like to recognize Kelly Janicek, the
II.D. USAHA MEMBERSHIP MEETINGS

association’s executive assistant. Many of you have spoken with her, or met her out at the registration desk. She is the voice on the other end of the phone. Kelly has become an important asset to USAHA, learning the ropes and doing so quite proficiently. We are fortunate to have her positive attitude, as I enjoy working with her on a daily basis. Please take a minute to say hello to her if you have the opportunity.

As we look to the coming year, I am excited about the opportunities with USAHA. It has been said that it takes three to four years to gain a full understanding of how USAHA works. I’ve been on a fast track for that, but I know I still have much to learn. I look forward to further developing myself for the benefit of USAHA. I hope to continue to serve the membership to the best of my abilities, looking to institutionalize much of USAHA’s operations, and continue to increase value for the membership, under the leadership and direction of the Executive Committee.

I would hope that if any of you have comments or suggestions for USAHA, that you would share those with us. I thank all of you for your support, and for this opportunity with USAHA. Thank you.
The United States Animal Health Association (USAHA) continues to operate on a sound financial basis. The Association operated within the budget approved by the Executive Committee for fiscal year 2006-2007. The Association’s total income for 2006-2007 was $614,703.17. The budget had projected an income of $614,112.00. The Association’s total expenses for fiscal year 2006-2007 was $543,091.50. The Association’s budget for 2006-2007 had allocated $587,733.61 for expenses. The expenses were less than what was budgeted. The Association’s income after expenses for 2006-2007 was $71,611.67.

During fiscal year 2006-2007 the Association placed an additional $75,000 in certificates of deposit and $4,177.29 in the money market. On July 1, 2006 the association had $727,203.48 invested in certificates of deposit and the money market account. Interest of $29,511.93 was earned during the fiscal year. The Associations net worth on June 30, 2006 was $853,563.40. Which includes $835,892.70 in certificates of deposit and the money market account and $17,670.70 checking account balance on June 30, 2006.
II.D. USAHA MEMBERSHIP MEETINGS

An internal audit was conducted by a committee appointed by the USAHA Treasurer. Committee members included Bill Hartmann, Bret Marsh, and J Lee Alley, with support from staff Ben Richey and Linda Ragland. This audit was conducted at the USAHA office in Richmond Virginia on April 16, 2007. The purpose of the audit was to determine the financial status of the association prior to moving the office to St. Joseph, Missouri. The committee met and reviewed the Association financial records. The committee found the financial records and statements to be in good order. The monthly chart of accounts provides an audible accounting of all of the Associations financial activities. The chart of accounts also provides an excellent document to monitor the budget.

The fiscal year 2006-2007 financial statements will be provided to the Board of Directors at its first meeting Monday afternoon, October 22, 2007. Also Secretary J. Lee Alley has a complete set of the monthly chart of accounts for fiscal year 2006-2007. He will be glad to make these available for your review.

Are there questions concerning the Association fiscal year 2006-2007 Treasurer’s Report.
II.D. USAHA MEMBERSHIP MEETINGS

REPORT OF THE COMMITTEE ON NOMINATIONS

Chair: Bret D. Marsh

Dr. Bret Marsh, Chair of the Committee on Nominations and Resolutions presented the 2007 slate of offices nominees: President, James W. Leafstedt, South Dakota; President-Elect, Donald Hoenig, Maine; First Vice President, Richard Breitmeyer, California; Second Vice President, Steven Halstead, Michigan; Third Vice President, David Marshall, North Carolina; and Treasurer, William Hartmann, Minnesota. The nominees for district delegates are Northeast, John Enck, Jr, Pennsylvania and Ernie Zirkle, New Jersey; North Central, Velmar Green, Michigan and Jay Hawley, Indiana; South Gene Lollis, Florida and Greg Rosales, Alabama; West Bill Sauble, New Mexico and Tim Richards, Hawaii.

Dr. Marsh announced that the slate of officers for 2008 would be posted on the bulletin board and would be presented again for discussion during the Wednesday afternoon Membership Meeting meets at 1:35 p.m. At that time, members have an opportunity to amend the report by placing 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.
II.D. USAHA MEMBERSHIP MEETINGS

SECOND MEMBERSHIP MEETING
WEDNESDAY, OCTOBER 24, 2007
1:30-3:00pm

Lee M. Myers, Presiding

REPORT OF THE ACTION OF THE COMMITTEE ON NOMINATIONS

Chair: Bret Marsh

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, James W. Leafstedt, South Dakota; President-Elect, Donald Hoenig, Maine; First Vice President, Richard Breitmeyer, California; Second Vice President, Steven Halstead, Michigan; Third Vice President, David Marshall, North Carolina; and Treasurer, William Hartmann, Minnesota. The nominees for district delegates are Northeast, John Enck, Jr, Pennsylvania and Ernie Zirkle, New Jersey; North Central, Velmar Green, Michigan and Jay Hawley, Indiana; South Gene Lollis, Florida and Greg Rosales, Alabama; West Bill Sauble, New Mexico and Tim Richards, Hawaii.

That is the Report of the Committee on Nominations and I move for acceptance of the Report on Nominations.

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

Dr. Lea: I second Dr. Marsh’s motion for approval.

Dr. Myers: Is there additional discussion regarding the motion to approve the report. All in favor of acceptance of the Report on Nominations say, aye. Those opposed, like sign. The Report of the Committee on Nominations is accepted. Now I call upon Mr. James Leafstedt, USAHA’s 2007-2008 President to the podium so that I can present him the President’s gavel and for his remarks to this body.
II.D. USAHA MEMBERSHIP MEETINGS

Lee Myers passes the presidential gavel to the incoming president, Jim Leafstedt.
I first want to thank you for the confidence you’ve placed in me. I’ve always been impressed by the acceptance, this prestigious group, of a South Dakota farmer, livestock producer. I’d also like to thank the National Pork Board for sponsoring my attendance at USAHA for these many years.

This opportunity has allowed me to realize over the years the value you place in the cooperation of Federal and State agencies and the livestock industry.

I’m challenged by those who’ve done this job before me and would like to especially add my thanks to Dr. Lee Meyers for a job well done!

My study of the history of USAHA revealed an eight-year process of determining direction of the organization regarding the industry representatives that attended the meeting. In the 55th meeting, a spirited debate was held as to the inclusion of representatives of the livestock industry to the board of directors. It took until the 63rd meeting in 1959 to approve the addition of eight
II.D. USAHA MEMBERSHIP MEETINGS

regional representatives of the industry to the board of directors. I take this as a process of USAHA determining it was not just a convention of state and federal regulators, but indeed was an organization for the entire livestock industry.

My background may be known to many of you, but I’d just like to point out that I lost part of my livelihood when PRV struck my farm in 1976. I subsequently became involved in the South Dakota and the national campaign to eradicate PRV. My first time at USAHA was in 1985. Having watched the evolution and success of the PRV program and my involvement in that process has convinced me of the role of industry in successful disease management.

Sometimes it’s easy to get caught up in PCR’s or UMR’s and forget why we are. I’ve roped a cow in a pasture and pulled a calf. I’ve laid on a cold floor in a farrowing house to assist a sow. I insist that it’s the success and profitability of that farmer or rancher out there is the reason we exist. Unless the producers of America continue to prosper and put a safe, abundant product on the table, we don’t have a job. My goal is for us to continue that focus.

I have three goals for my presidency. One is related to what I’ve said, that having to continue to keep our focus on enhancing the success of the producers out there and to continue to seek their increased involvement in USAHA.

The second is to build on the good decisions of the last 2 years and enhance the ability of USAHA to better serve our membership through our full time staff and enhanced administrative ability.

The third is to continue to examine how we remain the most relevant on issues, to both the states and the federal agencies we deal with in our resolution process and government relations. I think we must constantly examine our role and evaluate our potential impact in forwarding the interests of our membership.
II.D. USAHA MEMBERSHIP MEETINGS

RECOGNITION OF IMMEDIATE PAST PRESIDENT

Mr. Leafstedt: At this time I would like to call on Past President Bret Marsh to the podium.

Dr. Marsh: Thank you, Jim. At this time, we recognize and thank the Immediate Past President Lee Myers. On behalf of the Association, we are grateful for your leadership and guidance of the association as USAHA’s 2006-2007 President. We have seen a number of changes over the past year under your direction, laying the foundation for the future of USAHA. To honor you, we present you the President’s Plaque, your life membership and the USAHA gold key. This is only a small token to express the Association’s appreciation for the hours of dedication and leadership you have provided USAHA.

Bret Marsh presents outgoing president, Lee Myers, with the President’s plaque in recognition of her service to USAHA throughout his year as president.

Mr. Leafstedt: Dr. Marsh, will you please come and present the Report of the Committee on Resolutions.
A total of 77 resolutions from the committees were submitted to the Committee. The actions for the resolutions by the Committee and United States Animal Health Association members includes:

- The following resolutions were combined: 1, 13 & 75; 2 & 11; 3 & 10; 4 & 12; 5, 14, 16, 24, 41, 58, 61 & 67; 15 & 64; 28, 47, 60 & 63; 40 & 62;
- The following resolutions were approved as submitted: 1-6, 8-22, 24-33, and 35-77.
- The following resolutions were approved as amended: 7, 34.
- No action by the membership was taken on Resolution 23.

The complete report of the Committee, including all resolutions in their entirety can be found in the committee reports portion of these proceedings, under Committee on Nominations and Resolutions.

Mr. Leafstedt: Thank you, Dr. Marsh. I declare this membership meeting adjourned.
II.E. COMMITTEE BUSINESS

REPORT OF THE USAHA/AAVLD COMMITTEE ON ANIMAL EMERGENCY MANAGEMENT

Co-Chairs: Keith Roehr, Denver, CO  
          Pat Blanchard, Tulare, CA

John B. Adams, VA;  Bruce L. Akey, NY;  Gary A. Anderson, KS;  
Joan M. Arnoldi, WI;  Tammy R. Beckham, NY;  Shane A. Brookshire, 
GA;  Consuelo Carrillo, NY;  David M. Chico, NY;  Leslie E. Cole, 
OK;  Kevin Dennison, CO;  Shelley F. Doak, ME;  Orlo R. Ehart, 
DC;  Brigid N. Elchos, MS;  Dee Ellis, TX;  Francois C. Elvinger, 
VA;  W. Kent Fowler, CA;  Cyril G. Gay, MD;  Lelve G. Gayle, TX;  
Jeffrey J. Hamer, NJ;  Gregg Hawkins, TX;  Elizabeth B. Herring, 
NC;  Donald E. Hoenig, ME;  Greg P. Jillson, NM;  Patrice N. Klein, 
MD;  Charlotte Krugler, SC;  Elizabeth A. Lautner, IA;  Randall L. 
Levings, IA;  Martha A. Littlefield, LA;  Barbara M. Martin, IA;  
John Maulsby, CO;  Thomas J. McGinn, III, DC;  David L. Meeker, VA; 
Lee M. Myers, GA;  Brian V. Noland, CO;  Sandra K. Norman, 
IN;  Kristy L. Pabilonia, CO;  Boyd Parr, SC;  Deidre A. Qual, ND; 
Jeanne M. Rankin, MT;  Mark Robinson, MD;  Paul E. Rodgers, 
CO;  James A. Roth, IA;  Mo D. Salman, CO;  A. David Scarfe, IL; 
Gary B. Sherman, MD;  Marilyn M. Simunich, ID;  Harry Snelson, 
NC;  George A. Teagarden, KS;  Kerry Thompson, DC;  David B. 
Tomkins, TX;  Alfonso Torres, Ny;  William C. Wagner, VA;  Sherrilyn 
H. Wainwright, CO;  David P. Warner, NC;  Patrick Webb, IA;  Ronald 
B. Wilson, TN;  Pam Zaabel, IA.

The Committee met on October 20, 2007 at John Ascuaga’s 
Nugget Hotel, Reno, Nevada, from 8:00am to 4:50pm. There were 
29 Committee members and approximately 121 guests present. 
The presentations will be posted on United States Animal Health 
Association (USAHA) website under Committee header.

Lee Myers presented the Update on the Food and Agriculture 
Government Coordinating Council (GCC). Myers presented 
overview of structure and functions of GCC. 2007 activities 
completed and in progress and requested input for 2008 goals. 
Myers requested input from states on the following: current state 
projects, state issues or concerns that should be addressed by 
GCC, notable success stories, suggestions on how GCC can better assist states and how can states enhance contribution to GCC.
United States Department of Agriculture (USDA), Animal Plant and Health Inspection (APHIS), Veterinary Services (VS), National Center for Animal Health and Emergency Management (NCAHEM) was presented by José Diez. He provided an update on 2007 activities and priorities and future directions.

- USDA will be creating response plans that are more disease specific than the Highly Contagious Disease Response Plan and that will integrate continuity of business issues.
- USDA will be revising plan for suspicion of highly infectious diseases when they occur in slaughter establishments and similar points of concentration.
- USDA will provide guidance to states in writing highly pathogenic avian influenza (HPAI) response plans – developing templates for them to use if they do not already have a plan.
- There was discussion on availability of table top and test exercises- unknown schedule at this time but exercises will continue to be available.

Sebastian Heath, Program Specialist, Department of Homeland Security (DHS), Federal Emergency Management Agency (FEMA), National Preparedness Directorate (NPD), gave the Department of Homeland Security (DHS)-USDA liaison and credentialing update. Heath discussed the following: Resource Typing and Credentialing of Animal Emergency Responders; Continuity of Community Planning White Paper; Table Top Exercise on Recovery Options (a puzzle vs. a mystery); National Preparedness System (NPS); and carcass decontamination. He then reviewed his new position within the NPD within DHS and where it fits in their organizational chart.

- Resource Typing and Credentialing of Animal Emergency Responders - the animal emergency response working group Task 1 was to link resource typing to target capabilities list which involved a functions analysis of animal specific operations. Task 2 was to determine the minimal criteria and prerequisites for each animal responder title needed to complete the animal specific operations.
- Continuity of Community Planning White Paper - response and recovery planning needs to be addressed in the context of a community rather then at the livestock
production level as emergencies have impact on the entire rural community.

- The NPS is a collaborative planning and assessment process supported by an online tool designed to facilitate integrated capabilities planning for large-scale incidents across levels of government and with nongovernmental organizations and the private sector. The NPS guides users through a capability assessment process that helps answer key questions.

Department of Homeland Security Update was given by Tom McGinn, DHS, Director Office of Health Affairs (OHA), Food, Agriculture and Veterinary (FAV) Defense. McGinn reviewed the structure, organization and responsibilities of the DHS–OHA-FAV.

**Mission:** Serve as the principal agent for managing DHS FAV defense missions and programs. Manage OHA-FAV defense resources to accomplish DHS medical priorities. Working with federal, state and local agencies, and with the private sector, the Directorate leads department activities in communicating and coordinating FAV defense programs to ensure the safety of the Nation’s food, agriculture, and veterinary sector.

**Strategic Goals:** Actualize food, agriculture, and veterinary sectors as critical infrastructure and key resources (CI/KR) through the identification of critical nodes, risks and consequences of loss, and the adequacy of federal, state, and local funding requirements; Measure public confidence in food protection through determination of the factors that contribute to that confidence, what will alleviate fears, and ways to enhance confidence in food protection; Ensure food, agriculture, and veterinary federal, state, local, and private sector programs are functionally aligned; Ensure DHS-FAV defense programs are sustainable through the use of strategic plans, supporting budgets, and personnel. The FAV Defense planned outcomes include:

- focus appropriate veterinary expertise to the Secretary of DHS;
- Develop subject matter expertise for International, Education and Plant/Wildlife arenas;
- Continue expansion of the intelligence community engagement;
- Expand the infrastructure specific business outreach efforts; facilitate the deployment and adoption of newly developed sector asset vulnerability assessment tools;
- promote HSPD-9 metrics; complete the integration and alignment of Food, Agriculture and Veterinary Defense Education curricula;
- fund a liaison program to other agencies; establish mechanisms
for a state program to establish and fulfill homeland security state requirements; and finalize strategic plan for FAV defense for the nation.

Greg Christy, Florida Department of Agriculture presented the DHS State Liaison Perspective. Christy discussed:

- The Pets Evacuation and Transportation Standards Act (PETS) and that it was funded via Category B within FEMA Public Assistance Grant Programs which provides assistance to states, local governments, and certain non-profit organizations to alleviate suffering and hardship resulting from major disasters or emergencies declared by the President. It reimburses not less than 75 percent of eligible costs.

- Public Security Advisors (PSAs) which is a Federally-funded resource that assists industry efforts in protection of CI/KR; assists States to identify and support CI/KR and during incidents they serve as CI/KR subject matter experts.

- DHS 2008 grants and training funds are similar to 2007. It focuses the bulk of its available grant dollars on risk-based investments and there is support for regional collaborative projects (Bonus Points), however regional funding mechanism is still state based making regional projects difficult to complete.

- The national response framework replaces the national response plan and is shorter and intended for senior elected and appointed leaders. It is not an operations or con op plan. The review period ended for the main document and supplemental annexes review period ends 60 days from September 10. Comment form and instructions for submission online are at www.fema.gov/nrf

- DHS Criticality Project will be used to identify state CI/KR to establish state’s risk and should lead to funding.

- Homeland Security Information System (HSIN) provides: alerts, warnings, advisories, bulletins; incident reporting; sector collaboration and information sharing; contact information for government and industry; CI/KR monitoring and reporting; as resource library. Contact Greg Christy to sign up.
ANIMAL EMERGENCY MANAGEMENT

- The process on how Florida established state level response teams.

The National Veterinary Stockpile (NVS) Update was provided by Glen Garris, USDA-APHIS-VS. Garris reviewed the structure, mission and goals of the NVS. The stockpile is continuing to develop and expand. They are identifying additional locations. He discussed current management of stockpile, deployables, response sets by species, 3D (depopulation, disposal and decontamination) contracts being set up with private contractors and NVS is developing training and certification materials for these contractors which will be available to states also. He also discussed future capabilities under consideration. The federal, state and local NVS responsibilities include being able to request, receive, store, stage, manage and distribute assets and recover unused reusable assets.

Overview of Seven Years of Foot-and-Mouth Disease (FMD) Exercises and Progress was given by Rosemary Speers, CNA Corporation. The exercises over time have been building upon each other to test different areas of FMD response. Some outcomes include refining definitions in Tripartite doctrine; training for state agriculture responders about tripartite doctrine and vaccine Bank; increasing awareness among other agencies about response issues during FMD outbreak; participating countries are using our analysis to refine their FMD strategy; analysis used for development of NVS. The next steps include: Continue to include the “presumptive phase” since many important decisions are made before the disease outbreak is announced to trading partners and most response plans begin at confirmation; Develop and disseminate planning factors as broad assumptions are used in the absence of information, and errors can result and we need to identify the initial factors for field vs. policy decision-making regarding restriction zones, vaccine, depopulation, disposal, personnel, etc.; and USDA and DHS integration to resolve possible tension between mission to eradicate disease and mission to protect infrastructure.

Dee Ellis, Texas Animal Health Commission (TAHC), presented Texas FMD Exercise Operation Palo Duro. Ellis reviewed lessons learned in each of the five focus areas of the exercise which included lab surge capacity, public information,
euthanasia and disposal, vaccination, and movement control. His state planning suggestions included: write state and local basic plans focus on who more than how; incident command system (ICS) training critical and develop incident management teams (IMT); practice with state/federal/local/industry; stop/start/ permit movement policy; study USDA “Draft” guidelines i.e., highly contagious disease, disposal, etc… and policy starting points and resist the urge to write state/local policy on these topics; Assess Hub lab capacity/priority of samples; and endorse all hazard approach and clarify authority and roles.

From Farm to Fork: How to Feed Good Legislation was presented by Jennifer Bryning Alton, Public Health Preparedness Policy Director, Senator Richard Burr, Committee on Health, Education, Labor and Pensions. Bryning Alton covered the background and development of Senate 1804 National Agriculture and Food Defense Act including the breadth of federal and state agencies, academia and private sector organizations which were contacted for input in the issues prior to writing the bill. The six major areas addressed in the bill include: Identifies federal leadership; requires a national strategy; builds state capabilities; establishes public-private partnerships; implements early detection, rapid response; and requires decontamination and disposal standards and plans. She provided further details on the act which codifies many of the HSPD-9 responsibilities but also includes some new areas. She requested input on areas of concern or support and may be contacted at 202-224-0121.

Extension Disaster Education Network (EDEN); your land grant partner in preparedness and response education was presented by Julie Smith, University of Vermont. The role of EDEN is to share educational materials through the land grant system to reach a broad spectrum of users. These resources are inclusive of the four areas of emergency management—prevention mitigation, preparation, response and recovery—and provided with the intent of reducing the impact of natural and man-made disasters. The top-priority goals of the EDEN Agrosecurity Committee, formed in 2007, are to promote individual farm, agribusiness, and community planning; provide Extension personnel with guidance, lessons learned, and tools to enable assistance with county and state emergency management; promote regional planning activities; and promote preparedness and response exercises that
ANIMAL EMERGENCY MANAGEMENT

bring together government, industry, and academia. State EDEN points of contact (POCs) can be found through the website: www. eden.lsu.edu.

USDA-APHIS-Animal Care (AC) emergency management update was provided by Chester Gipson, Deputy Administrator, AC. Gipson reviewed the outcome of the Harvard School of Public Health Project on the Public and Biological Security 2006 and 2007 surveys related to hurricane evacuation. Thirty one percent of individuals in an 8 state area bordering the coast indicated they would not evacuate; an increase from 23 percent in 2006. Of those people who indicated they would not evacuate 27 percent cited an unwillingness to leave a pet (of all respondents - 8.4 percent would not evacuate for pet reasons). Unwillingness to leave a pet was the fifth most frequently cited reason why people said they would not evacuate. The Post Katrina Management Reform Act (PKEMRA) places primary responsibility for the management of household pets in disaster to the FEMA mass care directorate. PKEMRA directs the FEMA Administrator: (1) in approving standards for state and local emergency preparedness plans, to ensure that such plans take into account the needs of individuals with special needs and individuals with pets; (2) to ensure that each state, in its Homeland Security Strategy or other homeland security plan, provides comprehensive pre-disaster and post-disaster plans for individuals with special needs; and (3) to ensure that state and local emergency preparedness, evacuation, and sheltering plans take into account the needs of individuals with household pets prior to, during, and following a major disaster or emergency. The act authorizes the FEMA Administrator to provide financial and technical support to states and local governments. Responsibility for coordination of a response effort for household pets is delegated from FEMA to APHIS through the Emergency Support Function (ESF) 11 annex of the National Response Framework (NRF). The ESF 11 annex adds the safety and well-being of pets as a fifth area of primary responsibility. APHIS is working with FEMA to ensure that responsibilities for pets are clear and consistent throughout the National Response Framework. APHIS intends to establish a Multi-agency Coordination Committee (MAC) for pet issues. MAC membership would include all federal agencies and non-governmental organizations (including humane organizations) with resources available for household pets in a disaster. The function
of the MAC is to fill gaps in state response resources. This MAC should address the issues raised related to a need for a national coalition of stakeholders requested in USAHA 2006 Resolution.

**Business meeting**

Keith Roehr announced the new American Association of Veterinary Laboratory Diagnosticians (AAVLD) Co-Chair will be Dr Marilyn Simunch from Idaho who is replacing Pat Blanchard. Two resolutions were passed by unanimous vote of the Committee and forwarded to the Committee on Nominations and Resolutions.

Marilyn Simunich reviewed the final report of the Subcommittee reviewing the sector specific plan of the National Infrastructure Protection Plan. Report was handed out and sent via email to members.

The Committee recommended that carcass and product disposal/ decontamination be addressed by the GCC in 2008.
REPORT OF THE USAHA / AAVLD COMMITTEE ON
ANIMAL HEALTH INFORMATION SYSTEMS

Co-chairs: Bruce L. Akey, Ithaca, NY
Francois C. Elvinger, Blacksburg, VA

Stan D. Bruntz, Co; Craig N. Carter, KY; James T. Case, CA; Max E. Coats, Jr., TX; Malcomb G. Fearneyhough, TX; William L. Hartmann, MN; Jodi A. Hoynoski, VT; Elizabeth A. Lautner, IA; Janet Maass, CO; Kevin D. Maher, IA; Larry D. Mark, VA; Michael K. Martin, SC; Richard E. Pacer, MD; Deidre A. Qual, ND; Emi K. Saito, CO; Mo D. Salman, CO; Jack L. Schlater, IA; Robert Smith, VA; Glenn B. Smith, GA; Christine Spaulding, WA; Mark C. Thurmond, CA; Steve Weber, CO; Nora E. Wineland, CO.

The Committee met on Sunday, October 22, 2007 from 12:30pm to 5:30pm at John Ascuaga’s Nugget Hotel, Reno, Nevada. Attendance included 13 members and approximately 35 guests. Sixteen guests requested Committee membership.

Stan Bruntz, United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), National Surveillance Unit (NSU), presented the National Animal Health Reporting System (NAHRS) 2007 update. The NAHRS Steering Committee convened June 19, 2007 by teleconference and met August 13-14, 2007 in Fort Collins, Colorado. The following issues were discussed and were brought forward to the full Committee: Participation—as of October 2007, 46 States (44 States in 2006) are currently reporting to NAHRS. All 46 participant states reported to NAHRS every month in 2006. NAHRS information continues to be an important source of information used by Veterinary Services to complete U.S. animal disease status reports for the World Organization for Animal Health (OIE). The NAHRS is a credible source of information to support trade negotiations. It also provides summary level information on ‘program’ diseases and foreign animal diseases (FADs) as well as being a national source of information on the confirmed occurrence of endemic OIE-listed diseases. In 2008 the direction of NAHRS will move from recruitment to national awareness of NAHRS with continued improvement and validation of NAHRS reporting. This will be towards the objective: That the NAHRS reflects the
REPORT OF THE USAHA/ AAVLD COMMITTEE

comprehensive summary-level animal disease status of the United States. Individual State NAHRS reporting reflects the summary-level disease status in that State. NAHRS Steering Committee Membership has been enhanced to include representation from the National Assembly of State Animal Health Officials (NASAHO), Regional USDA Area Veterinarian in Charge (AVIC), and National Poultry Improvement Plan (NPIP). Current representatives are NASAHO; Tony Frazier, Alabama; Keith Roehr, Colorado; Steve Halstead, Michigan; AVIC—Paul Sciglibaglio, Texas; and NPIP—Steve Roney. The 2006 NAHRS Annual Summary Report included resource information on OIE listed diseases and the OIE Reportable Disease list. The expansion of NAHRS aquaculture reporting is moving forward as monthly teleconference meetings are being held with the NAHRS Coordinator, NAHRS Aquaculture Chair, NAHRS American Veterinary Medical Association (AVMA) Liaison, VS Aquaculture Program Staff and other involved parties and stake holders. The NAHRS On-line Reporting Tool version 2 is set for release in November 2007. The system will improve the function and format of the on-line reporting tool. As requested by the Subcommittee on Equine Infectious Anemia of the United States Animal Health Association (USAHA) and NAHRS Equine Chairperson and approved, the NAHRS On-line Reporting Tool version 2 will also include an expanded equine infectious anemia (EIA) data request. The EIA module is optional but states that utilize it will not have to submit an annual EIA report to VS Equine Program staff. Also due to the recent increase of Equine Herpesvirus Myeloencephalopathy (EHV1-EHM) a request from Equine Commodity Chair, Tim Cordes was made and approved to collect qualitative presence/absence information on EHV1-EHM in addition to the combined EHV-1 and 4 information currently reported in NAHRS. Other issues currently being discussed include compartment versus commercial reporting in NAHRS and current OIE reporting that requires information on the identification of the presence of infection/infestation, and the relation to NAHRS disease reporting criteria.

Stan Bruntz also followed up on the Committees’ request to the Centers for Epidemiology and Animal Health (CEAH) that: …recommend that CEAH direct its staff, National Surveillance Unit in collaboration with other units, to compile and evaluate all current disease reporting and notification requirements in all States, and suggest a federal list of reportable diseases for consideration at the 2007 USAHA Annual Meeting, Reno, Nevada.
The evaluation concluded that all states have some type of reportable disease list, or reporting requirements, but there is a significant lack of standardization between state lists. The basis for most lists includes FADs, OIE and ‘program’ diseases and several states utilize the NAHRS reportable disease list. These lists appear not to be updated as changes occur in the OIE or NAHRS reportable disease list. Diseases are also listed in multiple formats from state to state for the same disease. The diseases that should be reported to the national level and reporting requirements are listed in multiple areas of the Code of Federal Regulations (CFR) and VS memorandums. The reasons for a comprehensive U.S. National Reportable Disease List include: there are international animal disease reporting requirements with no corresponding U.S. national reporting requirement: diseases currently requiring reporting to the U.S. national level are listed in multiple locations of regulations and memorandums: state reportable lists lack standardization and are not updated as often as they need to be to provide accurate and timely reporting: the lack of a US Reportable Animal Disease List can be a trade issue, as one of the first requests from trade partners is to see the other countries National Reportable Disease List.

Aaron Scott, NSU, USDA-APHIS-VS, Centers for Epidemiology and Animal Health (CEAH), briefed the Committee on the current state of the development of the National Animal Health Surveillance System (NAHSS) as well as the need for development of a comprehensive, integrated surveillance program. The NAHSS began as a concept in the minds of many people thinking toward the future needs of industry to facilitate trade, consumer confidence, and informed policy decisions. Some of the outcomes of the concept were recommendations of the 2001 Safeguarding Review, a USAHA Resolution for a NAHSS strategic plan, the NAHSS Steering Committee, and the NSU – the first unit in VS wholly dedicated to surveillance. The NAHSS isn’t happening by accident or overnight and will continue to develop for years to come. For over a hundred years, APHIS-VS and the agricultural industries have built one of the greatest disease control and eradication infra-structures in the world. Now, after successfully eliminating many of those diseases, it is time to shift surveillance thinking. Can USDA rapidly find animal disease in the United States – wherever it may arise? Can the United States make statements about its national disease status?
that will convince trading partners that its products are safe and convince consumers to buy them? Can national policy decisions be informed by information based on actual data, support industry and have the information needed to spend tax dollars wisely? Having a comprehensive, integrated NAHSS will provide information to do all of these.

Today, a comprehensive and integrated NAHSS has grown beyond a concept in the minds of forward thinking animal health experts. The NAHRS includes over 120 diseases in 6 species categories and geographically covers 46 states. A comprehensive inventory of surveillance systems in the U.S. is available at http://nsu.aphis.usda.gov/inventory. National surveillance plans are based on standards that allow for comparison between diseases and species and the opportunity to gain efficiencies at all levels in the chain of operations.

A good example of a national system is bovine spongiform encephalopathy (BSE). In 2003, the beef industry in the U.S. lost between 2 and 3 billion dollars following the detection of a positive animal. A surveillance system was developed with broad participation by State, Federal, and industry groups. It included the National Animal Health Laboratory Network (NAHLN), Animal Health Surveillance and Monitoring (AHSM) which is a new paradigm for data base development, and data translated into information that proved that the prevalence of BSE in the U.S. is very, very low. The final product of the surveillance system (i.e., information) strongly supported reopening of markets, consumer confidence in American beef, and policy decisions to reduce the costly testing done through enhanced surveillance. The bottom line of this comprehensive national surveillance system amounts to substantial dollars for our industry and savings from science based policy decisions.

Comprehensive surveillance doesn't stop with thorough coverage for a single disease. Standardized plans allow for integration and efficiencies across diseases and even across species. Infrastructure leverage for cost efficiency and common surveillance streams with multiple tests from one farm, animal, or laboratory submission when possible. National databases with similar structure support rapid analysis of trade and health questions. Analytic tools to make surveillance more cost effective and efficient and allow similar metrics to be applied for comparison. Most importantly, it will yield national level information to support decisions, policy, trade, and consumer confidence.
Richard Baca, CEAH, USDA-APHIS-VS, described the evolution of the generic database (GDB) into the universal database and the animal health and surveillance management (AHSM) application. The goal of the AHSM development project is to create a complete tool for animal health management, from initial data collection in the field to easy data retrieval and data interchange at the database level. The AHSM is not just a newer version of the GDB but GDB data will be migrated into it. In addition, AHSM will use a variety of interfaces customized to the needs of different animal health programs yet will be based on strict data standards that will facilitate data sharing between programs. In contrast to the client-server forms-based GDB, the AHSM will use a standard browser interface which greatly simplifies maintenance of the application. At the core of the AHSM will be a re-designed unified database (UDB) which will provide greater flexibility and security. Currently the AHSM comprises several modules to allow data capture of laboratory testing data for the scrapie, classical swine fever, Avian Influenza and Bovine Spongiform Encephalopathy programs. In the coming year additional modules and enhancements will be focused on the scrapie, chronic wasting disease and the classical swine fever programs. In addition to data capture functionality the AHSM will include significant enhancements such as mapping, data query and drill-down, automated generation of alerts, photo uploads and analytic tools. The USDA plans to form a new State/Federal Committee made up of users, analysts and information technology specialists, lead by staff from the Center for Animal Disease Information and Analysis and the NSU to provide oversight and direction for development of the AHSM. An immediate goal will be to create a common Data Management Plan for all data processing within the AHSM.

Sarah Tomlinson, NSU, USDA-APHIS-VS, gave the Committee an update on the development of a National Vesicular Disease Surveillance Plan. The NSU has a two-part approach to the design of vesicular disease surveillance. Part 1 is baseline surveillance for detection of the initial case; Part 2 is surveillance during increased risk or an outbreak. The three phases of each part are design, development, and implementation. The design phase of Part 1 is complete, and Part 2 is in the early design phase. The two objectives for surveillance are the rapid detection of disease introduction and for the analysis and documentation to
support disease-free status. There are five general components of the vesicular disease surveillance plan: 1) observational surveillance, which includes both passive observation and reporting as well as active observational surveillance. 2) laboratory based surveillance, which is based on targeting pre-vesicular lesions and is in the final stages of design to incorporate foot-and-mouth disease (FMD) tested based on a trigger by clinical signs and case history and/or a syndromic panel that includes FMD. 3) high risk swine sero-surveillance on high risk populations, as identified by pathways assessments, which will integrate with existing CSF and pseudorabies (PRV) surveillance systems by using the same samples collected in waste feeding, outdoor herd and feral swine populations. 4) market based syndromic surveillance, an extension of active observational surveillance into markets, relying on accredited veterinarians to play a crucial role in the prevention of disease spread. 5) risk-based intelligence draws in information from a variety of sources to identify a location or population of elevated risk in which targeted surveillance can be conducted accordingly. The next steps will be to finalize the design phase of Part 1 by establishing laboratory protocols, proceed with the development phase, including information technology charters and system requirements, and secure funding sources.

James Case, California Animal Health and Food Safety Laboratory, University of California-Davis, presented a review of non-traditional data sources for animal disease surveillance. The recognized limitations of laboratory based disease surveillance require utilization of additional sources of data that are not commonly included as components of focused surveillance program. Many of these are being investigated by state and federal agencies for inclusion in their ongoing surveillance activities. Syndromic surveillance in the human health community utilizes a variety of data sources such as emergency medical services, school nurse records, school absentee records, physician outpatient encounters, over-the-counter pharmaceuticals, prescription pharmaceuticals, etc. Many of these data sources take advantage of existing code systems such as the National Drug Code, Current Procedural Terminology, International Classification of Diseases and others that are required for reimbursement or mandated reporting.

It is suggested that similar sources of data useful for surveillance are available for animal syndromic surveillance such
ANIMAL HEALTH INFORMATION SYSTEMS

as retail drug sales, non-identified herd health disease records, practitioner call records, corporate practice medical records, sale yards, abattoirs, vaccine sales and analytical test kit sales. Additionally, new technologies that allow searching of internet data sources such as animal related web sites, discussion forums, local and national media and blogs, can provide massive volumes of information that may be used to identify animal health events. Issues surrounding consistency, comparability and context of use of these data sources require that they be used carefully when included in animal health surveillance activities. The ability to perform event detection, spatio-temporal analysis and ongoing situational monitoring is highly dependent on the data quality of the sources used. A number of small scale projects have been undertaken to include some of these non-traditional sources and a renewed effort by the Center for Emerging Issues of CEAH to evaluate them in the context of improved surveillance may provide support for the value of these sources to improve our ability to monitor the health of animal populations. It is important to continue these efforts to augment the classical sources of surveillance data, taking into account the impact that they may have on decision and policy making and taking care not to overstate their veracity or understate their value.

Tracey Lynn, USDA-APHIS-VS, Center for Emerging Issues (CEI), described efforts underway to further develop surveillance for emerging animal diseases and issues. The focus of this development includes:

- alignment with the National Surveillance Units’ Surveillance Standards
- bringing structure to current processes
- identifying current challenges and strengths
- updating and streamlining processes
- coordinating the plan with CEI and CEAH communication plans
- coordinating the plan with needs of other VS units

The objectives of this surveillance plan are to:

- provide timely warning of a suspected domestic occurrence of a foreign animal disease
- provide timely recognition of emerging diseases
- create a body of knowledge relative to global disease emergence, movement and changes in risk
REPORT OF THE USAHA/ AAVLD COMMITTEE

- facilitate identification, assessment and forecasting of important trends affecting, or with the potential to affect, animal disease emergence, animal health or animal related industries

Data streams utilized include passive reporting and active observational data, both open source and structured data. Information from the Armed Forces Medical Intelligence Center, global newspaper services, animal-related listservs and websites, the Offshore Pest Information System and the newly created Argus biothreat surveillance system, among others, will be used. Potential emerging disease events are evaluated for level of risk using a weighted algorithm based on disease emergence factors. The risk level of the event combined with other intrinsic factors determine what information may be dispersed and to which customers. Expected outcomes from this surveillance effort include improved situational awareness, derivation of actionable information, detection of domestic emerging diseases, analysis of risk factors and identification of trends. A draft of a Communication Plan concerning this effort is under review; many of these surveillance processes are in progress already.

Andres Perez, Center for Animal Disease Modeling and Surveillance, University of California-Davis, addressed the Committee on FMD BioPortal: A System for Global Surveillance of Foot-and-Mouth Disease. Countries and agencies need to have a global situational awareness for FMD and to be able to estimate, in real time or near real time, elevated risks of FMD so that appropriate measures can be taken to prevent or mitigate disease and its impact. One of the strategies for early detection of and response to FMD is that of global surveillance, which would aim to seek out specific information about new FMD cases, changing risks of FMD, and genomic changes in the FMD virus as necessary in planning and preparing for an FMD incursion. Although there has been considerable discussion about the needs and prospects for a global surveillance system for FMD, little in the way of formal action has taken place to create such a system.

The FMD BioPortal was developed initially as a collaborative effort of the FMD World Reference Laboratory at Pirbright, United Kingdom, the Artificial Intelligence Laboratory at the University of Arizona, and the FMD Laboratory at the University of California, Davis. Version 1.0 was made operational in January, 2007 (http:
fmd.ucdavis.edu/bioportal/). An initial goal was to create a web-based system that would make all FMD-related data presently banked at the Pirbright laboratory available to the public. A primary objective was to be able to apply basic search and analytic tools to the data, including graphic and tabular presentation and spatial-temporal clustering analysis, and to be able to download selected records. Since its first release, additional databases have been captured by the FMD BioPortal, including FMD virus genomic data from GenBank and weekly country incident data from OIE (version 2.0). Major systems components of the FMD BioPortal include secure, real-time data transfer, data analysis modules, and interactive visualization tools that allow for integrated analysis and display of epidemiological and genomic sequence data, including linkages with Google Earth. Another version of the FMD BioPortal, which is planned for December 2007, will have additional functionality to access models for real-time development and comparison of phylogenetic trees of virus isolates using FMDV sequence data. One analysis module allows for user adjustment of a threshold genetic distance between any two isolates to assess genetic relatedness among FMD virus strains, using a phylogenetic tree display. Development of the FMD BioPortal represents an important step forward in realizing a goal of global infectious disease surveillance and in recognizing that global surveillance will not be possible without a system for international real time information sharing and analysis.

Tim Carpenter, Center for Animal Disease Modeling and Surveillance, University of California-Davis, addressed the Committee on Modeling as a Tool for Surveillance Planning and Analysis. Simulation modeling can be a useful tool in surveillance. It can be used either for exotic or endemic diseases, alike. For exotic diseases, such as FMD, simulation modeling can be applied in the planning, detection, response and recovery phases of a disease outbreak. Planning and detection- this is often thought of as the pre-war phase of disease, and as such presents an opportunity to simulate a wide range of scenarios. With respect to surveillance, alternatives can be evaluated, such as placement of virus detectors on sensitive premises, such as feed lots, sales yards, dairies and calf raising operations. Scenarios, such as number of these detectors and frequency of testing, can be evaluated in a benefit-cost manner, with the cost being the fixed and variable expenses of putting the system
in place and its operating costs. The benefit would be the costs avoided by detecting the disease earlier than it would have been without the detector. Another application would be the application of a ring vs. regional surveillance strategy to detect disease. Response planning would hopefully also be done in a pre-epidemic period. Simulation modeling can be useful to guide surveillance to evaluate testing strategies during an outbreak. This could enable the evaluation of constraints, e.g. manpower, field or laboratory tests, on the system. Non-surveillance examples of useful modeling would include carcass disposal, depopulation and vaccination. Simulation modeling could be used to guide the surveillance program once the disease was contained. This could consist of maximizing the testing efficiency and focusing on either contiguous premises, dangerous contacts, or herds in a high risk zone. This directed surveillance application could be applied to the response phase as well and if so, it could also help guide the timing of testing, e.g. based on the time since animals were received in a herd. Based on “intra-herd” simulations, a more rational testing strategy could be selected.

Michael McGrath, TraceFirst Incorporated, described lessons learned in the development and implementation of information systems to address Emergency Preparedness and Disease Outbreak Management. All such information systems require a foundation of good information, good processes and good system. Good information exhibits the following characteristics:

- electronic availability 24x7, 365 days a year
- systematically refreshed
- housed in a system relevant staff can actually use
- queries can be formed and executed without an advanced degree
- spatially accurate

Failure to design and implement a system with these characteristics can lead to massive amounts of incorrect data and systems that are unable to answer the call and facilitate getting ahead of disease spread such as happened in the FMD outbreak of 2001 in the United Kingdom. Development methods must also be conducive to efficient change control and the design must include easy scalability as well as data segregation. A systematic approach to continual data quality improvement must be included. Spatial display and analysis has also become a “must-have” but should be implemented at a level appropriate for the average end-
user while preserving links to full-featured spatial analysis systems for the experts.

The Committee considered, discussed and passed three resolutions that were forwarded to the Committee in Nominations and Resolutions.
The Committee met on Monday, October 22, 2007, at the John Ascuaga’s Nugget Hotel, Reno, Nevada. Chair Amelita Facchiano called the meeting to order at 1:00 p.m. with 30 Committee members and more than 40 guests present. Facchiano acknowledged the assistance of the Vice Chairs, Ria de Grassi and Carolyn Stull, in organizing the agenda. Facchiano described her background goals concerning animal welfare issues and then recounted the mission statement of the Committee as follows: The Committee on Animal Welfare explores animal welfare concerns and seeks to present data in an honest, unbiased, science-based manner for 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. She then invited Steven Halstead to review the 2006 meeting and the two Resolutions that passed the Committee, but failed the general membership vote.

Michael David, Director, National Center for Import and Export (NCIE), Sanitary International Standards Team, Veterinary Services (VS), Animal and Plant Health Inspection Service (APHIS), United States Department of Agriculture (USDA), provided a historical perspective and future activities of the World Organization for Animal Health (OIE) concerning animal welfare issues. In 2004, the member countries of the OIE voted to develop an animal welfare mandate with guidelines based on science, with focused outcomes, and a commitment to consult and communicate with stakeholders. As of May 2005, four guidelines have been developed and adopted for the issues of slaughter, humane killing for disease control purposes, transportation by sea, and transportation by land. A newly developed animal welfare guideline on dog population control is being circulated for comment. The 2007 Work Plan includes the development of a discussion paper on the housing and production of farm animals that will be based on three objectives for the standards including protection of animal health, protection of psychological well-being, and provision of natural living conditions. The OIE held its first conference on animal well being in Paris, France in 2004, and a second conference is planned for Cairo, Egypt in 2008. David forecasts that the acceptance and implementation of the guidelines in international trade will be slow and gradual.

Gail Golab, Interim Director, Animal Welfare Division, American Veterinary Medical Association (AVMA), provided an update on the organization’s activities. Since 2004, the AVMA has been strategically restructuring its animal welfare efforts. Between 2004 and 2006, AVMA restructured its Animal Welfare Committee with 18 members, various practice and species representations, developed the overarching AVMA Animal Welfare Principles, and created the Animal Welfare Division, including five approved positions.

In June of 2007, the AVMA Executive Board prioritized five strategic goals for the Association. One goal is that AVMA is a leading advocate for, and an authoritative, science-based resource on, animal welfare. To meet this goal, and in conjunction with a directive that animal welfare policy decisions and actions concur with the principles that animals may be ethically used.
for human purpose; that science, professional judgment, ethics, and societal values should all be considered in animal welfare decision-making; and that veterinarians should offer their time and expertise to efforts that promote the welfare of animals, the AVMA is now engaged in animal welfare-specific strategic planning to position the AVMA to be more effective scientifically and in internal and external communications.

AVMA’s animal welfare policy discussions since the last USAHA meeting have focused on unwanted horses, castration and dehorning of cattle, trapping (including use of steel-jawed leg/toe hold traps), foie gras, and animal fighting. AVMA continues to work to engage stakeholders in its policy development process with the intent of bringing as much pertinent information to the table as possible. Lastly, Golab described two awards presented by AVMA to ensure that individuals significantly contributing to the betterment of animal welfare are appropriately recognized for their contributions. The AVMA revamped its Animal Welfare and Humane Awards, bringing their coordination under one roof in the Animal Welfare Division. One award goes to a veterinarian, and one to a non-veterinarian.

Cathy Liss, President, Animal Welfare Institute (AWI), reviewed the background and goals of AWI. The AWI was founded in 1951 and seeks to reduce the sum of total pain and fear inflicted on animals by people. Their goals include a ban on use of steel jaw leghold traps, preservation of species threatened with extinction, reform of intensive confinement of farm animals and an end to inhumane slaughter, strict regulation of animal transport conditions and humane treatment of laboratory animals. Many publications addressing these goals are available from AWI. One current specific issue that AWI is actively pursuing is the development in the technology of remote trap monitors that are effective in the capture or monitoring of animals such as coyotes, bears, skunks, or feral pigs. Additionally, AWI is supporting a ban on the practice of shark finning that provides the pectoral and dorsal fins as the main ingredient for the delicacy of the Asian shark fin soup.

Joy Mench, Professor, Department of Animal Science, University of California-Davis presented a science-based discussion on caged and caged-free housing of laying hens. Mench gave an overview of the progress of housing of laying hens
ANIMAL WELFARE

from small backyard flocks to the conventional battery cages that house most layers in today’s commercial operations. However, due to the European Union (EU) ban on conventional cages in 2012 and the criticisms of conventional cages including the restriction of movement with associated reduction in bone strength and the lack of nest boxes, perches and dust bathing substrates, other alternative systems are being investigated in many different scientific studies. These alternative systems include floor systems, aviaries, systems with range access, furnished cages, and improvement in conventional cages. However, the transition to non-cage systems would be associated with significant health challenges as noted in the EU. These are related to parasites, wounding due to cannibalism, disease control, litter and range management issues, and the ability to maintain cleanliness. Advantages and disadvantages of laying hen systems are reviewed in the following two references: European Food Safety Authority (2005), Welfare Aspects of Various Systems for Keeping Laying Hens; and Laywel Project (www.laywel.eu).

Alice Green, Veterinary Epidemiologist, Centers for Epidemiology and Animal Health (CEAH), VS-APHIS- USDA, reviewed the findings on the factors associated with the occurrence and recovery of non-ambulatory livestock in the U.S. The study was part of a larger epidemiological survey investigation from The Farm and Rural Investment Act of 2002, a 2002 Farm Bill requesting the Secretary of Agriculture to investigate the scope, causes, and humane treatment of non-ambulatory livestock in the United States. The data showed that there are an estimated 270,000 cattle, weighing 500 pounds or more, that became non-ambulatory on-farm in the U.S. in 2004. One objective of the study was to compare characteristics of U.S. dairy operations that had one or more non-ambulatory cows with operations that had no non-ambulatory cows during 2004. The statistical analysis using odds ratios showed that the probability that cows became non-ambulatory were greater in herd sizes of more than 100 cows, facilities that fed a total mixed ration, herds with a rolling herd average of greater than 20,000 pounds of milk, and facilities with flooring for lactating cows of either concrete or dirt as compared to pasture. There are animal and treatment characteristics that appear to increase the likelihood of recovery, which include cows with hypocalcaemia and treatment with calcium, phosphorous, or potassium, cows with recumbency of less than 24 hours, and
cows with no prior history of health problems.

Paul Sundberg, Vice President, Science, Technology, National Pork Board (NPB), presented a overview of the NPB’s history of swine welfare issues. In 2004, NPB introduced Swine Welfare Assurance Program (SWAP) to commercial swine producers that was based on science and was an education or assessment program with no formal audit component. In 2005, the Pork Welfare Industry Coalition was formed and the SWAP and Pork Quality Assurance (PQA) programs were merged to create the PQA Plus program. Producer and premise certification were available. The Coalition made recommendations on issues for PQA including sow stalls that were based on credible, workable, and affordable criteria in order for the solutions to be sustainable. Science supports management as the biggest factor affecting sow well-being. The NBP funded seven research projects in 2006 totaling $403,013. Sundberg noted that pork producers will work to take advantage of marketing opportunities, such as the Smithfield Foods, Inc. decision in January 2007 to begin phasing out over the next ten years individual gestation stalls for sows and replacing them with group housing in its company owned farAnother notable decision was Burger King’s announcement to buy from suppliers who do not confine their pigs.

Debra Duncan, Director, Animal Facilities Inspection Program, Kansas Animal Health Department, recounted her experience with the Greensburg Project that was the result of a disastrous tornado destroying 95 percent of the town of Greensburg, Kansas on May 4, 2007. There was no disaster plan for the care of small animals at the time of the disaster. Much was learned from the experience and recommendations were presented including a workable record keeping system for each animal, an inventory for supplies, supervision and training of volunteers, on-site security issues, and the challenges in the return of the animals to the owners. As a result of the Greenburg Project, state responders are becoming credentialed and there are regulations being developed for emergency shelters such as basic standards of care, credibility of staff and volunteers, and standard record keeping procedures.

Tim Cordes, Equine Programs Coordinator, VS-APHIS-USDA, updated the Committee on the transport conditions of
ANIMAL WELFARE

horses to slaughter. The goal of the Slaughter Horse Transport Program (SHTP) was established and remains constant to this day as follows: if a horse must be transported commercially to slaughter, then it will travel in a safe and humane fashion. The program is often cited as a model for the future development of humane transport programs for other species. The final rule on humane transport of horses to slaughter was published in the Federal Register on December 7, 2001. All USDA-inspected horse slaughter plants are currently closed. It is anticipated that unwanted U.S. horses intended for slaughter will be transported to and processed in plants in Canada and Mexico. The USDA-APHIS-VS, SHTP will remain active in the field and at headquarters. Although the U.S. plants that process horses will be closed and therefore not staffed by SHTP, USDA will visit regularly the Canadian and Mexican border crossings and Canadian plants. SHTP Owner/Shipper Certificates (VS Forms 10-13) will continue to be received at headquarters from Canadian plants and the Mexican border. The slaughter horse industry divides horses into killers (slaughter horses) and riders (non-slaughter horses or all others). It is likely that most horses will move through the standard channels as killers with SHTP owner/shipper certificates and backtags. However, in an attempt to circumvent program regulations (9 CFR 88.4), an increasing number may move as riders with Coggins tests for equine infectious anemia (EIA). The SHTP has no jurisdiction over riders moved in compliance with interstate or international animal health regulations. Currently there are two Canadian plants, with three more opening in the immediate future, and two Mexican plants that process horsemeat for human consumption.

Susan Trock gave a short summary on the 1981 New York State regulations for vehicles transporting more than seven horses in which the vehicle’s interior compartment must have no more than one tier. Any constable or police officer can enforce this New York regulation.

The business meeting followed the last presentation. The Committee considered one Resolution calling for state governments to enact and enforce regulations that are consistent with the ban on double-deck trailers in the commercial transport of horses to slaughter, depending upon the state, such regulatory agencies might include commerce, consumer affairs,
transportation, or the state police. The Resolution was approved with a quorum present and was referred to the Committee on Nominations and Resolutions.
The Committee on Aquaculture met on October 20, 2007 from 1:00 to 6:30 p.m. at John Ascuaga’s Nugget Hotel in Reno, Nevada. Scott LaPatra called the meeting to order and introduced individuals attending the meeting.

Randy MacMillan provided an update from the National Aquaculture Association (NAA). Key points including a number of topics. First, he reviewed the NAA mission, followed by key National Domestic Aquaculture Issues. These topics include: Fish Health Management; Environmental Stewardship; Organic Standards; Off-Shore Aquaculture; Aquatic Nuisance Species; Food Safety; Public Perceptions and Dominant Aquaculture Issues.

The next topic covered by MacMillan was regarding aquatic animal health. First was viral hemorrhagic septicemia (VHS) disease. A review of the disease noted that Congressional appropriations of $5.6 million in House and $1.8 million in Senate could become available. Concern exists regarding adequate surveillance funding. He addressed wild versus farmed, and related concern regarding how the U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS) will respond to a Viral Hemorrhagic Septicemia (VHS)-positive farm. A contingency plan for domestic producers was also discussed, as well as the lack of scientifically credible information regarding VHS.

Chapters 1 through 9 have been posted through the
federal review process for the National Aquatic Animal Health Plan (NAAHP). The NAA is supportive of plan. There is concern regarding European Union audit of United States health management program.

MacMillan discussed the U.S. health management tools. The first point discussed was vaccine development, including the Joint Subcommittee on Aquaculture (JSA) Biologics. Vaccine survey results were presented at the Drug Approval Workshop in August 2007. There is existing concern regarding small size of the industry and the inability of biological companies to invest in vaccine development. Final Minor Use/Minor Species (MUMS) Rule for Drug Designation was published in July 2007, which includes seven years of market exclusivity. MUMS and tax exemptions include 50 percent credit for safety and effectiveness testing. In the area of new drugs, 35 percent PEROX-AID (Feb. 2007) and Aquaflor Type A (March 2007) are available.

Regarding food safety and antimicrobial resistance, NAA sent a letter to Food and Drug Administration Commissioner Von Eschenbach in May 2007 regarding imported seafood safety due to the import of farm raised fish with antibiotic residues. MacMillan also discussed the United Nations Food and Agriculture Organization (FAO) / World Health Organization (WHO) Codex Alimentarius Commission, regarding the following events:

- FAO good aquaculture practice (GAP)- 2008
- Hazard Analysis and Critical Control Points (HACCP) plans for aquaculture- 2008
- Developing international guidelines for certification in aquaculture (food safety/quality, animal health and welfare, social and environmental aspects)
- Stakeholder meeting Nov. 26, 2007

MacMillan reviewed environment and off shore aquaculture. First was the Clean Water Restoration Act of 2007, which includes House of Representatives bill 2421 (169 co-sponsors) and Senate bill 1870 (19 co-sponsors). NAA sees concern due to inclusion of aquaculture ponds/ effluent in the act. For the National Offshore Aquaculture Act of 2007, which includes House of Representatives bill 2010- (1 co-sponsor). NAA provided oral and written testimony in July 2007 and Senate bill 1609- (1 co-sponsor) NAA submitted written comments to the Senate in April 2007.

On National Animal Identification System, the NAA’s position is opposed because of practicality and expense. NAA plans to closely monitor this issue.
AQUACULTURE

For Organic Standards, MacMillan noted the Organic Aquaculture Symposium scheduled for November 27, 2007. Key issues include open cage net pens and alternative nutritional technology fish oil and fish meal.

On Country of Origin Labeling (COOL), which is still operating under the Interim Final Rule, effective 2005, is for traceability in retail only. USDA, Agriculture Marketing Service (AMS) audits are currently in progress. There is also preparation of a final rule for Mandatory Fish and Shellfish Country of Origin Labeling. The comment period ended Aug. 20, 2007.

Aquatic Nuisance Species were discussed. Big scaled and black carp are listed as injurious. Other species discussed included Channeled apple snail and the New Zealand mud snail.

For public education, NAA and the National Fisheries Institute (NFI) have begun collaboration. The American Association for the Advancement of Science (AAAS) Symposium was held February 2007 regarding education.

MacMillan concluded with the NAA concerns for 2008, which are:

- VHSV management
- Escalating imports
- Continually escalating domestic production costs
- Public perceptions
- Sustainability

David Scarfe provided an update from the American Veterinary Medical Association (AVMA) – Aquatic Veterinary Medicine Committee (AVMC). A copy of the AVMC report from the Proceedings of the 144th Session of the AVMA House of Delegates in Washington, D.C. July 13, 2007 was shared. See the above document for complete review; Key points covered included:

- One World-One Health-One Medicine Initiative
- AVMA Legislative and Regulatory Issues
  - National Offshore Aquaculture Act of 2005
- Biological and Therapeutic Agents
  - Aquaculture Sub-Committee (JSA) Working Group for Aquaculture Drugs, Biologics and Pesticide Liaison
  - Veterinary Feed Directive Regulations
  - CODEX ad hoc Intergovernmental Task Force on Antimicrobial Resistance
  - Ornamental Bacterial Flora and Antimicrobial Use
REPORT OF THE USAHA/ AAVLD COMMITTEE

- Aquatic Animal Health and Diseases
  - Association of Fish and Wildlife Agencies (AFWA) National Fish and Wildlife Initiatives
  - World Animal Health Organization (OIE) Global Conference on Animal Health
    - Bergen, Norway on October 9-12, 2006

Andy Goodwin provided an update from the Fish Health Section (FHS) of the American Fisheries Society (AFS). He provided background regarding the organization. The next meeting of the AFS-FHS is at Prince Edward Island in July 2008. Goodwin indicated that the Bluebook and Standardized Inspection Manual is available. The diagnostic and inspection sections have been re-worked. The VHS section has been updated and posted on AFS website, www.fisheries.org. The diagnostic section has new chapters for shrimp and shellfish.

Regarding the re-evaluation of certification of fish health inspectors, it has been revised and inspectors would have to show specific expertise in aquatic animal health. For fish pathologists, the plan is to be revised soon.

Jerry Heidel provided an update on the National Animal Health Reporting System (NAHRS). He covered the background of the NAHRS. Reporting procedures would include five diseases listed with OIE. Progress has included adding committee members so that the group has members in fish, shellfish and shrimp. The group is looking for member associated with catfish. Discussions are ongoing regarding if reporting is with either presence of infectious agent or if there is a need to have both infectious agent and clinical disease. Utilization of definitions typically for terrestrial animals are in debate; for example do all production activities meet the definition of an animal maintained in captivity for food production? Additionally, the group includes native American tribes.

Norm Willis provided an update from the Committee on International Standards. He discussed the background and function of the Committee, and highlighted the importance and the desire to interact with the Committee on Aquaculture.

Jill Rolland provided an update from Animal and Plant Health Inspection Service (APHIS). She first discussed Infectious salmon anemia virus. After providing a background of disease...
in Maine, she spoke on the transition from trying to eradicate to surveillance and mandatory testing. There have been no new cases since March 2006. Rolland discussed the transition to Federal-State-Industry Coop Program in FY 2007, and that funds are in place for FY 2008. APHIS is working on import protocols.

Regarding Viral Hemorrhagic Septicemia Virus (VHSV); Great Lakes strain, Rolland provided a background with timeline of VHS in the Great Lakes. She covered Federal Emergency Order in Oct 2006; two modifications have been made to the order since then. APHIS held meetings with interested parties in January, 2007. There is development of an interim rule to replace the emergency order. Regulatory text and a risk analysis are currently in draft form. An environmental analysis is in an incomplete draft form. For funding, Administrators’ contingency funds are being used for Surveillance/ Education-Outreach/ Infrastructure at National Veterinary Services Laboratories (NVSL). Rolland discussed a surveillance plan, which involves states, Canada and the United States Fish and Wildlife Service (USFWS). Eleven states requested funding, while eight states did not request funding.

On the National Aquatic Health Plan, Rolland gave some background and rationale. It involves the National Oceanic and Atmospheric Administration (NOAA), APHIS and USFWS. A draft document is complete and has been submitted for first review. Moving ahead, it needs to go to agencies, Joint Subcommittee of Aquaculture and the National Science and Technology Council (NSTC)-Office of Science and Technology Policy (OSTP) then published for public review. She then provided an overview of the plan.

Rolland next discussed the European Union Audit, providing background on the June 2007 event. It included NOAA, FWS, Regional APHIS Offices and aquaculture industries in Washington and Oregon. From the exit interview there were the following improvements and actions:

- training of veterinarians
- surveillance program lacking
- Standard Operating Procedure’s (SOP) lacking
- “Evidence” written records lacking
- Cessation of live mollusks to EU for grow out

In response to Exit Interview, funding was received to develop training modules for the National Veterinary Accreditation Program (NVAP). Regarding general funding, underfunding continues,
though the House and Senate look to include funding $5.6 million and $1.8 million, respectively, for VHS

    David Morris provided an update on the National Animal Identification System (NAIS). NAIS has developed and printed a new business plan which describes the NAIS plan for the next three to four years. It has been developed into a two tier segregation of importance for animal species to be incorporated into NAIS:

    • Tier 1: cattle, swine, poultry, goats and competitive equines
    • Tier 2: all other animal species including fish

    Francois Elvinger provided an update on The National Animal Health Surveillance System (NAHSS). He provided the origin of NAHSS, and partners in surveillance. Elvinger noted NAHSS Steering Committee Aquaculture Representative, Ken Cline, Cline Trout Farms, Inc., Boulder, Colorado. He went on to discuss NAHSS accomplishments, integration of surveillance and comprehensive surveillance. He concluded by discussing a resolution from the NAHSS for evaluation by the Committee on Aquaculture. The Committee opened discussion of the resolution. After minor modifications to the document the committee voted and accepted the resolution.

    Judy Akkina provided and overview of the project Assessing Infectious Disease Emergence Potential in the U.S. Aquaculture Industry.

    Scott LaPatra conducted old business. First he reviewed last year’s Resolutions passed by Committee on Aquaculture. Progress reports of actions taken were then discussed.

    Scott LaPatra conducted new business. A Resolution from the National Aquaculture Association was presented by Randy MacMillan. The Resolution was ultimately passed. A second Resolution from the American Fisheries Society-Fish Health Section was presented by Scott LaPatra. This resolution was withdrawn.
REPORT OF THE COMMITTEE ON
BIOLOGICS AND BIOTECHNOLOGY

Chair: Bob Tully, Lenexa, KS

Gary A. Anderson, KS; Joan M. Arnoldi, WI; Charles A. Baldwin, GA; Karen E. Burns-Grogan, GA; Yung Fu Chang, NY; James J. England, ID; William H. Fales, MO; Robert W. Fulton, OK; Ted Girshick, CT; Keith N. Haffer, SD; Larry L. Hawkins, MO; Chris S. Hayhow, KS; Ruud Hein, DE; Richard E. Hill, IA; Joseph N. Huff, CO; Majon Huff, CO; Robert F. Kahrs, FL; Terry L. Klick, OH; Hiram N. Lasher, DE; Lloyd H. Lauerman, WA; John C. Lawrence, ME; Randall L. Levings, IA; Richard E. Pacer, MD; Robert E. Pitts, GA; Carol L. Rinehart, MO; Deepanker Tewari, PA; Deoki N. Tripathy, IL; Jeff T. Trunnell, IA; Mary Anne Williams, CA.

The Committee met on Monday, October 22, 2007 at 7:00 p.m. at John Ascuaga’s Nugget Hotel, Reno, Nevada. Seven members, twelve new members and sixteen non-member attendees were present. The Chair welcomed the participants to Reno and the Committee meeting. Last year’s Committee Report and the agenda for the meeting were reviewed and attendees introduced themselves.

The Chair announced that the Vice Chair position was vacant. Bob Pitts volunteered to take minutes for the record. The meeting this year is on Monday evening and the Chairman expressed pleasure with the large interest and turnout.

Following introductions, the Chair read the mission statement and reiterated the reason for the Committee and the responsibility to the industry. The Chair explained the Committee action process of resolution formation and the ways that the Committee takes action by submitting Resolutions to the Committee on Nominations and Resolutions.

The roster for attendance was passed and all encouraged to list their membership status and encouraged all to join and become involved. The Committee mission statement is as follows:

The mission of the Committee on Biologics and Biotechnology is to monitor new developments in veterinary biologics, monitor regulation of the manufacturers, distribution and use of veterinary biologics and monitor needs of the livestock industries for new biological products. The Committee also provides a forum as directed by State, Federal, University, private
industry and citizens-at-large to focus on issues and development in the field of biotechnology related to animals. The committee reviews and discusses guidelines that are in preparation or have been issued at the national, state and international level in an attempt to regulate developments in the field which are designed to provide protection to man, animals and the environment. Biotechnology has profound economic implications, brought about by development of totally new products or processes. The Committee has the responsibility to keep abreast of these changes and to advise the United States Animal Health Association relative to impacts on the U.S. livestock industry. Committee action may be in the form of recommendations and or in the case of major issues, Resolutions that are considered by the general membership.

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

Hill discussed the recent progress at the National Centers for Animal Health (NCAH), the new combined facility at Ames, Iowa. The APHIS/Agriculture Research Service (ARS) Plan for upgrading and modernizing the Ames laboratory facilities brings three animal health institutes together in one site. They are the CVB, NADC which is part of ARS and the NVSL. The plan calls for the modernization and consolidation of facilities for existing (2002 level) programs. The Combined Services Plan announced September 2005 calls for 286 support positions assigned to APHIS/ARS.

USDA has received all $460,770,000 of the construction budget, The Consolidated Laboratory/Administration Facilities is funded and Phase 1 was complete August 2004. Phase 2 completion is due 2009. Infrastructure pieces are also phased in the high containment large animal facility (HCLAF) was completed on February 2007. The low containment animal facility construction is underway and the completion date is 2008.

According to Hill, USDA continues to explore ways to meet the total budget. They are reducing scope and costs of new construction and continuing the use of some existing buildings. The mycobacteria laboratory was completed in July 2004. The digester building was completed September 2004. The training
barn was completed in 2004. However, equipment and operational expenses are not in construction budget. Concern was expressed that funds for the operational expenses of the new buildings will not be available in next year’s budget.

Hill then discussed some of the current and emerging issues at APHIS and VS. In the leadership area Cindy Smith is the new APHIS Administrator. Kevin Shea is the Associate Administrator. The Select Agent and Toxin list was republished and is a Proposed Rule out for comment. There is a discussion draft for Animal Disease Traceability. The APHIS Strategic Plan was briefly discussed and Hill gave this website for further details, http://www.aphis.usda.gov/about_aphis/strategic_plan.shtml.


In a report to the President about Protecting American Consumers, Hill warned the Committee that new restrictions may occur due to the troublesome issues with recent imports, i.e., toys with lead paint, Tenrecs – any of 29 species of shrew like and hedgehog like mammals that can carry foot-and-mouth disease (FMD) – and tainted feeds with melamine. Consequently, a Strategic Framework for Import Safety was formed. It will include an International Trade Data System with an Interagency Working Group that is requesting public comments on import safety. VS is represented on the APHIS Steering Committee. Further detail can be found at www.importsafety.gov.

Issues surrounding the discontinuance of biological products following a successful eradication/control programs were discussed. Diseases like pseudorabies and brucellosis were given. Challenges such as timelines for discontinuing domestic production of vaccines for export, emergency preparedness (domestic use), Select Agent status and biosecurity, wildlife reservoirs and vaccine/antigen/seed banks are consideration on how to deal with this issue. The white paper, Vaccine Use Following Brucellosis and Pseudorabies Eradication, can be viewed at: http://www.aphis.usda.gov/vs/cvb/PDFs/10_10_06_VaccineUseWhitePaper.pdf
REPORT OF THE COMMITTEE

The annual summary of CVB activity is summarized below and compared FY 2007 with 2006 and 2005:

<table>
<thead>
<tr>
<th></th>
<th>FY 05</th>
<th>FY 06</th>
<th>FY 07</th>
</tr>
</thead>
<tbody>
<tr>
<td>Submissions</td>
<td>6,993 (+48)</td>
<td>6,646 (-347)</td>
<td>6,656 (+10)</td>
</tr>
<tr>
<td>Product Licenses</td>
<td>97 (27)</td>
<td>76 (-21)</td>
<td>63 (-13)</td>
</tr>
<tr>
<td>and Permits Issued</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New Antigen</td>
<td>16 (-1)</td>
<td>11 (-5)</td>
<td>18 (+7)</td>
</tr>
<tr>
<td>Combinations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Serial Released</td>
<td>16,178</td>
<td>15,945</td>
<td>16,021</td>
</tr>
<tr>
<td>Eligible % Tested</td>
<td>11,685 (13.5)</td>
<td>11,634 (8.46)</td>
<td>11,938 (6.51)</td>
</tr>
<tr>
<td>Inspections</td>
<td>88</td>
<td>85</td>
<td>85</td>
</tr>
<tr>
<td>Regulatory Actions</td>
<td>47 / 145</td>
<td>53 / 113</td>
<td>30 / 113</td>
</tr>
</tbody>
</table>

CVB is currently operating under the 2007 budget allocation of $15,687,000. The President’s budget of $19,867,000 is not authorized. The house mark up is $17,569,000 and the Senate mark up is $18,156,000. Dr Hill expressed concerns with the lower funds from the Continuing Resolution, the increased campus costs, increased equipment and operational expenses due to the new facilities. These will impact CVB program activities.

The vacancies in various CVB positions are shown in the chart below. The first number is the vacancies. The second number is the total number of positions.

<table>
<thead>
<tr>
<th>Position</th>
<th>Vacancies</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reviewers</td>
<td>7/17</td>
<td></td>
</tr>
<tr>
<td>Specialists</td>
<td>6/16</td>
<td></td>
</tr>
<tr>
<td>Epidemiologists</td>
<td>2/2</td>
<td></td>
</tr>
<tr>
<td>Lab VMO/Micro</td>
<td>6/17</td>
<td></td>
</tr>
<tr>
<td>Technicians</td>
<td>3/30</td>
<td></td>
</tr>
<tr>
<td>Asst/Assoc. Directors</td>
<td>1/2</td>
<td></td>
</tr>
<tr>
<td>Support Staff</td>
<td>8/32</td>
<td></td>
</tr>
<tr>
<td>Safety &amp; Security Unit</td>
<td>11/23</td>
<td></td>
</tr>
<tr>
<td>Information Management Unit</td>
<td>8/42</td>
<td></td>
</tr>
</tbody>
</table>

The organization chart for CVB was discussed and given as a handout.

Hill reported the results of an International Regulatory Report that reviewed various international animal health programs. The International Federation for Animal Health (IFAH) and regional animal health industry associations conducted an international
BIOLOGICS AND BIOTECHNOLOGY

benchmarking the competitiveness of the animal health industry.

There is a specific United States report, however these results come from documents available on the web. Regulatory programs were scored for Europe, Canada, Australia, Japan, and the United States.

The regulatory framework is the biggest single obstacle for maintaining/extending licenses and/or competitiveness is the regulatory framework in some other regions and the U.S. Specifically, APHIS had some very low scores: safety, quality and efficacy guidelines are applied on the basis of practical and rigorous assessment of risks and benefits – 29 percent. Overall scientific assessment of risk and benefits is clear and respected by other regulators internationally – 25 percent. Hill expressed disappointment but it was noted from the audience that all other international regulatory agencies scored lower.

Additional issues and activities include pharmacovigilance agreements with the International Cooperation on Harmonization of Technical Requirements for Registration of Veterinary Medicinal Products (VICH), epizootic hemorrhagic disease incidences, In vitro policies and guidance documents, member of an E. coli coalition with National Cattlemen’s Beef Association (NCBA), Food Safety Inspection Service (FSIS), Centers for Disease Control and Prevention (CDC), and Food and Drug Administration (FDA), dealing with E. coli, O157 pre-harvest interventions, and the recent certification of the laboratory to International Standards Organization (ISO) 9001:2000 standards.

Hill noted the submission response times have decreased over the years and now are a respectable 40+/- days. This is the average of all submissions but is fearful the budget constraints and vacancies will increase these times in the future. CVB tracks individual categories such as biometrics that are much longer.


Donna Gatewood, Policy, Evaluation and Licensing (PEL), CVB-VS-APHIS-USDA, shared the following information with the Committee in regards to the agencies activities.

The current PEL organizational chart was made available. Gatewood highlighted the PEL 2008 priority activities,
REPORT OF THE COMMITTEE

including: staffing, application review, laboratory testing, program documentation (policy) and Program Quality Assurance. She shared documents that the program had published in 2007, which comprised by 15 CVB notices, four VS Memorandums and 25 documents posted to the website for comment.

Gatewood discussed the 2007 establishments and permittees from PEL. There were three establishment licenses issued and no permittees. On the contrary, four Establishment Licenses were terminated, as well as three permittees. Total numbers for 2007 were 83 licensees and 18 permittees.

For 2007 products, 57 product licenses (includes three unique products) were issued while 216 licenses were terminated. In all for 2007, there were 2,063 active product licenses.

Gatewood presented summary graphs of the following PEL licensing data (contact PEL office for copies):

- Number of biotech products licensed over time (1987 to 2007)
- Number of biotech products licensed by category (1, 2 and 3) – 1993 to 2007
- Number of diagnostic products licensed over time (1987 to 2007)
- Number of licensed establishments vs products licensed over time (1987 to 2007)
- Number of FFM products licensed over time (1987 to 2007)
- Number of unique products over time (1993 to 2007)
- Number of biologic permits issued in 2007 – also shown on graph from 1991 to 2007
- Number of research and evaluation permits – 265
- Number of transit shipment permits – 1
- Number of doses produced and destroyed 1986 to 2006
- Number of total submissions compared by category from 1995 to 2007
- Number of aquaculture products licensed over time (1987 to 2007)
- Number of permittees, 2007, as listed below:
Steven Karli, Director, Inspection and Compliance (IC), CVB-VS-APHIS-USDA, reported IC-CVB fiscal year 2007 activities. IC-CVB monitors over 135 active licensees and permittees at nearly 175 sites globally. CVB conducted 38 in-depth inspections, three follow-up inspections and 44 special inspections. The majority of special inspections were conducted for product or facilities inspections and also to conduct inspections for the National Center for Import and Export (NCIE) for compliance to the Select Agent regulations as part of the registration process under the Agriculture Bioterrorism and Preparedness Act of 2002.

In August, the consolidation of Information Management Unit was initiated as a support services for the NCAH. This unit reports to the Director of Inspection and Compliance and includes information technology, library and visual services for the NVSL, NADC and CVB. Full implementation of the unit is targeted to be completed by February 2007. On September 1, 2007, the Information Management Resource Services unit came under CVB supervision and direction. This unit, previously reporting to the Director of NVSL, included all of the APHIS information technology support for the Ames campus.

In addition, budget resources for fiscal year 2007 continue to be limited. As a result, CVB is implementing a plan to shift resources (human and financial) to priority areas identified by the Center Directors. Inspections and quality assurance continue to be priorities for the unit.

In Fiscal Year 2007, CVB processed 456 requests for Export Certificates and in excess of 2,834 Certificates of Licensing and Inspection. Export activities by serial increased by nearly 25 percent this year and export activities by product increased by approximately 5 percent from FY 2005 levels. These numbers still represent overall reductions in product exports primarily due to the report of bovine spongiform encephalopathy (BSE) in the United States. Serials reviewed and processed by CVB were reported and summarized as 16,655; 15,945 serials were released for marketing – representing nearly stable numbers since FY

---

**BIOLOGICS AND BIOTECHNOLOGY**

<table>
<thead>
<tr>
<th>Country</th>
<th>Vac/Bact</th>
<th>Antibody</th>
<th>Diagnostic</th>
<th>Immunomodulat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada</td>
<td>12</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Australia/New Zealand</td>
<td>18</td>
<td>1</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td>Europe</td>
<td>0</td>
<td>0</td>
<td>11</td>
<td>1</td>
</tr>
<tr>
<td>Mexico</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>0</td>
</tr>
</tbody>
</table>

---
REPORT OF THE COMMITTEE

2003. Administrative Inspection Reviews continued in FY 2006 and was expanded to include permittees as well. CVB sent out 65 reviews and processed 49 of those reviews. This new inspection process has provided CVB with a means to work with licensed manufacturers outside of the normal inspection process to assure CVB files are current as well as providing manufacturers with the opportunity to schedule their resource utilization to make sure their regulatory files are kept current.

The CVB Directors have continued their commitment to a Quality Management System. In FY 2007, all employees received training specific to the ISO 9001 and ISO 17025 standards. In addition, CVB Inspectors also received specific training for auditing guidelines (ISO 19011) in March 2006. CVB continued its commitment to process improvement by conducting process audits to further improve internal processes for both CVB Inspection and Compliance, and the Policy, Evaluation and Licensing units. CVB has also contracted with an ISO Registrar for ISO 9001 Registration to be completed in fiscal year 2008.

Compliance activities reported included updates on investigation numbers for CVB (50 opened, 17 closed). Investigations opened included false and misleading advertising, promotions and/or product labeling. Additional compliance issues facing CVB in 2008 are continuing to look at our regulations to determine changes as a result of lessons learned from previous investigations/cases. Also, CVB is working collaboratively with the California Department of Food and Agriculture to take a comprehensive look at those firms that operate under the California exempted program. An update on pharmacovigilance activities was also provided and progress within the International Cooperation on Harmonization of Technical Requirements for Registration of Veterinary Medicinal Products (VICH) continues. The expert working group met two times this fiscal year and has been able to make progress on documents. See the VICH website for specific documents and their status. Voluntary reports of adverse events continue to be received by the CVB and a summary of the types of reports was published in the October 1, 2006, issue of the Journal of the American Veterinary Medical Association.

Issues from the floor included a status report on the 2004 Resolution 13 regarding publication of rule-making authorizing the use of gamma irradiation for the importation of commercial
shipments of fetal bovine serum from countries and/or regions
that are free of BSE, but having restrictions because of other
pathogens that can be eliminated by gamma irradiation. In 2005
the Committee made further recommendations on two measures
for the agency to consider in the re-proposal. Representatives
from NCIE were present at the 2006 committee meeting and
stated there was no change as the proposal was in progress and
the risk analysis and regulatory work plan have been drafted. No
NCIE representative was present at the Committee meeting. The
Chair reported he had discussed the matter with Michael David
who was present at the meeting in an acting capacity due to Lee
Ann Thomas’ recent transfer. David attempted to contact today
staff members that are close to this matter however, he advised
the Chair he was unable to make contact. David will source a
response and contact the chair upon his return to Washington.

A question was raised to CVB staff regarding the
current requirements for conditional license requirements. An
ensuing discussion resulted. Richard Hill stated that the basic
requirements for conditional license approval are 9 Code of
Federal Regulations (CFR) compliance with purity and safety
standards along with supportive data demonstrating a reasonable
expectation of efficacy.
The Committee met at John Ascuaga’s Nugget Hotel, Reno, Nevada on October 22, 2007. There were 41 members and guests in attendance. James E. Pearson, Chair, and William C. Wilson, Vice Chair, conducted the meeting.

The Committee agenda included three sections of presentations. These presentations included a summary of bluetongue and epizootic hemorrhagic disease situation, Canadian bluetongue import policy and a research update.

**Summary of Bluetongue and Epizootic Hemorrhagic Disease Situation**

Donna J. Johnson, National Veterinary Services Laboratories (NVSL), Veterinary Services (VS), Animal and Plant Health Inspection Service (APHIS), U.S. Department of Agriculture (USDA), presented, Exotic Bluetongue Viruses Identified from Ruminants in the Southeastern U.S. from 1999-2006. Supporting authors include Peter Mertens and Sushila Maan, Institute for Animal Health- Pirbright Laboratory and Eileen Ostlund, NVSL-VS-APHIS-USDA. This paper is included at the end of the Committee report in these proceedings.

David E. Stallknecht, Southeastern Cooperative Wildlife Disease Study (SCWDS), University of Georgia, gave an update on Bluetongue and Hemorrhagic Disease Surveillance.
This year SCWDS received numerous reports of hemorrhagic disease (HD) in deer and have received an unprecedented number of samples for virus isolation originating mostly from penned and wild white-tailed deer. As of October 16, SCWDS have made 237 virus isolations we continue to receive large numbers of samples as well as reports every day. Nearly all virus isolations have been epizootic hemorrhagic disease virus-serotype 2 (EHDV-2) from white-tailed deer. We also have isolated EHDV-1 and bluetongue virus (BTV)-DIV 10, -11, and -17. EHDV-1, BTV-10 and BTV-11 and BTV-17 (one each) have been isolated from Missouri. We have one isolate of BTV17 from a mule deer in New Mexico and three isolates of BTV-17 from pronghorn in Wyoming.

For the second year, we have also isolated EHDV-6. In 2006, EHDV-6 (as identified by NVSL and Pirbright) was isolated from white-tailed deer (free-ranging and captive) in Illinois and Indiana. The 2007 isolated came from a captive white-tailed deer in Missouri.

Freeda Issac, National Center for Import Export (NCIE), VS-APHIS-USDA, provided a report on the Florida Bluetongue Surveillance Study.

A bluetongue survey will be conducted by SCWDS at request of USDA- APHIS-VS. The goal of this study is to determine the presence of Culicoides spp. and BTV in the Southeastern United States. Surveys for Culicoides spp. will be conducted through the Cooperative Agreement for Exotic Arthropod Surveillance in the Southeastern United States and Puerto Rico. Surveys for BTV will be conducted through the above Cooperative Agreement and through the Cooperative Agreement for Disease Relationships that Involve Wildlife, Domestic Livestock and Poultry.

The objectives of the study is to determine the species of Culicoides present in the state of Florida and to further develop a surveillance system for BTV present in the Southeastern United States in white-tailed deer. The principal investigators are Dr. Joseph L. Corn and Dr. John R. Fischer.

Surveys will be conducted at selected sites in Florida at locations of previous BTV activity. Additional trapping will be conducted statewide between spring and fall of 2008 to account for seasonal activity of Culicoides. Insect trapping will be coordinated with wildlife surveys for exotic ticks and other arthropods and will employ several light traps per site at four to eight geographic locations per month. Insect specimens will be
processed and submitted for identification to a laboratory. SCWDS will maintain a database to include species collected, date and trapping locations.

SCWDS will evaluate the feasibility of collection of *Culicoides* spp. from sentinel wildlife at selected sites in Florida. Where feasible, SCWDS will collect *Culicoides* spp. and these specimens will be processed and submitted to a laboratory for identification. SCWDS will maintain a database to include species collected, sentinel host, date and sentinel locations.

SCWDS will initiate contact with the owners of captive deer facilities in Florida to determine the feasibility of collection of *Culicoides* spp. in the vicinity of captive deer facilities and of collection of blood specimens from captive deer less than one year of age for BTV isolation. *Culicoides* specimens will be processed and submitted to a laboratory for identification. SCWDS will maintain a database to include species collected, sentinel host, date, and location of collection.

SCWDS will enhance its collection of diagnostic specimens for BTV isolation from white-tailed deer from the southeastern United States, specifically Georgia, Florida, Alabama, Mississippi, Texas and Louisiana. Diagnostic samples are submitted by SCWDS member state wildlife management agencies and other sources throughout the United States. Specimens are collected from clinically ill or dead white-tailed deer for diagnostic testing for BTV and EHDV, a related orbivirus. SCWDS has existing diagnostic capabilities (virus isolation, polymerase chain reaction (PCR) and supporting diagnostic tests to identify known North American BTV and EHDV serotypes) to conduct this work and has partnered with NVSL and Agriculture Research Service (ARS), Laramie, in previous orbivirus surveillance and research. EHD viruses utilize the same *Culicoides* vectors and risk factors for their potential range expansion or introduction into the United States are similar to those of BTV. Because EHD viruses represent a significant pathogen of white-tailed deer, their inclusion should enhance participation from wildlife agencies.

Still under discussion and development by APHIS is the sampling of sentinel cattle herds in Florida and other states to determine the presence of BTV and fluctuations in viral activity. Periodic sampling of sentinel cattle may represent the most efficient means of obtaining BTV isolates.

These surveys will help to determine which species of *Culicoides* are present in Florida, including exotic species not
previously reported. In addition, surveys for BTV will help to
determine which BTV serotypes are present in the southeastern
United States and BTV isolates will provide much needed
biological material to determine their origin. *Culicoides* and BTV
identified will be reported to APHIS on a quarterly and annual
basis. Any unknown BTV recovered from white-tailed deer will be
immediately sent to NVSL for confirmation and identification.

An update on diagnostic observations for BT, EHD, and
bovine leukosis virus in the United States was given by Eileen
Ostlund, NVSL-VS-APHIS-USDA. Details of this update are
included in these proceedings at the end of this report.

Rudy Meiswinkel, Central Institute for Animal Disease
Control, Lelystad, The Netherlands presented an update and
overview of the BTV serotype 8 epidemic in Northern Europe. This
paper is included in these proceedings at the end of this report.

**Canadian Bluetongue Import Policy**

Samira Belaissaoui, Animal Health and Production
Division, Canadian Food Inspection Agency (CFIA), Ottawa,
Canada. provided a report on the bluetongue import policy for
Canada.

A background of the situation was first presented. After
broad consultation, Canada announced in 2006 the removal
of BT-related import conditions for ruminants from the United
States. It has been concluded that there may be only very limited
opportunities for bluetongue to spread and become established
beyond a single season. The new import conditions came into
effect in early 2007 after the necessary regulatory changes.
The current situation is:

- Under the Health of Animals Act, the traditional
  United States serotypes 2, 10, 11, 13, 17 are
  immediately notifiable while the other 24 serotypes
  are reportable;
- When the U.S. announced the discovery of exotic
  serotypes in Florida, CFIA changed its BT related
  import conditions for that state
This is consistent with CFIA policy that exotic BT serotypes (those not normally found in North America) will continue to be subject to risk mitigation measures.

New import conditions: A negative test for BT virus infection by cELISA must be performed and documented within 30 days prior to import. In the case of a positive result, a negative PCR test performed and documented within 30 days prior to import will qualify the animal for import.

Research Presentations

Jim MacLachan, University of California-Davis, presented The Pathogenesis and Pathology of Severe Bluetongue of Sheep. The results of experimental infection of sheep with virulent bluetongue virus serotype 4, studies were presented; the work was done collaboration with colleagues at the Faculty of Veterinary Science, University of Pretoria. The investigators induced severe bluetongue in the inoculated sheep. The disease initially was characterized by hemorrhagic manifestations where later in the course, at approximately two weeks after infection, the animals developed severe respiratory signs as a consequence of pulmonary edema. The signs and lesions in these experimentally infected sheep were very similar to those that occurred in sheep infected at the Institute of Virology and Immunoprophylaxis (IVI) facility in Switzerland with the strain of bluetongue virus serotype 8 that is currently spreading throughout northern Europe. Potential mechanisms of pathogenesis were discussed, along with future avenues for research.

Will K Reeves Arthropod-Borne Animal Diseases Research Laboratory (ABADRL), ARS- USDA, presented, Characterizing the Epidemiology of Bluetongue Virus Serotype 1 in Southern Louisiana.

In November 2004 BTV-1 was isolated from the tissues of a hunter-killed white tailed deer from southern Louisiana. There was significant concern that BTV-1 might be established in Louisiana. Unfortunately, the hurricanes season of 2005 caused so much devastation that monitoring the status of BTV-1 in southern Louisiana was impossible. Culicoides spp. were sampled from southern Louisiana in 2006 and 2007. Four pools of Culicoides tested positive for BTV but the virus serotype appears to be BTV-17. The reason for the disappearance of BTV-1 from
Louisiana remains unknown.

Analysis and Characterization of the Receptor for Bluetongue Virus on Vertebrate Cells was presented by James Mecham, ABADRL, ARS-USDA.

The presentation featured research at ABADRL on characterization of mammalian cell receptor(s) for bluetongue virus. Experiments with glycan deficient cells and competitive inhibitors suggest the involvement of specific glycans in the initial interaction of virus with susceptible cells. The data also indicate that this initial interaction facilitates or enhances virus binding to a secondary receptor, which is required for virus internalization. Understanding the nature of viral receptors on susceptible cells will enhance our understanding of tissue tropism and pathology and may lead to more effective disease control strategies.


The presentation highlighted ABADRL efforts on the development of rapid nucleic acid detection tests for BTV and the related EHDV for all serotypes. This work has been done in collaboration with the Lawrence Livermore National Laboratories and the SCWDS. Rapid real-time reverse transcriptase-polymerase chain reaction (qRT-PCR) tests that detect prototype strains of indigenous and exotic BTV and EHDV RNA have been developed. The EHDV qRT-PCR detected all 40 field strains available. The EHDV qRT-PCR was evaluated against clinical samples, and could directly viral RNA from tissues were also virus isolation. The assay is slightly less sensitive than the nested RT-PCR previously developed by ABADRL but is not as prone to cross-contamination.

An Update on ABADRL was given by Barbara S. Drolet, ABADRL, ARS-USDA.

The mission of the ABADRL is to solve major emerging and/or exotic arthropod-borne disease problems that affect or threaten the U.S. livestock industry and wildlife. Many arthropod-borne diseases also have an effect on human health. Research is conducted in the Animal Health (NP-103) and the Veterinary, Medical, and Urban Entomology (NP-104) ARS National Programs with the goal of transferring information and technology to livestock industries, and to action and regulatory control agencies.
The ABADRL operates Biosafety Level 1 (BSL-1), BSL-2 and BSL-3 facilities. Contracts are also in place with cooperators for use of BSL-3Ag and BSL-4 laboratory and high containment animal space. At 95 percent renovation completion of the BSL-3 laboratories, a roof structure failure was identified and is currently being addressed. Target completion date is spring or summer of 2008 and will provide ca. 1,500 ft² of BSL-3 space. In addition, the former ABSL-3Ag large animal facility (2,680 ft²) is being renovated and re-classified as aBSL-2 enhanced space.

Currently the ABADRL is addressing research gaps of several arboviruses including domestic and exotic strains of BTV, EHD virus, vesicular stomatitis virus, and Rift Valley fever virus. Research areas include virus-vector-host interactions; development, refinement, evaluation and validation of diagnostic tests and vaccines; characterization of viral receptors on vertebrate and invertebrate cells; characterization of viral persistence in Culicoides; vector competence; horizontal and vertical arbovirus transmission; vector genomics and proteomics of insect salivary glands and midguts; vector biology, ecology, and behavior; disease risk assessment; and development of effective disease and vector control management strategies.

The name of the Committee was discussed and it was pointed out that bovine retroviruses are no longer discussed in the meetings. A motion was made and passed that the name of the Committee be changed to: Committee on Bluetongue and Related Orbiviruses.
EXOTIC BLUETONGUE VIRUSES IDENTIFIED FROM RUMINANTS IN THE SOUTHEASTERN U.S. FROM 1999-2006

Donna J. Johnson, Eileen N. Ostlund
National Veterinary Services Laboratories

Peter P. C. Mertens, Sushila Maan
Institute for Animal Health
Pirbright Laboratory, United Kingdom

World-wide, 24 serotypes of bluetongue virus (BTV) have been identified, and five (BTV-2, BTV-10, BTV-11, BTV-13, and BTV-17) are considered endemic in the United States. Isolation and identification of BTV isolates is routinely performed at the National Veterinary Services Laboratories (NVSL), Ames, Iowa. From 1999 to 2005 several isolates of BTV originating from Florida sheep, cattle or deer could not be identified at NVSL as one of the U.S. BTV serotypes. Virus neutralization tests conducted on the isolates using type-specific reagents to BTV serotypes that had been identified in the Caribbean and Central American regions were inconclusive.

For BTV, the serotype identification is conferred by the major outer capsid protein, VP2. Until recently, genetic sequences for the VP2 region of all 24 serotypes of BTV were not available. Using newly published sequences of all 24 VP2 genes, polymerase chair reaction (PCR) primers were developed for the exotic BTV VP2 regions. Subsequent PCR testing and sequencing of the PCR products were performed with the previously untypeable isolates. The archived Florida isolates as well as recent isolates from Florida and Mississippi were successfully identified. Several of the isolates were also submitted to the Institute for Animal Health, Pirbright, United Kingdom for identification and/or confirmation of the NVSL results.
REPORT OF THE COMMITTEE

BTV serotypes previously believed to be exotic to the United States that have been identified are:

BTV-3: Highlands County Florida, 1999 (sheep); Martin Country Florida, 2001 (deer); Volusia County Florida, 2002 (deer); Okeechobee County Florida, 2002 (cattle); and Manatee County Florida, 2003 (cattle); Yalobusha County Mississippi, 2006 (deer).
BTV-5: Manatee County Florida, 2003 (cattle).
BTV-6: Okeechobee County Florida, 2006 (cattle).
BTV-14: Marion County Florida, 2003 (sheep).
BTV-22: Okeechobee County Florida, 2002 (cattle); Marion County Florida, 2005 (sheep).

*Culicoides insignis*, the common vector of BTV in Caribbean and Central American regions and extreme southeastern United States, has traditionally been restricted to those areas. *Culicoides sonorensis* is considered the BTV vector for Midwest, West and other Southern regions of North America. The limited range of *C. insignis* in the United States may account for the initial isolation of these exotic BTV serotypes only from southeastern animals, however, it is not known if the range of *C. insignis* is expanding as a result of global warming. Additionally, the potential for infection of *C. sonorensis* with any of these viruses is not known.
Bluetongue virus (BTV) and epizootic hemorrhagic disease virus (EHDV) isolations/polymerase chair reaction (PCR) positives, Calendar year 2006

Bluetongue virus (BTV) and epizootic hemorrhagic disease virus (EHDV) isolations/PCR positives, calendar year 2006 are as follows:

BTV or RNA was detected in 37 samples submitted during calendar year 2006. The positive BTV isolation and PCR test results from submissions to the National Veterinary Services Laboratories (NVSL) in 2006 are listed below:

**Table 1** BT virus isolation (VI) / PCR positives, Calendar year 2006

<table>
<thead>
<tr>
<th>State</th>
<th>No.</th>
<th>Species</th>
<th>PCR</th>
<th>VI</th>
</tr>
</thead>
<tbody>
<tr>
<td>FL</td>
<td>1</td>
<td>Cattle</td>
<td>Pos</td>
<td>Not done</td>
</tr>
<tr>
<td>FL</td>
<td>2</td>
<td>Cattle</td>
<td>Pos</td>
<td>BTV 6</td>
</tr>
<tr>
<td>FL</td>
<td>3</td>
<td>Cattle</td>
<td>Pos</td>
<td>Neg</td>
</tr>
<tr>
<td>FL</td>
<td>1</td>
<td>Sheep</td>
<td>Not done</td>
<td>BTV 2</td>
</tr>
<tr>
<td>IA</td>
<td>1</td>
<td>Sheep</td>
<td>Not done</td>
<td>BTV 17</td>
</tr>
<tr>
<td>IL</td>
<td>3</td>
<td>Cattle</td>
<td>Pos</td>
<td>Neg</td>
</tr>
<tr>
<td>IL</td>
<td>1</td>
<td>Cattle</td>
<td>Pos</td>
<td>Not done</td>
</tr>
<tr>
<td>KS</td>
<td>1</td>
<td>Sheep</td>
<td>Not done</td>
<td>BTV 11</td>
</tr>
<tr>
<td>KY</td>
<td>1</td>
<td>Deer isolate</td>
<td>Not done</td>
<td>BTV 17</td>
</tr>
<tr>
<td>MO</td>
<td>1</td>
<td>Deer isolate</td>
<td>Not done</td>
<td>BTV 17</td>
</tr>
<tr>
<td>MS</td>
<td>1</td>
<td>Deer isolate</td>
<td>Pos</td>
<td>BTV 3</td>
</tr>
<tr>
<td>NE</td>
<td>17</td>
<td>Bovine hemoglobin</td>
<td>Pos</td>
<td>Neg</td>
</tr>
<tr>
<td>NM</td>
<td>1</td>
<td>Sheep</td>
<td>Pos</td>
<td>Not done</td>
</tr>
<tr>
<td>OR</td>
<td>1</td>
<td>Mule deer</td>
<td>Pos</td>
<td>BTV 17</td>
</tr>
<tr>
<td>SD</td>
<td>1</td>
<td>Cattle</td>
<td>Pos</td>
<td>Not done</td>
</tr>
<tr>
<td>TX</td>
<td>1</td>
<td>Cattle</td>
<td>Pos</td>
<td>Neg</td>
</tr>
<tr>
<td>WA</td>
<td>2</td>
<td>Sheep</td>
<td>Not done</td>
<td>BTV 17</td>
</tr>
</tbody>
</table>
REPORT OF THE COMMITTEE

During calendar year 2006, nine samples tested positive for EHDV by virus isolation and/or PCR. Six of these were virus isolates identified as EHDV 6, a virus type not previously reported in the United States. The positive EHDV isolation and PCR test results from submissions to the NVSL in 2006 are listed in Table 2.

Table 2. EHDV isolation (VI)/ PCR positives, Calendar year 2006

<table>
<thead>
<tr>
<th>State</th>
<th>No.</th>
<th>Species</th>
<th>PCR</th>
<th>VI</th>
</tr>
</thead>
<tbody>
<tr>
<td>IN, IL</td>
<td>6</td>
<td>Deer isolates</td>
<td>Pos</td>
<td>EHDV 6</td>
</tr>
<tr>
<td>Unknown</td>
<td>1</td>
<td>Deer</td>
<td>Pos</td>
<td>EHDV 2</td>
</tr>
<tr>
<td>MO</td>
<td>2</td>
<td>Isolate (species not provided)</td>
<td>Pos</td>
<td>Pos (typing not attempted)</td>
</tr>
</tbody>
</table>

Calendar year 2007 (January 1–October 20)

Bluetongue virus or viral RNA has been detected by PCR from 26 specimens submitted thus far in 2007. Serotype 17 was isolated from several species in Montana. The positive bluetongue virus isolation and polymerase chain reaction (PCR) test results are listed in Table 3.

Table 3. BT virus isolation (VI)/PCR positives, Jan.-Oct., 2007

<table>
<thead>
<tr>
<th>State</th>
<th>No.</th>
<th>Species</th>
<th>PCR</th>
<th>VI</th>
</tr>
</thead>
<tbody>
<tr>
<td>MO</td>
<td>2</td>
<td>Cattle</td>
<td>Pos</td>
<td>Neg</td>
</tr>
<tr>
<td>MT</td>
<td>4</td>
<td>Sheep</td>
<td>Pos</td>
<td>BTV 17</td>
</tr>
<tr>
<td>MT</td>
<td>3</td>
<td>Antelope</td>
<td>Pos</td>
<td>BTV 17</td>
</tr>
<tr>
<td>MT</td>
<td>2</td>
<td>White-tailed deer</td>
<td>Pos</td>
<td>BTV 17</td>
</tr>
<tr>
<td>MT</td>
<td>1</td>
<td>Mule deer</td>
<td>Pos</td>
<td>BTV 17</td>
</tr>
<tr>
<td>MT</td>
<td>2</td>
<td>Sheep</td>
<td>Pos</td>
<td>Neg</td>
</tr>
<tr>
<td>NE</td>
<td>11</td>
<td>Bovine hemoglobin</td>
<td>Pos</td>
<td>Neg</td>
</tr>
<tr>
<td>SC</td>
<td>1</td>
<td>Cattle</td>
<td>Pos</td>
<td>Neg</td>
</tr>
</tbody>
</table>

As of October 20, 2007, EHDV has been detected in 35 samples submitted to NVSL. With the exception of one virus isolate submission from Texas, for which the collection date is unknown, all 2007 EHDV isolates at the NVSL in 2007 have been type 2. The positive EHDV isolation and PCR test results are listed in Table 4.
Table 4. EHDV isolation (VI)/ PCR positives, Jan. – Oct., 2007

<table>
<thead>
<tr>
<th>State</th>
<th>No.</th>
<th>Species</th>
<th>PCR</th>
<th>VI</th>
</tr>
</thead>
<tbody>
<tr>
<td>FL</td>
<td>1</td>
<td>Deer</td>
<td>Pos</td>
<td>EHDV 2</td>
</tr>
<tr>
<td>FL</td>
<td>1</td>
<td>Deer</td>
<td>Pos</td>
<td>Pos-type pending</td>
</tr>
<tr>
<td>IA</td>
<td>1</td>
<td>Deer</td>
<td>Pos</td>
<td>EHDV 2</td>
</tr>
<tr>
<td>IN</td>
<td>1</td>
<td>Deer isolate</td>
<td>Pos</td>
<td>EHDV 2</td>
</tr>
<tr>
<td>IN</td>
<td>1</td>
<td>Cattle</td>
<td>Pos</td>
<td>EHDV 2</td>
</tr>
<tr>
<td>KY</td>
<td>1</td>
<td>Deer isolate</td>
<td>Pos</td>
<td>EHDV 2</td>
</tr>
<tr>
<td>KY</td>
<td>1</td>
<td>Deer</td>
<td>Pos</td>
<td>EHDV 2</td>
</tr>
<tr>
<td>NY</td>
<td>2</td>
<td>Deer</td>
<td>Pos</td>
<td>Pending</td>
</tr>
<tr>
<td>OH</td>
<td>4</td>
<td>Cattle</td>
<td>Pos</td>
<td>Neg</td>
</tr>
<tr>
<td>OH</td>
<td>2</td>
<td>Deer</td>
<td>Pos</td>
<td>EHDV 2</td>
</tr>
<tr>
<td>OH</td>
<td>2</td>
<td>Cattle</td>
<td>Pos</td>
<td>EHDV 2</td>
</tr>
<tr>
<td>PA</td>
<td>1</td>
<td>Deer</td>
<td>Pos</td>
<td>Neg</td>
</tr>
<tr>
<td>PA</td>
<td>1</td>
<td>Deer</td>
<td>Pos</td>
<td>EHDV 2</td>
</tr>
<tr>
<td>PA</td>
<td>1</td>
<td>Deer</td>
<td>Pos</td>
<td>Not done</td>
</tr>
<tr>
<td>SD</td>
<td>1</td>
<td>Deer</td>
<td>Pos</td>
<td>EHDV 2</td>
</tr>
<tr>
<td>SD</td>
<td>1</td>
<td>Deer isolate</td>
<td>Pos</td>
<td>EHDV 2</td>
</tr>
<tr>
<td>SD</td>
<td>1</td>
<td>Deer</td>
<td>Pos</td>
<td>Not done</td>
</tr>
<tr>
<td>TN</td>
<td>2</td>
<td>Elk</td>
<td>Pos</td>
<td>EHDV 2</td>
</tr>
<tr>
<td>TN</td>
<td>1</td>
<td>Cattle</td>
<td>Pos</td>
<td>EHDV 2</td>
</tr>
<tr>
<td>TN</td>
<td>1</td>
<td>Cattle</td>
<td>Pos</td>
<td>Pending</td>
</tr>
<tr>
<td>TX</td>
<td>1</td>
<td>Deer isolate</td>
<td>Pos</td>
<td>EHDV 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(date unknown)</td>
</tr>
<tr>
<td>WI</td>
<td>3</td>
<td>Deer</td>
<td>Pos</td>
<td>EHDV 2</td>
</tr>
<tr>
<td>WI</td>
<td>1</td>
<td>Deer</td>
<td>Pos</td>
<td>Not typed (same owner as above)</td>
</tr>
<tr>
<td>Wash., DC</td>
<td>1</td>
<td>Deer</td>
<td>Pos</td>
<td>Pending</td>
</tr>
<tr>
<td>N/A</td>
<td>2</td>
<td>Deer isolate</td>
<td>Pos</td>
<td>EHDV 2</td>
</tr>
</tbody>
</table>

2007 Bluetongue Serology Proficiency Test

Fifty-eight laboratories participated in the 2006 BT proficiency test. The panel consisted of 20 serum samples. The passing score was two or fewer samples missed. Three laboratories failed the 2006 BT proficiency panel on the first attempt. Two laboratories passed the retest. One laboratory failed the proficiency retest and a serologist from the laboratory received refresher training at NVSL. As of October 20, 2007, there are 58 laboratories approved to conduct official (export) BT serology tests.
REPORT OF THE COMMITTEE

2007 Bovine Leukosis Proficiency Test

Fifty nine laboratories participated in the 2007 bovine leukosis (BLV) proficiency test. Fifty nine laboratories participated in the 2007 BLV proficiency test. The panel consisted of 20 serum samples and the passing score was one or fewer samples missed. Two laboratories failed the 2007 bovine leukosis proficiency panel on the first attempt. Both of these laboratories have successfully completed a retest. As of October 20, 2007, there are 58 laboratories approved to conduct official (export) BLV serology tests.
“What is disturbing about the metaphor of relations between human beings and viruses as a chess game is that the virus always plays with the white pieces and we human beings with the black. The virus makes its move, and we react”. (J. M. Coetzee, Diary of a Bad Year, 2007).

INTRODUCTION

Bluetongue (BT) (represented by serotype 8) appeared in northern Europe in August 2006. Subsequently, it spread across five Member States (MSs) and by December had affected an area of approximately 170,000 km$^2$. Both cattle and sheep showed clinical signs and at least two species of Culicoides i.e. C. obsoletus and C. dewulfi were shown to be involved in its transmission. All affected MSs initiated national entomological surveillance programmes with the result that Culicoides are now monitored widely using mainly Onderstepoort-type blacklight traps. The most significant findings made over the past year are summarised and discussed with emphasis on The Netherlands, where 20 farms are sampled weekly.

RESULTS

Culicoides activity during the winter months of 2006 and 2007

In Holland and Belgium, low numbers of Culicoides (almost exclusively of the Obsoletus Complex and excluding C. dewulfi) were captured almost each week between January and March; 99 percent were freshly emerged nullipars indicating low-level breeding to have continued throughout the winter.

How did BTV-8 overwinter between 2006 and 2007?

Between January and March (±90 days) the absence of older parous, potentially bluetongue virus (BTV)-infected, previous-season adult midges in light trap collections led to the (false!) hope that BTV would not survive the winter. However, its ferocious recrudescence in 2007 invites many questions, which are discussed.
More Culicoides in a cooler and wetter 2007…!

The average number of vectors captured in Holland in 2007 is approximately 10 times greater than the number collected in 2006 despite it being cooler and wetter, quite unlike last year (the hottest on record since measurements began in 1706). This would indicate that warmer winters and moderate ‘normal’ summers favour vector proliferation and perhaps also the endemisation of viruses exotic to Europe.

Marked changes in some vector Culicoides abundances

The *Obsoletus* complex is the most prevalent vector in Holland and dominant on half the farms surveyed. However, in parts of southern Holland, *C. dewulfi* has this year superseded *C. obsoletus*. If a similar reversal has occurred also elsewhere in Europe, it may in part explain the intensity of the current outbreak.

Diurnal biting activity in Culicoides

*C. dewulfi* and *C. obsoletus* attack livestock in broad daylight while they are at pasture, especially on overcast days. Aggravating the situation is that they enter also animal houses after dark. Therefore, the attack of livestock by day and at night, and both indoors and outdoors, complicates our fight against BT. At this stage vector control seems to hold little promise for halting the spread of the disease.

CONCLUSIONS

In 2007 BT continued to spread and included a jump across the English Channel. The BT restriction zone now covers an area of almost one million km$^2$. There are no obvious geographical or topographic boundaries that might halt the advance of BTV-8, making it likely that it will continue to do so in 2008 (and beyond) until it reaches the — as yet unknown — limits of its range. This is daunting when it is considered that vector *Culicoides* (and susceptible ruminant hosts) occur across the entire Holarctic Region, which includes the Mediterranean Basin where *C. imicola* lies in waiting, and North America, where outbreaks of BTV and epizootic hemorrhagic disease of deer virus (EHDV) — another *Culicoides*-borne pathogen), are occurring also. In this respect it would seem that warmer winters will only add to the conundrum in future promoting rather than suppressing virus survival and vector longevity. Vaccination still seems to be the best defence available to us. But have we waited too long?
The Committee met on Wednesday, October 4, 2007 from 7:30 a.m. to 1:30 p.m. at John Ascuaga’s Nugget Hotel, Reno, Nevada. A total of 117 individuals were in attendance of which 52 were Committee members and 65 were guests. The meeting was chaired by Glenn Plumb, National Park Service, and there were 22 scientific presentations, reports, resolutions, and recommendations presented to the Committee for consideration.

Claude Barton, gave a brief review of the 2006 meeting in Minneapolis, Minnesota, and reported on one Resolution and one recommendation from that meeting. The response from United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) to both was positive.
REPORT OF THE COMMITTEE

Phillip Elzer presented the report of the Scientific Advisory Subcommittee on Brucellosis, as follows.

Report of the Scientific Advisory Subcommittee on Brucellosis

Chair: Philip Elzer

Subcommittee Chair Phillip Elzer, Brucellosis Researcher, Louisiana Annual State University (LSU), convened the Subcommittee at 10:00 a.m., October 23, 2007 during the 111th Meeting of the United States Animal Health Association (USAHA). Subcommittee members are Keith Aune, Don Davis, Phillip Elzer, Don Evans, Barb Martin, Steve Olsen, Jack Rhyan, and Gerhardt Schurig. There were no scientific issues referred to the Subcommittee during the year. If needed, further actions will be taken at a later date. Members present were Davis, Elzer, Martin, and Olsen. There were 39 visitors also in attendance.

Geetha Srinivas, United States Department of Agriculture (USDA), Animal and Plant Health Inspection Services (APHIS), Veterinary Services (VS), Center for Veterinary Biologics (CVB), gave a presentation outlining procedures and requirements for approval of new technologies, including needle-free delivery systems for vaccinations. The presentation included considerations for safety and efficacy using the needle-free system compared to the currently approved vaccination method.

The Subcommittee did not make a formal recommendation regarding this new technology. However, it should be pointed out that this system currently would be considered off label usage of the vaccine and therefore animals vaccinated using this method would not be considered to be officially vaccinated in accordance with the Brucellosis Uniform Methods and Rules (UMR).

Terry Kreeger, Wyoming Game and Fish Department, gave a presentation updating the pilot brucellosis test and removal project for elk at the Muddy Creek feed-ground. This project is intended to measure the effect of test and removal of sero-positive animals on the prevalence of brucellosis in elk at this feed-ground. He discussed plans for expanding the program in 2008. The Subcommittee looks forward to the results of 2008.

Pauline Nol, VS-APHIS-USDA gave a brief presentation entitled, Immunologic Responses and Protection in Elk Vaccinated

218
with *Brucella abortus* Strain RB51, over-expressing superoxide dismutase (SOD) and wboA and challenged with virulent *Brucella abortus*. Although there was some evidence of immune response, the results were inconclusive and the number of animals in the study was low. The view of the Subcommittee is that more study in this area is needed.

Chuck Massengill, Missouri Department of Agriculture, presented a request for a recommendation to change the cut-off values for the fluorescence polarization assay (FPA) brucellosis serologic test. Due to program changes and potential budget reductions, the Subcommittee recognizes that there is a need for more efficient testing standards. Therefore, the Subcommittee recommends that the Chair of the Committee on Brucellosis put forth a formal charge to the Brucellosis Scientific Advisory Subcommittee to evaluate FPA data in regard to a change in the current cut-off value. Further, the Scientific Advisory Subcommittee requests that the Chair of the Committee on Brucellosis communicate with USDA-APHIS-VS the need to gather and compile FPA results sufficient to support this effort.

The Scientific Advisory Subcommittee Report was accepted by the Committee.

The Feral Swine Subcommittee on Brucellosis and Pseudorabies Report was delivered to the Committee by Carter Black and Joseph Corn, as follows.

**Report of the Feral Swine Subcommittee on Brucellosis and Pseudorabies**

Co-Chairs: Carter Black
Joseph Corn

The Subcommittee was called to order by the Chair at 1:00 p.m. on Monday, October 22, 2007. There were 49 attendees, including eight members of the Subcommittee. Reports were provided on feral swine issues relating to brucellosis and pseudorabies.

Joseph L Corn, Southeastern Cooperative Wildlife Disease Study (SCWDS), University of Georgia, provided a report on development of the National Feral Swine Mapping System (NFSMS). SCWDS produced nationwide feral swine
distribution maps in 1982, 1988 and 2004 by working directly with state and territorial natural resources agency personnel. In 1982, there were 17 states reporting feral swine in a total of 475 counties. In 2004, there were 28 states reporting feral swine in 1014 counties. With support from United States Department of Agriculture, (USDA) Animal and Plant Health Inspection Service (APHIS) Veterinary Services (VS) SCWDS has now developed the NFSMS, an interactive data collection system to be used to collect and display real time data on the distribution of feral swine in the United States. The real time feral swine distribution maps will be produced using data collected from state and territorial natural resources agency personnel and from USDA-APHIS-Wildlife Services (WS). The real time map will be available to be viewed by the public on the NFSMS home page. Distribution data submitted by agency personnel will be evaluated by SCWDS on a continual basis, and the real time distribution map updated with verified additions on a monthly basis. Feral swine populations included in the map will be those determined to be established and breeding. Updated maps will be available to be viewed and downloaded from the website.

Additionally, Corn provided a report on disease exposure in feral swine populations geographically associated with high densities of transitional swine premises and commercial swine production. Surveys for evidence of exposure to pseudorabies virus (PRV), *Brucella suis*, swine influenza virus (SIV, human-like H1N1, reassortant type H1N1, H1N2-like H1N1 and H3N2), porcine circovirus 2 (PCV 2), and porcine respiratory and reproductive syndrome virus (PRRSV) in feral swine were conducted in areas where feral swine were geographically associated with high densities of transitional swine premises in South Carolina and in areas where feral swine were geographically associated with high densities of commercial swine production in North Carolina. These areas were identified using overlays of maps of the distribution of feral swine in the United States, maps of the distribution of transitional swine premises in South Carolina, and county-level maps of the distribution of commercial swine premises in North Carolina.

Tom Ray, North Carolina Department of Agriculture and Consumer Services, gave an update on feral swine programs in North Carolina. Of the 10 largest hog producing counties in the United States, eight of these are in North Carolina. Swine
inventories are more than nine million with the vast majority located in the eastern third of the state. Feral swine have been found in 84 of the 100 counties in the state. In addition to surveillance sampling by USDA-APHIS-WS and SCWDS in Eastern North Carolina, sampling has occurred in other parts of the state, particularly in and around the Great Smokey Mountains National Park. Sampling over the past three years has shown no positive samples for PRV, *Brucella suis* or classical swine fever (CSF) in the eastern third of the state where the vast majority of North Carolinas’ commercial swine industry is located. A small number of PRV positive samples have been found in Western North Carolina and the number is increasing. Because feral swine are the greatest risk for spreading PRV and swine brucellosis (SB) to the commercial swine industry, an objective-based surveillance plan, or hazard analysis critical control points (HACCP), is suggested, based on a sound, reliable epidemiological investigation of prevalence, statistical sampling and incidence rates, combined with education/outreach and regulatory involvement.

Troy Bigelow, gave an update on VS programs related to feral swine. Feral swine continue to be a threat to domestic swine. They, being carriers of PRV and brucellosis, have transmitted these diseases to herds where exposure to feral swine is allowed. This presentation reviews the number of indemnified herds due to feral or potential feral swine exposures and discusses possible ways to modify the regulations to account for different risks in different states. HACCP is a systematic thought process used as the regulatory background in other agencies to mitigate risks. HACCP principles, if adopted could be used to mitigate risks of PRV and swine brucellosis from entering the commercial compartment. The HACCP principle will be discussed as a way to protect the commercial compartment of possible risks.

Seth Swafford, gave an update on WS activities related to feral swine. As part of an intra-agency initiative, WS has continued to partner with VS to design and implement a nationwide surveillance approach regarding sampling feral swine for CSF. As an equally important component, these agencies have included monitoring for SB and PRV over the last three years in feral swine populations. This has been possible only with support provided by state departments of agriculture and state wildlife agencies. This
approach has truly become an inter-agency effort and represents one of the largest coordinated wildlife disease surveillance efforts implemented by WS. Information provided below is a general compilation of activities conducted between October 2006 and September 2007 and the planned approach for the following year. The inter-agency effort involved sampling 2029 feral swine from 20 States as one surveillance stream to support a comprehensive swine disease surveillance program. CSF surveillance remains the emphasis of the effort and is based on serological analyses performed by VS Foreign Animal Disease Diagnostic Laboratory (FADDL), Plum Island, New York. CSF was not detected in any of the samples collected during the sampling period. Surveillance for SB and PRV is also serologically based, samples are analyzed at state or university laboratories. This is an important distinction between the two components of the effort, foreign animal disease surveillance and endemic disease monitoring, and establishes the local experts as the leading authorities. SB and PRV was detected in many, but not all, local populations of feral swine. Data are presented from three states, Oklahoma, Florida, and South Carolina, to highlight the disparity between apparent sero-prevalence findings in feral swine. These states are used only to highlight the differences between apparent sero-prevalence findings and are not meant to implicate these states in any way. Apparent sero-prevalence of SB and PRV in feral swine from these states ranged from 0.6 percent to 19.0 percent and 3.8 percent to 26.5 percent respectively. These findings document the large degree of variability in which SB and PRV circulate in feral swine populations. Monitoring endemic diseases in feral swine should continue as a long term objective to establish baseline data, monitor for epidemics in feral swine which could increase risk to domestic swine, aid in response and eradication if necessary, and leverage information and education to local communities. The inter-agency cooperative has planned to sample approximately 2,100 feral swine in 30 States during the next sampling period.

Ned Hahn, College of Veterinary Medicine, University of Illinois, reported on, Feral Pig PRV: What is in your Neighborhood? The overlap of feral and domestic swine herds and the traffic among transitional herds and shooting preserves poses a high risk of reintroduction of PRV to commercial herds. There are DNA markers in the PRV that will assist in identifying
BRUCELLOSIS

the source of infection. Pinpointing the source of infection will dictate appropriate management changes needed to mitigate the risk. Improved preparedness presents confidence to the world that our nation can handle this persistent reservoir of infection. The risk of infection of domestic swine from the feral reservoir will not diminish. The route of transmission can occur by oral as well as venereal routes and marker technology can differentiate viruses to establish sources of infection.

There was a discussion on the status of transitional herds. This will require more discussion as the nation moves toward World Organization for Animal Health (OIE) Free status.

The Subcommittee Report was unanimously accepted by the Committee.

Debra A. Donch, Arnold A. Gertonson, and Jack C. Rhyan, VS-APHIS-USDA, presented the Fiscal Year (FY) 2007 Annual Report of the National Cooperative Brucellosis Eradication Program. During the year a single brucellosis affected cattle herd was disclosed in the Brucellosis Class Free State of Montana. No new affected herds were disclosed during the year in Texas, the single remaining Brucellosis Class A State. A pre-review for Class Free status was conducted in Texas during the year. Regulatory administrative requirements for advancement of Texas to Brucellosis Class Free Status were initiated and in progress as FY 2007 came to a close. The complete text of the 2007 National Status Report is included in these proceedings.

Alfredo Gutierrez gave the brucellosis status report for Mexico. He reported that the Mexico Norm (program standards) and other animal health regulations have been reviewed and are in the process of being updated. The goal for the coming year is for Sonora, Yucatan, and Lower Baja states to become brucellosis free and all the border states being in the eradication phase. Gutierrez reviewed serologic testing and vaccination data for the year. The number of human cases of brucellosis continued to decline, with approximately 1,600 cases having been reported during the year.

The Texas Brucellosis Report was given by Bob Hillman, Executive Director, Texas Animal Health Commission (TAHC). The State of Texas is the only State in the United States which has not yet achieved Brucellosis Class Free Status. Cattle producers, market operators, veterinarians, and animal health officials have worked long and hard to qualify Texas for Class Free Status. By
1990 the number of affected herds discovered in the State had been reduced to five-hundred and twenty five. By 1994, the number of affected herds had been reduced to one-hundred and eighty-one, and on March 28, 1994, Texas achieved Brucellosis Class A Status. From 1990 to the present time Texas aggressively pursued all of the components of the brucellosis program and there was a continuous decrease in the number of affected herds discovered in the state. Producers, market operators, veterinarians and animal health officials continued vigorous efforts to eliminate the disease.

The pathway has not been easy. The state neared zero affected herds several times only to find additional infection. In an effort to assure that animal health officials were doing all of the tasks necessary to eliminate brucellosis, the TAHC, in early 2006 formed a Brucellosis Eradication Working Group to review the state’s brucellosis program and make recommendations that could assist achievement of Class Free Status. The working group made a number of recommendations to the Commission. Foremost among these was the recommendation to aggressively pursue Class Free Status for the State of Texas. Other recommendations included: strategic vaccination of heifers, alternative methods to achieve vaccination, identification of non-vaccinated heifers, continuation of first-point testing, testing of higher risk herds, improved recordkeeping to assist in trace-back, and dissemination of information about the need for the support of the cattle industry segments to complete the eradication effort in Texas. The last affected herd identified in the state was detected in August 2005, in Hardin County, Texas. The herd consisted of 24 cattle. Only one infected animal was discovered in the herd. The herd was tested as recommended by the Brucellosis Uniform Methods and Rules and as required by TAHC regulations. The herd was released from quarantine in August 2006.

At the time of release of the last quarantined herd, animal health officials in Texas believed that the state had met all of the requirements for classification of the State to Brucellosis Class Free Status. The Executive Director and the Area Veterinarian-In-Charge requested a Brucellosis Class Free pre-review by USDA. This review was conducted from July 30 through August 3, 2007. The review team was led by Arnold Gertonson. Texas awaits the report from the review team. Texas animal health officials strongly believe that the State meets all of the requirements for Class Free Status. However, they remain committed to making any
corrections or adjustments to the Texas Brucellosis Program that may be necessary to achieve classification to Class Free Status. The Yellowstone National Park Status Review was presented by Rick Wallen, Wildlife Biologist and Glenn Plumb, Chief of Natural Resources, Yellowstone National Park. Yellowstone National Park is active in implementing the Interagency Bison Management Plan (IBMP). The IBMP is a brucellosis risk management program focused primarily on reducing the probability of wild bison commingling on common ranges used by domestic livestock. The IBMP is cooperatively implemented with USDA-APHIS-VS, U.S. Forest Service, Montana Department of Livestock, and Montana Department of Fish, Wildlife and Parks. The action plan has been in place since December 2000. Seasonal climate variability is a significant ecological driver in the Yellowstone ecosystem causing all native ungulate populations to shift from high elevation summer ranges to lower elevations as snow accumulates in the mountains. The majority of the bison population uses ranges within the park on a year around basis. Portions of the population migrate variable distances, in response to population density and winter severity, to find suitable winter habitats to survive the long cold winters. Bison tend to migrate later than other species and in some years migratory movements outside the National Park can be up to 30 percent of the population. Some bison winter range outside the park overlaps with livestock range. To reduce the risk of brucellosis transmission from wild bison to domestic livestock, interagency partners actively haze bison away from livestock and when necessary capture and cull portions of the wild bison population. These actions keep the wild bison population within the primary conservation area established by the IBMP. The active management period generally runs from October through the winter and ends in June when the bison population returns to high elevation summer range.

During winter 2006-2007, risk management activities were successful in preventing brucellosis transmission from Yellowstone bison to livestock. One hundred twenty five hazing events were conducted to keep bison within the primary conservation area. Nine individual bison were culled because they persistently moved outside the conservation area onto spring livestock ranges. Yellowstone National Park continues to evaluate the feasibility of remote vaccination of the bison population. An ongoing environmental impact study is showing that the current program
REPORT OF THE COMMITTEE

to vaccinate young (non-reproducing) bison only during years when risk management operations capture and release individuals will do little to reduce disease prevalence. Uncertainty about the duration of vaccine protection, the effects of vaccinating pregnant animals and the comparability of experimental trials with expected results in wild populations are driving new efforts to initiate field studies in association with an expanded vaccination program that was directed in the 2000 management plan.

Wildlife, domestic animals and humans share a large and increasing number of infectious diseases. The continued globalization of society, human population growth, and associated landscape changes will further enhance interfaces between wildlife, domestic animals, and humans, thereby facilitating emergence and resurgence of infectious diseases. Further, habitat loss and other human-caused stresses on ecosystems have reduced the ability for many wildlife populations to recover following declines. The increasing challenges of zoonotic diseases has given new attention to the century-old concept of “the one medicine” because of the need to address these diseases across species if their economic, social and other impacts are to be effectively minimized. The wildlife component of this triad has received inadequate focus in the past. Disease emergence and resurgence has reached unprecedented importance for the sustainability of desired population levels for many wildlife populations and for the long-term survival of some species. At Yellowstone National Park, the following wildlife diseases are currently, or have the potential to, determine the outcome of the park’s conservation mandate: brucellosis (bison and elk), hantavirus (small mammals), Whirling Disease (trout), West Nile Virus (birds), chronic wasting disease (elk and deer), Johne’s disease (bison), and high pathogenic avian influenza (waterfowl and mammals). In response, Yellowstone National Park formed a new partnership with Montana State University and the University of California-Davis Wildlife Health Center in 2007 to create the Yellowstone Wildlife Health Program (YWHP), a long term research program focused on understanding and solving priority wildlife health problems in Yellowstone National Park.

With government and private sector funding, the YWHP will design and implement a long term wildlife health assessment program to monitor and evaluate wildlife diseases and health indicators; a subcomponent of the Vital Signs Monitoring Program; design and implement a disease surveillance program for priority
wildlife disease threats; manage and conduct research on urgent and emergent wildlife disease and ecosystem health issues; prioritize and offer competitive grants for research projects pertaining to wildlife disease and health assessment; provide on-site wildlife veterinary services, including veterinary support for animal handling activities and disease outbreak investigation, including field evaluation, necropsy and specimen sampling; establish and manage an on-site wildlife disease diagnostics and research field laboratory; and facilitate graduate and post-doctoral research projects on wildlife disease and health.

The YWHP operational design includes Program Coordinators. Each of the three principle program partners designated a program coordinator. It is the responsibility of the Program Coordinators to coordinate research and facilitate cooperative efforts involving the three institutions and other program partners. The YWHP will establish a Scientific and Stakeholder Advisory Committee to provide guidance to the program; provide a forum for scientific issues and assess the relevance and priority of research efforts among various research and stakeholder communities. Resident Ecosystem Health Field Director—a wildlife veterinarian/ecosystem health specialist will be based in the park to manage the Wildlife Health Program and to provide wildlife veterinary support services. The program may hire additional researchers and staff as needed if funding is available. Competitive Grants Program for Wildlife Health Research—to involve the best scientists and to include pre-existing regional expertise, the program will annually award grants through a competitive grants program to address both urgent and long term ecosystem health issues including evaluating vital signs and protocols. Proposals to the competitive grants program will be reviewed and selected by the advisory committee with the assistance of external reviewers. Graduate and Post-Doctoral Field Research Element—this program element will facilitate research by graduates and post-doctorate researchers to tackle priority wildlife health research projects in the Park.

Walt Cook, Wyoming State Veterinarian, gave the Wyoming Status Review. The State of Wyoming reached the one year mark of being brucellosis-free in September. State and Federal agencies as well as producers and sale barns continue efforts aimed at reducing the risk of introducing brucellosis in the State’s livestock. Early in 2007, Dwayne Oldham resigned
as State Veterinarian for Wyoming. Walter Cook was hired as his replacement and will work out of Cheyenne. Jim Logan was then hired as Assistant State Veterinarian to work out of Riverton. Logan’s primary responsibilities will be overseeing the state’s brucellosis and scrapie program. From October 2006 through September 2007, Wyoming tested 121,456 cattle for brucellosis. None were classified as reactors. Six were classified as suspects and appropriate actions taken. Over the same time period 177,019 cattle were vaccinated. This included calf-hood vaccines, adult vaccines and booster vaccines. A few slaughter suspects were traced back to Wyoming. One resulted in a whole herd test with all being negative. Other suspect cases were resolved without whole-herd testing.

In November 2007, state and federal personnel will conduct an annual test of three herds that are in the area of the original cases that occurred in 2003-2004. This will include testing of approximately 1,200 cattle. These cattle herds are also booster vaccinated every two years. Wyoming received some cattle from Montana that had been in brief contact with infected cattle. We have successfully traced most of these; one herd is still under quarantine to be tested this December when the cattle return from summer grazing. We are continuing tracing efforts on the unaccounted few that remain. The State of Wyoming has requested a brucellosis program review which we expect to occur sometime in 2008. The Wyoming Livestock Board has also adopted new brucellosis rules. These rules have reduced some testing requirements, but still require testing of all breeding cattle sold through a Wyoming auction market and also require change of ownership testing for most test-eligible cattle from an identified area in which contact with infected elk is considered possible.

The Wyoming Governor’s Brucellosis Coordination Team continues to follow and provide recommendations aimed at reducing the risk of brucellosis transmission from wildlife to cattle. Among the recommendations made by this group are the development of cattle herd management plans, elk brucellosis management action plans, and a pilot test and slaughter program for feed-ground elk. The Wyoming Livestock Board and VS personnel have worked with producers to develop 155 cattle herd plans. Herd plans are voluntary and individualized based on the individual herd exposure to potentially infected wildlife. They represent an obligation of the producer to take certain steps to minimize the risk of transmission to their cattle and include
surveillance measures for herds with potential wildlife contact. Several herd plans call for periodic adult booster vaccination with Strain RB51. One producer, who vaccinated 281 pregnant, seronegative, cattle on November 12, 2006, documented multiple abortions, and other fetal/calf losses. A total of 20 (7.12 percent) booster vaccinated cows were found to have aborted, given birth to a weak calf or otherwise failed to deliver a healthy calf. Abortions were documented beginning February 10 and ending on April 3, 2007. Seven fetuses/tissues were sent to the Wyoming State Veterinary Laboratory and/or the National Veterinary Service Laboratory. All had lesions consistent with bacterial infection, pneumonia and Strain RB51 *Brucella abortus* was cultured from five fetuses; an additional fetus was culture negative, but a positive polymerase chain reaction (PCR) for RB51 was obtained at Wyoming State Veterinary Laboratory. There may be confounding factors involved in this herd. For instance, the herd had existing problems with bovine viral diarrhea (BVD), and eight cattle that aborted and were bled had titers to BVD. Adult cattle on other premises with herd plans (approximately 1,000 head) also were booster vaccinated using the same vaccine serial and dose and no problems were associated with the vaccination in those animals.

The Wyoming Game and Fish Department has completed Brucellosis Management Action Plans for all seven elk herds in Northwestern Wyoming. These plans require wildlife management aimed at minimizing risk of brucellosis transmission from elk to livestock. The Wyoming Game and Fish Department is in the process of developing plans for Wyoming’s two wild bison herds as well. In the winter of 2006, the Wyoming Game and Fish Department began a test and slaughter of elk on the Muddy Creek feedground. That year, 158 test eligible females were trapped; 58 (37 percent) of these elk were seropositive and sent to slaughter and culture. Eighteen (32 percent) of the seropositive elk were culture positive. The project continued during the winter of 2007 with the capture of 79 test eligible female elk; 13 (16 percent) of which were seropositive and eight (62 percent) of seropositive were culture positive. Interestingly, four elk that were captured and tested negative in 2006 had seroconverted in 2007 and three (75 percent) of these were culture positive. Current plans expand the test and slaughter program; a trap has been built on Fall Creek feedground and the Department plans to trap there this winter (2008) in addition to trapping on Muddy Creek again.

229
REPORT OF THE COMMITTEE

The following year they expect to trap on Scab Creek feedground in addition to the other two. I thank Brandon Scurlock of the Wyoming Game and Fish Department for the data on the elk test and slaughter program and Tom Linfield of VS-APHIS-USDA for data on fetal loss associated with booster vaccination.

The Montana Status Review was given by Martin Zaluski, State Veterinarian, Montana Department of Livestock. Montana experienced its first case of brucellosis in cattle since regaining its Class-Free Status in 1985. The index animal was a three-year old beef cow that was given as a wedding present from an individual ranching in Emigrant, Montana to daughter and son-in-law ranching in Bridger, Montana. The animal aborted as a two-year old within a month of arriving in Bridger, and then again as a three-year old. She was subsequently sold through a sale in Billings, Montana for use as an embryo transfer recipient. During export testing, she was found to be a brucellosis reactor, and further testing revealed six additional reactor animals in the index herd.

Epidemiological investigation revealed that exposure most likely occurred from elk co-grazing and co-mingling at the Emigrant herd, however, fingerprinting (hoofprinting) of the brucella strain was not conclusive Montana is enhancing surveillance by two methods. First, Montana Department of Livestock (MDOL) is working with Montana Fish Wildlife and Parks to increase surveillance (blood and tissue) of hunter harvested elk in the area directly north of Yellowstone National Park. Second, MDOL is working with VS to assess the risk of brucellosis in the Greater Yellowstone Area (GYA) herds, and to enhance the number of herds that have herd plans which includes brucellosis testing as well as adult brucellosis vaccination.

John Chatburn, Idaho Department of Agriculture, and Phil Mamer, Idaho Department of Fish and Game provided the Idaho Brucellosis Report.

Idaho regained Brucellosis Class Free Status during the summer of 2007. The states surveillance and elk/cattle mitigation efforts are focused on a high risk area in eastern Idaho that is adjacent to Yellowstone National Park and the state of Wyoming. Individual, site specific, Brucellosis Action Management Plans have been developed for the 15 high risk herds identified in the high risk area. These plans are developed jointly between the rancher, Idaho State Department of Agriculture (ISDA), and the
BRUCELLOSIS

Idaho Department of Fish and Game (IDFG). The plans include mitigation actions provided by the rancher as well as the two state agencies. ISDA and IDFG are working with all of the ranches in the high risk area that were not identified as high risk herds to develop additional Brucellosis Action Management Plans. The plans for the remaining herds should be completed by the summer of 2008. The efforts required to regain Idaho’s Brucellosis Class Free Status were substantial. However, the cooperation, team work, and dedication exhibited by Idaho’s cattle industry ISDA and IDFG have been nothing short of monumental. Maintaining Idaho’s Class Free Status will require even more cooperation and vigilance in the foreseeable future.

John Clifford, Deputy Administrator, VS-APHIS-USDA, spoke on the Proposed Changes to the National Brucellosis Surveillance Program. Clifford introduced this section of the Committee agenda by referring to the expected achievement, within the near future, of Brucellosis Class Free Status for brucellosis in livestock throughout the United States. Dr. Clifford stated that the status of animal brucellosis in the country, coupled with declining fiscal resources and improved technology necessitates a review of the national brucellosis surveillance program. About a year ago a Federal-State Working Group on National Brucellosis Surveillance Planning was established to do an in-depth review of brucellosis surveillance as it exists today and what the needs will be in the future. The complete text of the following three presentations listed below are included in these proceedings.

- **Proposed National Brucellosis Surveillance Plan**
  David Cummings, VS-APHIS-USDA, Planning and Strategy Staff
  This presentation was a time specific paper that gave an in-depth overview of the issues associated with the current brucellosis surveillance program, as well as needs and options for surveillance in the future.

- **Proposed Brucellosis Laboratory Consolidation Plan**
  Bob Brady, VS-APHIS-USDA, Area Epidemiologist (New England)
  This presentation outlines the findings of the committee within the surveillance working group that was responsible
REPORT OF THE COMMITTEE

for developing a plan for restructuring the brucellosis laboratory system. This included the identification of laboratories, personnel, fiscal issues associated with brucellosis surveillance and a national plan for consolidating these laboratories.

- **Proposed Brucellosis Laboratory Testing Standardization Plan**
  Eric Ebel, Food Safety Inspection Service (FSIS) USDA
  This presentation dealt with the crucial importance of the serologic test sensitivity and specificity of the diagnostic protocol in estimating the prevalence of brucellosis in the national livestock herd, and the need for this estimate to be done at least annually.

  After completion of the above three presentations, the Committee was divided into three discussion groups to consider the issues that were presented on brucellosis surveillance and to develop resolutions and/or recommendations for consideration by the Committee. The discussion group on the proposed adjustments to standardized serology protocols proposed that the Committee Chair prepare and send a letter of recommendation to the Brucellosis Laboratory Restructuring Committee to ensure that the following points of concern are included in the standardization plan. There was widespread support for a standardization protocol for serological testing, including support for the proposed screening and confirmatory tests. There was additional concern about how long it would take for some individuals to become comfortable with using only three tests and how decision makers would fund the additional testing needed to meet their needs.

  The Committee approved a recommendation to the Brucellosis Laboratory Restructuring Committee that training and preparation for implementation be provided prior to phasing out the old system. The Committee also recommended that the Brucellosis Laboratory Restructuring Committee include the following considerations to ensure quality of samples and management of information.

  1. Establish standards to describe the quality of acceptable samples needed for testing
  2. The plan should account for appropriate time
BRUCELLOSIS

lines for submitting samples and for subsequent retesting if a trace block is necessary

3. Individual animal identification should be a part of the standardization plan to improve record keeping and retracing of initial samples collected

4. The time period for community results book through the testing system should be established for efficient decision making.

5. Consider the value in keeping records of both negative and positive test results

There was a total of seven Resolutions proposed to the Committee. These Resolutions were approved by the Committee and forwarded to the Committee on Nominations and Resolutions.
Fiscal Year (FY) 2007 exemplified the “tail of the dragon,” a maxim often used to describe the steadily declining prevalence of brucellosis affected cattle herds in the final years of eradication efforts. A single brucellosis affected cattle herd was disclosed in a Brucellosis Class Free state while no new brucellosis affected cattle herds were disclosed in the single Brucellosis Class A state. With final eradication imminent, maintaining effective and efficient surveillance is a program priority. FY 2007 program activities have focused on developing effective brucellosis surveillance and assessing ways to restructure the nation’s brucellosis laboratory system for greater efficiency. Additional program activities continued to focus on furthering cooperative efforts to develop concepts to eliminate brucellosis from the Greater Yellowstone Area (GYA).

One new brucellosis affected cattle herd was disclosed in FY 2007. This compares to two new brucellosis affected cattle herds disclosed in FY 2006, three new brucellosis affected cattle herds disclosed in FY 2005, seven new brucellosis affected cattle herds disclosed in FY 2004, two new brucellosis affected cattle herds disclosed in FY 2003, nine new brucellosis affected cattle herds in FY 2002, six in FY 2001, and fourteen in FY 2000 (Figure 1). The FY 2007 brucellosis affected cattle herd was disclosed in May 2007 in the state of Montana, a state which has been classified as Brucellosis Class Free since June 3, 1985. The affected herd was depopulated with indemnity. Montana successfully completed the herd depopulation and epidemiologic investigation, including all required testing, within sixty days, thereby maintaining Class Free State classification.
Figure 1

The single brucellosis affected cattle herd disclosed in the state of Montana in mid-May 2007 was disclosed on a test of animals intended for interstate movement. One reactor-titered animal was identified and traced to the herd of origin. The herd of origin was tested, disclosing six additional reactor animals. Bacteriologic culture results on the initial reactor animal revealed *Brucella abortus* Biovar 1. The herd of origin was held under quarantine and depopulated with indemnity in mid-July 2007, meeting the sixty day depopulation requirement for a Class Free State to maintain class free status. In addition, all adjacent herds, potential source herds, contact herds, and area herds were tested and placed on herd plans within the required sixty day period to maintain class state status. Approximately 3,200 head of cattle in approximately 25 herds were tested as part of this brucellosis affected herd epidemiological investigation. No additional brucellosis affected herds were disclosed.

Throughout 2007, Texas maintained diligent brucellosis surveillance activities while conducting an in-house review of previous brucellosis affected herd investigations and high-risk areas. First-point testing has been a key component of brucellosis surveillance activities in Texas. Upon completing their self-assessment, Texas formally submitted application to advance to Class Free Status in June 2007. A pre-Class Free review conducted in Texas the week of July 9 to August 4, 2007 evaluated Texas’s brucellosis program to confirm that all requirements to advance to Class Free Status have been met. Regulatory activities to advance Texas to Class Free Status were initiated and in progress as FY 2007 came to an end.

A Brucellosis Surveillance Planning Working Group was convened in FY 2007 and tasked with drafting a proposed future brucellosis surveillance plan based on the findings and recommendations of the National Surveillance Unit evaluation.
REPORT OF THE COMMITTEE

of current bovine brucellosis program surveillance activities conducted in FY 2006. The Brucellosis Surveillance Planning Working Group is composed of eighteen members, including four state veterinarians. In drafting a proposed plan, the working group focused on reducing redundancies in surveillance testing and addressing imbalances in surveillance in lower risk states, while maintaining effective and cost efficient surveillance. The working group held discussions with key industry partners and members of the National Assembly to better understand impacts and concerns relative to changes in brucellosis surveillance activities. A draft of a proposed surveillance plan was presented to the VS Management Team and is being presented for further discussion during this year’s USAHA Committee on Brucellosis meeting.

A Brucellosis Laboratory Restructuring Committee, consisting of state and federal animal health officials and laboratory personnel, was convened in FY 2007. This Committee was tasked with drafting a proposal for a regional brucellosis laboratory concept for brucellosis surveillance testing. The objectives are to increase the cost effectiveness of brucellosis surveillance testing while maintaining testing effectiveness and timely reporting of test results. The Committee sent a questionnaire to the eighty-two laboratories currently approved to conduct serological testing for brucellosis to garner information on testing capacity, cost of testing, and laboratory funding. Assessing and comparing this information has proved to be a complex endeavor. Laboratories have been a key component of the national brucellosis eradication program. The Committee continues to work to develop a set of criteria for selection of regional brucellosis laboratories that will meet the needs of all states and maintain the integrity of the national brucellosis surveillance program.

The Brucellosis Program delivered two annual training courses in FY 2007 – the Basic Brucellosis Epidemiology course and the Designated Brucellosis Epidemiologist (DBE) Refresher training course. The Basic Brucellosis Epidemiology course, held in March 2007 in Austin, Texas, was attended by 35 state and federal veterinary medical officers and animal health technicians and four state and federal animal health officials from Mexico. The Basic Brucellosis Epidemiology course is a three-day training event, with instructor-led lectures, facilitated discussions, practical exercises, and laboratory demonstrations. The purpose of the course is to provide training in the principles
of the brucellosis eradication program, including the organism, the
disease as it occurs in various species of animals, and detailed
epidemiological considerations necessary to effect the efficient
and rapid eradication of brucellosis. The Designated Brucellosis
Epidemiologist Refresher training, held in May 2007 in Bozeman,
Montana, was attended by 55 state and federal veterinary medical
officers. This training partnered with fourteen experts from state
and federal wildlife agencies and focused on brucellosis in wildlife
in the GYA.

Brucellosis in the Greater Yellowstone Area (GYA)

A Greater Yellowstone Interagency Brucellosis Committee
(GYIBC) Memorandum of Understanding (MOU) draft, agreed
to by the United States Departments of Agriculture and the
Interior has been forwarded to the Governors of Idaho, Montana
and Idaho for their signatures. The Grand Teton National Park
(GTNP)/National Elk Refuge Bison (NER) Elk Management Plan
and Environmental Impact Statement (EIS) final report and Record
of Decision has been issued. The plan is to reduce the number
of bison from approximately 1,200 to 500 head and to reduce
the number of elk to approximately 5,000 head. The Interagency
Bison Management Plan (IBMP) cooperating agencies made
several adaptive management changes for 2007. These include
strategic hazing in Zone 2 on public lands, increased tolerance
of bison bulls in Zone 2 during certain times of the year, bison
hunting in Zone 2, and a clarification of the 3,000 bison population
number as a management trigger rather than a Yellowstone
National Park (YNP) population objective or target. Adaptive
management changes for operations in the IBMP can be made
with the concurrence of all of the IBMP cooperating agencies.
Montana issued 140 bison hunt permits last year, resulting in 31
bison successfully taken during the hunt. The Nez Perce tribe
also successfully hunted six bison. Montana will issue 40 bison
hunt permits in a drawing this year (2007) and 40 bison hunt
permits will be issued to Native American tribes.

VS personnel assisted IBMP bison management
operations. Hazing operations (125) were performed during
this past year. Capture operations resulted in the capture of
57 bison on lands adjacent to the west boundary of the park.
These bison were hauled to the north side of park and released
into YNP. The GYA states (Idaho, Montana, and Wyoming) are
continuing, in consultation with APHIS-VS, with development
REPORT OF THE COMMITTEE

and implementation of individual livestock herd and individual elk herd unit plans to mitigate potential transmission of brucellosis from elk or bison to cattle. Idaho completed and implemented herd plans in 2006. Montana has completed its survey of livestock herds in the GYA and is performing a risk analysis of the individual livestock herds to determine management actions for inclusion in the individual livestock herd plans. Montana is also reviewing its elk herd unit plans. Wyoming has a larger number of livestock herds and elk units in the area of concern. Wyoming is currently surveying livestock herd owners and developing individual livestock herd plans in the area of concern. Wyoming has completed individual elk herd plans for the seven elk herd units of concern. Wyoming is also continuing statewide elk herd brucellosis surveillance using hunter collected blood samples. Wyoming is continuing a five year elk brucellosis test and removal of brucellosis sero-positive elk pilot project at its Muddy Creek feed-ground. This project was initiated in 2006. Data gathered from this project will be evaluated to determine if test and removal will significantly reduce brucellosis sero-prevalence in those elk herds. The study of fluorescent polarization assay (FPA) and buffered acidified plate antigen (BAPA) tests to determine their suitability for brucellosis testing elk sera is ongoing. Three state laboratories are working with NVSL to determine repeatability of test results. The study is expected to be completed in 2007. APHIS-VS personnel attended Wyoming Brucellosis Coordination Team, Greater Yellowstone Interagency Bison Committee, IBMP, United States Animal Health Association (USAHA) regional and national meetings, state and local meetings of ranchers, and meetings of other stakeholders to provide technical assistance and to make presentations when requested. Veterinary Services continued activities and involvement in several projects aimed at assessing potential effective brucella control strategies for affected wildlife populations. These on-going developmental projects include the following studies:

- **Bison Quarantine Feasibility Study (BQFS):** There are currently 37 two and three-year-old cows and eight males in Phase II of the BQFS. Phase II of this study will evaluate the likelihood that latent disease expression will be demonstrated during the first pregnancy. Phase I animals that remained test negative, advanced into Phase II quarantine protocols and were bred. The goal of the Phase II quarantine protocols is to determine if and how latent brucellosis infection is expressed
during the stress of pregnancy. To date, no animals in this study have sero-converted in 2007. Many two and three year old females in the study are in early pregnancy. If latent infection does not become evident at parturition, some cows and their calves should be eligible for soft release (release into fenced pasture for continued surveillance at the sight of intended full release) next fall/winter. A new cohort of calves is anticipated this winter (Phase III).

- Brucellosis vaccine in elk: In a study last year, elk received engineered RB51 by injection and oral administration. No abortions were seen in these elk and there was less tissue colonization than controls on challenge with Strain 2308. A further study focusing on an oral prime and an oral boost in elk will begin this winter (2007).
- Development of non-lethal methods to eradicate brucellosis from GYA wildlife:
  - Gonacon™, a GnRH immunocontraceptive vaccine, has shown efficacy in bison for three years following a single administration of this vaccine. Immunocontraceptive studies are ongoing in elk. So far, results appear to be similar as those observed in the bison.
  - Studies on rifampin treatment of brucellosis are ongoing in cattle, goats, and mice.
- Serologic differentiation of brucellosis and infection with Yersinia enterocolitica strain 0:9 in elk: A study to determine if infection with Yersinia can reliably be differentiated from infection with Brucella abortus by western blot and ELISA tests is on-going.

**Brucellosis Program Surveillance Activities**

The following surveillance statistics for the cattle brucellosis eradication program is based on data available as of October 15, 2007. Normal data reporting time allowances for states to gather and submit monthly data preclude ascertainment of all data for FY 2007.

FY 2007 began with 48 States and three Territories classified Brucellosis Class Free, and two states classified Brucellosis Class A Status. FY 2007 ended with 49 States and three Territories classified Brucellosis Class Free Status. The two states classified as Class A at the beginning of FY 2007 were Texas and Idaho. After successfully completing all program regulatory requirements, Idaho successfully regained Class Free
REPORT OF THE COMMITTEE

Status July 23, 2007. Idaho had initially attained Class Free Status in February 1991, however pursuant to the disclosure of two brucellosis affected herds in November of 2005, Idaho’s status was downgraded to Class A Status in January 2006. The state of Texas achieved Brucellosis Class A classification in August 1994. The last brucellosis affected herd in Texas was disclosed in August 2005, placed under hold order and subjected to the required herd testing protocol. The final negative herd test was conducted in September 2006. During the first half of FY 2007, Texas conducted additional epidemiological evaluations in high-risk areas before submitting application for Class Free Status.

Figure 2. Brucellosis Eradication Program
Cattle inventories in the U.S. at the end of FY 2007 are distributed as follows: 14.52 percent of all cattle and 15.27 percent of all cattle herds are located in the Brucellosis Class A state; 8.35 percent of all cattle and 8.16 percent of all cattle herds are located in states that have held Brucellosis Class Free Status for five years or less; 40.23 percent of all cattle and 39.08 percent of all cattle herds are located in states that have held Brucellosis Class Free Status for six to ten years; 13.26 percent of all cattle and 9.26 percent of all cattle herds are located in states that have held Brucellosis Class Free Status for eleven to fifteen years; 5.70 percent of all cattle and 7.04 percent of all cattle herds are located in states that have held Brucellosis Class Free status for sixteen to twenty years; and 17.94 percent of all cattle and 21.19 percent of all cattle herds are located in states that have held Brucellosis Class Free Status for more than twenty years.

The national herd prevalence rate for bovine brucellosis was 0.0001 percent in FY 2007. One brucellosis affected cattle herd was disclosed in FY 2007. This herd was disclosed on a herd test of animals intended for interstate movement. Per the Brucellosis Emergency Action Plan (BEAP) recommendation, the brucellosis affected herd was depopulated with indemnity and a thorough epidemiologic investigation was completed disclosing no additional brucellosis affected herds. In addition, trace exposed test negative cattle were depopulated and indemnified as well.

Maintaining Brucellosis state status focuses on continual surveillance activities. Two primary surveillance activities are conducted for bovine brucellosis, market cattle identification (MCI) testing and brucellosis milk surveillance testing (BMST). During FY 2007, APHIS tested approximately 7.995 million head of cattle under the MCI surveillance program. Brucellosis program standards require testing of a minimum of 95 percent of all test-eligible slaughter cattle. In FY 2007, approximately 96.40 percent of all test-
eligible slaughter cattle were tested. First-point testing at livestock markets is required in Brucellosis Class A states. Several Brucellosis Class Free States continue to conduct first-point testing at markets to facilitate interstate movement of cattle and enhance surveillance activities. Brucellosis program standards require a minimum of 90 percent successful traceback of all MCI reactor cattle and a minimum of 95 percent successful case closure. In FY 2007, approximately 97.87 percent of all MCI reactors were successfully traced and investigated resulting in successful case closures. Approximately 835,200 additional head of cattle were tested on farms or ranches during FY 2007, bringing the total cattle tested for brucellosis in FY 2007 to approximately 8.831 million head. BMST surveillance is conducted in all commercial dairies – a minimum of two times per year in Class Free States and a minimum of four times per year in Class A States. Suspicious BMSTs are followed up with an epidemiologic investigation. Herd inventory data reported on individual state annual reports reveals there were approximately 62,500 dairy operations in the U.S in FY 2007. Approximately 142,700 BMSTs were conducted in FY 2007; approximately 126 of those BMSTs yielded suspicious results after repeat screening (repetitive BRT and/or HIRT). All suspicious BMSTs in FY 2007 were confirmed negative by subsequent epidemiologic investigations and additional herd testing.

There were approximately 4.212 million calves vaccinated for brucellosis in FY 2007. The national calfhood vaccination policy recommends proper calfhood vaccination in high risk herds and areas and whole herd adult vaccination when appropriate in high risk herds and areas. Elimination of mandatory vaccination in all states is also recommended. Brucellosis program activities during FY 2007 demonstrate continued commitment by all states to achieve and maintain final eradication of brucellosis from the United States domestic cattle, bison, and swine herds. Diligent effective surveillance and judicious affected herd management continue to be critical program activities. As final eradication nears, focused, efficient, and effective surveillance is paramount to the integrity of a national brucellosis-free classification for the United States.
When households, businesses or governments consider whether to buy more insurance, more security precautions or increased surveillance, more is—by definition—better. Every dollar spent yields a small, maybe even tiny increment of greater safety. But even though more is always better to some degree, we certainly wouldn’t spend all of our budgets on the preventative items. We have a variety of pressing needs. So, we look for the sweet spot that strikes the best balance for our short-, medium- and long-run situation. Over the past year, I have had the opportunity and privilege to chair a Federal-State Working Group on National Brucellosis Surveillance Planning. For me this was truly a learning experience; I was able to work closely with some real experts on brucellosis control, eradication and surveillance, and I and the Working Group encountered multiple parties expressing a wide range of perspectives on the various and inter-related brucellosis surveillance issues. To begin, let me reiterate why this working group came to be. Clifford, in his opening remarks, touched on each of these points. First, for decades, “brucellosis surveillance” has been synonymous with “animal health infrastructure” but this is almost certainly not sustainable. It’s not feasible to fund tuberculosis (TB), animal identification and other pressing needs with brucellosis surveillance money. The brucellosis surveillance program has made enormous progress and all parties want to preserve those gains and not regress in any way. Although most States are brucellosis-free, surveillance in low-risk areas has changed little over the years. Finally, appropriations are declining for both brucellosis eradication and surveillance. We need to approach this with an eye toward fiscal responsibility and putting our appropriated Federal dollars toward our highest brucellosis priorities.

Federal spending on brucellosis surveillance is roughly $30 million. This money supports sample collection, transportation, testing and investigation costs, as well as personnel, equipment, materials and overhead. In the end, we see that we spend a lot on slaughter and first point testing. Proposing changes to national brucellosis surveillance has been discussed since at least 2005.
REPORT OF THE COMMITTEE

It's a process, maybe even a journey, to alter this historic and institutionalized program. These steps are involved, and these are the steps I will walk you through during my talk:

- National Surveillance Unit evaluation, 2006
- Vetting of Working Group proposals, ongoing
- Implementation, 2008-2011

The Veterinary Services National Surveillance Unit (NSU) evaluation completed during 2006 was a foundation step for brucellosis surveillance planning. I’m sure many of you recall that Ebel presented the NSU 2006 evaluation findings to this Committee last year. Those findings highlighted that unneeded redundancies exist in current surveillance, that is, collection of multiple samples from the same animals within a short period of time. NSU analysis suggested that the combination of slaughter surveillance and brucellosis ring test (BRT) testing for dairy herds was redundant. Similarly, for beef herds, first point sampling is often redundant with slaughter sampling. Current surveillance intensity is also imbalanced. The program is currently biased toward finding affected dairy herds, but these herds face a much lower risk of brucellosis infection compared to beef herds. Current Federal spending for detecting dairy herds is nearly equivalent to its spending for detecting beef herds, but on a per herd basis, the spending on dairy is nine times more than beef. Finally, NSU reported that non-standardized testing and data entry do not support regional or national collaboration, but I believe Drs. Brady and Ebel will elaborate on those points when they speak next.

The NSU evaluation of 2006 recommended that: (1) in the beef sector, slaughter surveillance continue at current levels; (2) in the dairy sector, discontinue slaughter surveillance and use only BRT by conducting one round per year in states that have been Class-free for five or more years; (3) in Class-free states, conduct strategic first point testing of out of state cattle and cattle from smaller herds; (4) perform slaughter sampling at the 40 to 50 largest slaughter establishments that process over 95 percent of U.S. cattle; (5) identify and use one standard laboratory protocol to be conducted on all blood samples, and conduct testing at a limited number of laboratories; (6) standardize data entry across all laboratories to ensure consistent practices and entry of all animal identification information; and (7) promote
and fund abortion screening as a long-term surveillance activity for brucellosis. Following the NSU evaluation, a Federal-State Working Group was formed in December 2006. Reviewing the NSU findings, and also the NSU recommendations, was a starting point for this brucellosis surveillance planning working group. Those recommendations from the earlier NSU evaluation, the Working Group considered them all and arrived at similar proposals regarding laboratory testing and abortion screening. The Working Group, however, offered a set of proposals that differed from the above evaluation recommendations in how slaughter surveillance, BRT and first point testing could be combined and feasibly implemented to result in the most effective and fiscally responsible approach.

The Working Group’s charge was to propose an effective and efficient surveillance plan for bovine brucellosis, and to consider implementation issues and draft a skeletal implementation plan. The idea was that implementing changes would necessarily take several years to do it smoothly, and ideally at least some small-scale changes could begin in 2008. This Working Group included four State Veterinarians and Veterinary Service representatives from Headquarters, Eastern and Western Regional Offices, NSU, four Area Veterinarian in Charge (AVIC), and National Veterinary Services Laboratory (NVSL). We also had an APHIS public affairs person to assist in communication planning. Between December 2006 and June 2007, this working group met through a series of teleconferences and in-person meetings.

I would characterize the discussions as candid. In some cases, working group members advocated a change as something that absolutely needed to be done. In other cases, some group members expressed that if change is inevitable, then this is the best way to go. The group had no guarantees that it would reach consensus, but following are proposed changes that the group agreed to unanimously support to reduce redundancies and imbalances in low-risk States (no changes were proposed for higher-risk areas). Low risk States were defined as Class Free for at least five years and not bordering the Greater Yellowstone Area.

Proposal number one was to remove federal funding for all first point testing activities (blood sample collection, shipping, testing, reporting) at markets and other first points of concentration in low-risk States. It appears that 11 low-risk states currently conduct first point testing. Even if federal funding were removed,
some or all of those low-risk states may choose to continue first point testing. The extent of federal support for first point testing varies among the 11 States. Generally, the federal contribution is for shipping and laboratory testing, although in some States the Federal Government pays significantly more, or less, than shipping and laboratory testing. It was noted that the Federal Government does not require first point testing in low-risk states. No change would be needed to the Code of Federal Regulations (CFR), but smooth implementation would obviously require communication and budget planning, to name just two logistics. Implementing this change would require updating the guidelines and dollar amounts in the Federal-State cooperative agreements that support surveillance.

Proposal number two was to remove federal funding for all brucellosis ring testing (BRT) activity—milk sample collection, shipping, testing and reporting—in low risk States. As you might guess, this proposal generated significant discussion and exploration. One reason it emerged and survived was that the BRT—an excellent and cost-effective test—could target only dairy cattle, whereas slaughter surveillance targeted both beef and dairy cattle and was perceived to form the backbone of brucellosis surveillance. It was also expected that some States and industry may opt to continue use of the BRT even without federal funding. A Federal rule change to remove the BRT requirement would be needed to enact this change, and a change to the Brucellosis Uniform Methods and Rules (UMR). When that is nearing completion, cooperative Federal-State cooperative agreements would be updated.

Proposal number three was to no longer require slaughter surveillance at plants that process less than 500 cattle per year, in low-risk States that have been Class Free at least 10 years, but to continue testing all domestic bison and elk. Implementing this change in a State would be subject to approval by both the State Veterinarian and the AVIC. As you know, APHIS-VS contracts with the Food Safety and Inspection Service to collect and package blood samples at small- and medium-size slaughter facilities. This was the only slaughter-based proposal made by the working group, although there were many discussions of the pros, cons and implementation logistics of several other potential alterations to slaughter surveillance. A Federal rule change in the CFR would also be required to enact this change, and a change in the UMR. Revising the APHIS-Food Safety and Inspection Service contract
for blood sample collection would be the final step.

Proposal number four was to identify, screen and investigate abnormal abortion events as if the event were a foreign animal disease. This would involve developing guidelines for transitioning brucellosis in the United States from a program disease to a foreign animal disease. The working group spent less time on this particular recommendation, but the key idea was that abortion screening remains highly important in brucellosis surveillance and may evolve as the country progresses further toward eradication.

Proposal number five was to research and pursue validation in the United States of a new herd-level testing protocol using bulk milk and/or serum for both brucellosis and tuberculosis surveillance. One example of such technology would be the flourescent polarization assay (FPA). If a herd-level testing protocol for both brucellosis and TB were validated in the future, the working group discussed that such a breakthrough would open the door to serious consideration of further and substantial changes to slaughter blood surveillance. It is difficult to accurately project a timeline for this recommendation; approving the technology is a first step, and then completing a Federal rule change would be next followed by the logistics of implementing such testing in the field and at laboratories.

Vetting these ideas in State, industry and Federal circles has been ongoing and today’s session in this Committee is a watershed date in that vetting process. Clifford emphasized that your input will be critical to the decisions concerning brucellosis surveillance and any regulatory changes that may be considered. Since the working group drafted its proposals in June, State Veterinarians have presented those in draft form to various industry groups and other State Veterinarians. In May and June 2007, the working group contacted a small cross-section of the cattle industries informally to gauge initial reactions to these proposals. The VS Management Team heard the proposals formally in June and discussions have proceeded also within APHIS-VS as to whether and how changes should be made. Communication throughout the State-Federal-industry animal health infrastructure will of course be the key to successful implementation. States and industries and federal offices need adequate time and information to make smooth transitions. As Clifford noted, VS and the working group will need your help in developing a communication plan for any changes so that
industries receive a consistent, timely, factual message.

Timelines for implementation were estimated by the working group. As I mentioned earlier, whether a CFR change is required often determines the timeline for when changes to these surveillance methods could begin:

- First point testing: 2008 or 2009
- Brucellosis ring testing: 2010
- Slaughter surveillance: 2010
- Abortion screening: TBD
- Herd-level testing for brucellosis and tuberculosis: 2011

Again, what I have presented are proposals for discussion. All of us truly look forward to your discussions today. I'm afraid that any huge-scale program such as brucellosis eradication and surveillance is going to have aspects that are clunky and in need of tuning. Please help to identify the sweet spot that uses preventative spending well and addresses today’s highest priorities. Although the working group inevitably considered laboratory issues as those overlapped with overall surveillance planning, I have not even touched on laboratories. That was intentional because Brady and then Ebel are about to speak on those. I'll close by relating what one working group member said to me. He said, “You know, early in my career I was there when the brucellosis program was ramping up and that was the right thing. Now, as I near the end of my career, I know that the brucellosis program needs to be in a different place. It would be very rewarding professionally to help it arrive to where it should be today.”
PROPOSED BRUCELLOSIS LABORATORY CONSOLIDATION PLAN

Robert C. Brady
Area Epidemiologist, New England

A Committee was formed in January, 2006, to come up with recommendations for restructuring the brucellosis laboratory system. The Committee was Chaired by Michael Gilford, and included Bob Hillman, David Warner, Dix Harrell, Deb Donch, Eric Ebel, Steve Hennager, John Belfrage, Chuck Massengill, Rick Nabors, George Teagarden, Francisco Collazo-Mattei, Mark Camacho, Eric Cline, and Teresa Sigafoose. I served as the Coordinator. The Committee’s objectives were to increase the cost efficiency of brucellosis testing, identify funds saved for use elsewhere in the brucellosis program, and maintain the accuracy of testing and speed of reporting results. The Committee decided on the information it needed, and concluded the best way to obtain most of this information was to get it directly from the brucellosis laboratories. Other information was obtained from the two regional offices, Ruminant Diseases Staff, and National Veterinary Services Laboratories (NVSL). A questionnaire was sent to all brucellosis laboratories in August, 2006. A second questionnaire was sent to 15 laboratories in May, 2007.

There are 82 laboratories approved to conduct serological testing for brucellosis. All receive reagents free from NVSL. There are 362 technicians approved to conduct brucellosis serological tests. Each receives an annual proficiency test provided free by NVSL. Forty-two laboratories receive USDA money, mostly through cooperative agreements. This laboratory funding totals $3.1 million. Thirty-five laboratories received no USDA funds, and five laboratories did not answer this question. The Committee tried to determine how many brucellosis laboratories are needed to meet the serological testing needs of the United States. We assumed that the number of samples tested would remain at the 2006 level, since changes in surveillance would require two years to implement. We believe it is necessary to continue supporting abortion screening with free reagents and proficiency tests. We also believe it is necessary to continue support for the three laboratories in the Greater Yellowstone Area (Wyoming, Montana, and Idaho), since wildlife in this area is the last known reservoir of brucellosis (B. abortus) in the United States.
Criteria for selecting laboratories to continue receiving USDA funding included the cost of testing samples at the laboratory, the capacity and willingness of the laboratory to test additional out-of-state samples, the geographic proximity of the laboratory to cattle populations and adult cow slaughter plants, and the ability of the laboratory to produce reliable test results and report them quickly. Cow/bull slaughter operations are concentrated in California, Texas, the Upper Midwest, Pennsylvania, and the Southeast. Fifteen laboratories that were proposed to serve as Regional laboratories were sent a second questionnaire in May, 2007. They were asked how many additional out-of-state samples they could test, and how much additional money they would require from USDA to test this number of samples (Table 1).

Table 1. Additional sample capacity and cost per additional sample of 15 proposed regional brucellosis laboratories

<table>
<thead>
<tr>
<th>City</th>
<th>State</th>
<th>How many more samples?</th>
<th>Cost per additional sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Davis</td>
<td>CA</td>
<td>400,000</td>
<td>$0.46</td>
</tr>
<tr>
<td>Jefferson City</td>
<td>MO</td>
<td>2,000,000</td>
<td>$0.19</td>
</tr>
<tr>
<td>Topeka</td>
<td>KS</td>
<td>364,000</td>
<td>$0.35</td>
</tr>
<tr>
<td>Fort Worth</td>
<td>TX</td>
<td>125,000</td>
<td>$0.00</td>
</tr>
<tr>
<td>Austin</td>
<td>TX</td>
<td>125,000</td>
<td>$0.00</td>
</tr>
<tr>
<td>Lubbock</td>
<td>TX</td>
<td>118,000</td>
<td>$0.00</td>
</tr>
<tr>
<td>Palestine</td>
<td>TX</td>
<td>120,000</td>
<td>$0.00</td>
</tr>
<tr>
<td>Ithaca</td>
<td>NY</td>
<td>125,000</td>
<td>$1.82</td>
</tr>
<tr>
<td>Atlanta</td>
<td>GA</td>
<td>300,000</td>
<td>$0.59</td>
</tr>
<tr>
<td>Live Oak</td>
<td>FL</td>
<td>465,000</td>
<td>$0.25</td>
</tr>
<tr>
<td>Frankfurt</td>
<td>KY</td>
<td>2,000,000</td>
<td>$0.40</td>
</tr>
<tr>
<td>Madison</td>
<td>WI</td>
<td>175,000</td>
<td>$0.59</td>
</tr>
<tr>
<td>Laramie</td>
<td>WY</td>
<td>50,000</td>
<td>no answer</td>
</tr>
<tr>
<td>Boise</td>
<td>ID</td>
<td>279,500</td>
<td>$0.55</td>
</tr>
<tr>
<td>Bozeman</td>
<td>MT</td>
<td>no answer</td>
<td>no answer</td>
</tr>
</tbody>
</table>

The cost per additional sample in Table 1 was derived by dividing the amount of USDA money the laboratory said it would require by the number of additional out-of-state samples they said they could test. At this point, our Committee was divided on the best course of action. Some felt we had enough information, and should go ahead and recommend a system of Regional
laboratories. Others felt it would be better to develop national laboratory standards and a uniform price per sample that USDA would pay approved laboratories to test blood for brucellosis. Under the first option, the 12 regional laboratories would be those shown in Table 2. Georgia was not included because its cost-per-sample was $0.59, which was more than twice that of Live Oak, Florida ($0.25). The Florida laboratory indicated it could meet the testing needs of the Southeastern United States. New York was not included because its cost of $1.82 was too high, considering that Kentucky could meet the testing needs of the Northeast at lower cost-per-sample ($0.40). Wisconsin was not included because $0.59 for testing out-of-state samples was considered too high (although Wisconsin tests in-state samples at very low cost to USDA).

Table 2. Proposed list of Regional Brucellosis Laboratories under First Option

| Davis, CA | Palestine, TX |
| Jefferson City, MO | Live Oak, FL |
| Topeka, KS | Frankfurt, KY |
| Fort Worth, TX | Laramie, WY |
| Austin, TX | Boise, ID |
| Lubbock, TX | Bozeman, MT |

This first option proposes that 17 laboratories that currently receive $901,496 in USDA funds would no longer receive this money. The approximately 1 million samples tested by these laboratories would be redistributed to five of the Regional laboratories, as follows:

- California would receive samples from Washington and Oregon
- Missouri would receive samples from Tennessee and Arkansas.
- Kansas would receive samples from Arizona and North Dakota
- Florida would receive samples from Alabama, Georgia, and South Carolina
- Kentucky would receive samples from Indiana, West Virginia, Delaware, Maine, New Jersey, Ohio, and New York
REPORT OF THE COMMITTEE

It would cost USDA $310,038 to test these 1 million samples at the five Regional laboratories (Table 3). Thus, a net savings to USDA of $591,458 is expected. Seven states that currently receive USDA funds to do brucellosis serological testing would continue to receive those funds. These states likely receive sufficient state funding that USDA’s cost per sample at these laboratories is competitive with the Regional laboratories (Table 4.) The first option includes the following recommendations:

- In 2008, or perhaps 2009, stop USDA funding for 17 laboratories, and redistribute their samples to 12 regional brucellosis laboratories, as described above.
- Maintain funding for seven other state laboratories, as listed above.
- Allow the 17 de-funded laboratories to continue brucellosis testing, if they wish, by using state funds, or by charging user fees.
- If this option is adopted, it will require very careful planning and coordinated implementation.
- Ample notice must be given to each affected laboratory. This would be an amount of time sufficient for hiring and training additional technicians, acquiring needed reagents, and obtaining and installing needed laboratory equipment.

This option has a number of limitations. The method of calculating USDA cost per sample is crude, merely dividing the amount of USDA money the laboratory receives by the number of samples they test. This option is based mostly on responses received to a questionnaire sent out by the Brucellosis Laboratory Restructuring Committee. Some people said questions were ambiguous, and some of the people answering the questions may not have had the most accurate information. Most of the data used is now more than a year old. Our analysis does not take other cost factors into account, such as shipping costs. Finally, some states would rather choose which laboratory they send their samples to, as opposed to be told by USDA which laboratory to use.

This resulted in Committee members proposing an alternative option. Key points of this option include:

- Approving brucellosis laboratories based on national standards which would be developed. Laboratories would have to follow these standards in order to be eligible for USDA funds.
- Establish a nationwide price per sample that USDA would pay for brucellosis testing.
BRUCELLOSIS

- Clearly specify what is expected in exchange for that price per sample, including which tests would be used, the time frame for reporting results, maintenance of test equipment, and, possibly, data entry.
  This second option also has some limitations:
- Determining a national price for brucellosis testing would require detailed analysis by an economist. No economist from the Centers for Epidemiology and Animal Health was available to serve on the Brucellosis Laboratory Restructuring Committee when it was formed in early 2006.
- Determining a national price per sample would likely require site visits, and be time consuming.
- Setting a federal price for brucellosis testing that is uniform throughout the country would disadvantage states where labor and facility costs are higher.
- A system of monitoring laboratories for compliance with standards, and dealing with laboratories which do not comply, would need to be established.
  The Brucellosis Laboratory Restructuring Committee seeks input from the USAHA Committee on Brucellosis as to which alternative is better, or if some third alternative would be best.
<table>
<thead>
<tr>
<th>State</th>
<th>No of samples</th>
<th>USDA funds</th>
<th>USDA cost/sample</th>
<th>Proposed destination laboratory</th>
<th>USDA cost/sample at destination</th>
<th>USDA cost at destination</th>
</tr>
</thead>
<tbody>
<tr>
<td>WA (2)</td>
<td>79,100</td>
<td>$52,000</td>
<td>$0.66</td>
<td>CA</td>
<td>$0.46</td>
<td>$36,386</td>
</tr>
<tr>
<td>OR</td>
<td>17,143</td>
<td>$11,500</td>
<td>$0.67</td>
<td>CA</td>
<td>$0.46</td>
<td>$7,886</td>
</tr>
<tr>
<td>AZ</td>
<td>153,579</td>
<td>$126,982</td>
<td>$0.83</td>
<td>KS</td>
<td>$0.35</td>
<td>$53,753</td>
</tr>
<tr>
<td>ND</td>
<td>7,600</td>
<td>$20,000</td>
<td>$2.63</td>
<td>KS</td>
<td>$0.35</td>
<td>$2,660</td>
</tr>
<tr>
<td>TN</td>
<td>45,000</td>
<td>$24,410</td>
<td>$0.54</td>
<td>MO</td>
<td>$0.19</td>
<td>$8,550</td>
</tr>
<tr>
<td>AR</td>
<td>207,000</td>
<td>$200,000</td>
<td>$0.97</td>
<td>MO</td>
<td>$0.19</td>
<td>$39,330</td>
</tr>
<tr>
<td>AL</td>
<td>36,000</td>
<td>$75,833</td>
<td>$2.11</td>
<td>FL</td>
<td>$0.25</td>
<td>$9,000</td>
</tr>
<tr>
<td>GA</td>
<td>236,457</td>
<td>$134,452</td>
<td>$0.57</td>
<td>FL</td>
<td>$0.25</td>
<td>$59,114</td>
</tr>
<tr>
<td>SC</td>
<td>16,484</td>
<td>$20,000</td>
<td>$1.21</td>
<td>FL</td>
<td>$0.25</td>
<td>$4,121</td>
</tr>
<tr>
<td>WV</td>
<td>10,266</td>
<td>$49,538</td>
<td>$4.83</td>
<td>KY</td>
<td>$0.40</td>
<td>$4,106</td>
</tr>
<tr>
<td>OH</td>
<td>111,664</td>
<td>$74,970</td>
<td>$0.64</td>
<td>KY</td>
<td>$0.40</td>
<td>$44,666</td>
</tr>
<tr>
<td>DE</td>
<td>1,406</td>
<td>$3,186</td>
<td>$2.27</td>
<td>KY</td>
<td>$0.40</td>
<td>$562</td>
</tr>
<tr>
<td>ME</td>
<td>5,646</td>
<td>$3,093</td>
<td>$0.55</td>
<td>KY</td>
<td>$0.40</td>
<td>$2,258</td>
</tr>
<tr>
<td>IN</td>
<td>33,121</td>
<td>$39,032</td>
<td>$1.18</td>
<td>KY</td>
<td>$0.40</td>
<td>$13,248</td>
</tr>
<tr>
<td>NJ</td>
<td>14,452</td>
<td>$9,000</td>
<td>$0.62</td>
<td>KY</td>
<td>$0.40</td>
<td>$5,781</td>
</tr>
<tr>
<td>NY</td>
<td>46,543</td>
<td>$57,500</td>
<td>$1.24</td>
<td>KY</td>
<td>$0.40</td>
<td>$18,617</td>
</tr>
<tr>
<td>Total</td>
<td>1,021,461</td>
<td>$901,496</td>
<td></td>
<td></td>
<td></td>
<td>$310,038</td>
</tr>
</tbody>
</table>

Table 3. Comparison of USDA cost for brucellosis testing at 17 laboratories vs. Regional laboratories.
## BRUCELLOSIS

Table 4. Seven states that would continue receiving USDA funding, and their cost per sample.

<table>
<thead>
<tr>
<th>State</th>
<th>No. of samples</th>
<th>USDA funds</th>
<th>USDA cost/sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO</td>
<td>95,000</td>
<td>$3,729</td>
<td>$0.46</td>
</tr>
<tr>
<td>SD</td>
<td>138,500</td>
<td>$2,098</td>
<td>$0.02</td>
</tr>
<tr>
<td>MI</td>
<td>171,009</td>
<td>$20,000</td>
<td>$0.12</td>
</tr>
<tr>
<td>NC</td>
<td>192,959</td>
<td>$69,123</td>
<td>$0.36</td>
</tr>
<tr>
<td>VT</td>
<td>8,647</td>
<td>$2,592</td>
<td>$0.30</td>
</tr>
<tr>
<td>VA</td>
<td>24,139</td>
<td>$10,000</td>
<td>$0.41</td>
</tr>
<tr>
<td>WI</td>
<td>979,868</td>
<td>$1000</td>
<td>&lt;$0.01</td>
</tr>
</tbody>
</table>
Motivation for standardization of serologic protocol

The data generated from slaughter surveillance should support estimation of national herd prevalence; this should be done at least annually. A crucial part of estimating prevalence is the sensitivity and specificity of the diagnostic protocol used in the program. Eventually, these estimates will support the U.S. case for brucellosis freedom. Test results should not depend on which laboratory a sample is tested, but our current serologic protocol is inconsistent across laboratories. There are different numbers of different tests run in different laboratories. This might not be a problem if all tests, protocols and laboratories had the same performance characteristics. But, published evidence suggests they don’t. In the past, we had more complete reporting of laboratory data and greater oversight across laboratories. For example, all laboratories reported all test results and regional epidemiologists visited all laboratories at least annually. This oversight probably imposed some uniformity in serologic protocols because epidemiologists responsible for several States had their own preferences. One benefit of a future standardized laboratory protocol is the valid aggregation of testing data across all laboratories to support national herd prevalence estimates. When the international community (or a domestic auditing group) scrutinizes our program, they can readily appreciate the uniformity in our program and agree with our arguments in favor of brucellosis freedom. Another benefit is improved monitoring of test results across laboratories across time. Improved monitoring supports identifying problems in disease occurrence or laboratory performance earlier, so these problems can be addressed sooner. Other benefits may include reduced costs of conducting tests, as well as supplying reagents and other equipment and materials needed for testing. The costs of standardization are substantial but justified. Some additional equipment may be needed in some laboratories. Additional training to get everyone up to speed will be needed. But, the biggest cost is the lost independence of laboratory personnel and epidemiologists to make the decisions they believe are best for their individual situations. Changing
human behavior is difficult.

**Strategy for change**

The process by which affected herds are detected via slaughter surveillance begins with serologic testing. But, it does not end there. Trace-back investigation, herd serologic testing, and isolation via culture of suspect cattle are needed before a herd is determined to be affected. All of these steps are imperfect; so we can never be 100 percent confident in detecting affected herds. Ironically, culture probably has a higher chance of missing infected cattle than the other steps of the diagnostic algorithm. A double irony is that the culturing protocol is probably much more standardized across laboratories than the serologic protocol. We want to minimize the cost of misclassification

\[
(\text{i.e.,}) \left( \frac{\$}{\text{false} - \text{pos}} \times \# \text{false} - \text{pos} \right) + \left( \frac{\$}{\text{false} - \text{neg}} \times \# \text{false} - \text{neg} \right)
\]

during the serologic testing component of our slaughter surveillance. In the current low prevalence environment, this objective amounts to maximizing the serologic protocol's specificity subject to maintaining sensitivity at credible (i.e., 80-90 percent) levels. For the purposes of illustration, we contacted four large State-Federal cooperative laboratories (in different States) and received their serologic protocols for slaughter samples. All four protocols were different; but all used the rapid automated presumptive (RAP) as an initial screening and all used two confirmatory steps. Three of these laboratories used multiple tests for one of their confirmatory steps. Based on published sensitivity and specificity estimates for the various tests, we assessed the overall sensitivity and specificity of these protocols. Given the low expected number of infected cattle in the United States, the overall sensitivity of these protocols (e.g., range 76 percent to 87 percent) was roughly similar; that is we expect to miss 1 or 2 of every 10 infected animals tested. Given the large expected number of uninfected cattle in the United States, the overall specificity of these protocols (e.g., range 99.1 percent to 99.9 percent) was problematic. Such a difference in overall specificity amounts to 900 false-positive cattle vs. 140 false-positive cattle among every 100,000 uninfected cattle tested. The laboratories whose protocols included the most tests had the lowest specificities; and the
REPORT OF THE COMMITTEE

Laboratory using the fewest tests had the highest specificity. So, running more tests (often in the name of trying to rule out false-positive cattle) actually increased the number of false-positive test results.

We demonstrate that a protocol that screens all samples using the RAP, then retests the RAP-positive samples with the fluorescence polarization assay (FPA), then retests FPA-positive cattle using the complement fixation (CF) test will generate an overall sensitivity of approximately 83 percent and a specificity of 99.99 percent! Such a specificity amounts to roughly four false-positive results from every 100,000 cattle tested. In comparison to the example protocols above, this protocol achieves essentially equivalent sensitivity with much improved specificity (thereby minimizing the cost of misclassification). Some will complain about the absence of the rivanol or card or particle concentration fluorescence immunoassay (PCFIA) test in this protocol. This complaint can be addressed, however, if we use those tests in a supplemental role. If an investigation of a positive sample is conducted and a rivanol or PCFIA test-result might help decide whether to test its herd of origin, then these supplemental tests can be used. This use of the other tests does not involve the routine and arbitrary testing of all positive samples; it only applies supplemental tests on an as-needed basis. Furthermore, those supplemental tests were not used to determine if a sample warranted investigation. Instead, those supplemental tests only influenced the final disposition of the investigation. Multiple tests during the confirmatory stage of serologic testing will increase the overall sensitivity of the protocol but will decrease its specificity. It is strange, then, that most objections to the standardized protocol we've suggested are based on concerns that the number of false-positive cattle will increase as a result. In fact, the opposite should occur.

It must be acknowledged that people are using protocols they are comfortable with and believe are doing a good job. But, in all our discussions on this topic, no one has quantified the overall sensitivity and specificity they think their protocol achieves. It is the predictability of a diagnostic protocol that allows decision-makers to choose appropriate actions in response to test results. If we don’t know the quantitative performance characteristics of our protocol, then how can we make decisions that are consistent, transparent and effective? There is a natural human propensity to be creative and different. Standardizing the brucellosis serologic
protocol across all laboratories threatens this propensity. One approach for smoothing the transition is to allow laboratories to conduct other tests on samples as needed as long as the standard protocol is always completed. These ancillary data can be compared with the standard protocol to determine their relative performance. If a better protocol is available, we want to incorporate it and make it our standard. But, we can’t improve if we’re not willing to change. Humans also prefer to be in control and standard protocols threaten loss of control in the brucellosis program. This sentiment is best expressed by one of VS top epidemiologists, “I don’t mind if everybody uses the same protocol; as long as the protocol they use is mine.” But, serologic results are only the beginning of the diagnostic protocol for brucellosis and we need to know that investigations begin in a consistent manner. We all know serologic testing is imperfect; individual tests are designed to be positive or negative with fixed predictable errors! Inserting judgment at this stage is counter-productive. In contrast, the brucellosis program is strongly reliant on the expert judgment of epidemiologists to manage investigations, classify the status of herds and manage affected herds once they are detected. This reliance will not change and, ultimately, the classification of affected herds will not change as a result of a standard serologic protocol.

**Follow-through**

We need to plan for adequate training and equipment to make these changes. We need better data about the correlation between serologic tests. We need to commit to continual assessment of the validity of serologic tests. FPA was the most scrutinized diagnostic test in recent memory. Yet, the brucellosis program generates huge amounts of data that could be used to better assess the performance characteristics of all serologic tests. In the end, a standard serologic protocol will support credible analysis of our brucellosis status. Overall, the standard protocol will perform better than most alternatives.
The Committee met at 8:00 a.m. on October 20, 2007 at John Ascuaga’s Nugget Hotel, Reno, Nevada. The meeting was called to order by Vice Chair Michele Miller. There were approximately 120 people in attendance of which 103 signed in and 37 were Committee members. In her opening remarks, Vice Chair Miller welcomed attendees and requested a show of hands to ensure a quorum of members were present.

Dr. Chester Gibson, Deputy Administrator, Animal Care (AC), Animal and Plant Health Inspection Service (APHIS), United States Department of Agriculture (USDA), presented an Update on Animal Care, USDA-APHIS. Information on several of these issues is available at www.aphis.usda.gov/animal_welfare/index.shtml. During Fiscal Year (FY) 2007, 18,343 total inspections were
performed on a total of 10,063 facilities. Some of the issues in the spotlight included large exotic cat handling, elephant tuberculosis and handling, birds, pet evacuation/rescue, and avian influenza. The Pets Evacuation and Transportation Standards (PETS) Act of 2006 ensures that state and local emergency preparedness operational plans address the needs of individuals with household pets and service animals following a major disaster or emergency. Pending legislation (Haley's Act) would allow USDA to draft public safety regulations for facilities falling under the Animal Welfare Act (AWA), specifically defining big cat and direct contact. The Captive Primate Safety Act is still pending and would make it illegal to import, export, sell, acquire, or purchase nonhuman primates. The revised marine mammal sections of the AWA are still in the rulemaking process. The plan is to have the proposed rule in clearance by the end of 2007. Proposed rulemaking is being developed for birds to be covered under the AWA. Rulemaking for rats and mice will be done at a later time. The Animal Care Policy Manual is now available on the website. Public comment period closes November 8, 2007. USDA-APHIS-AC is developing a Center for Animal Welfare Education, Outreach, and Technology. The role of the Center will be to develop new technologies through cooperative agreements and collaboration with land grant colleges, veterinary schools, and other professional organizations.

Drs. Tom Gidlewski and Dean Goeldner, VS-APHIS-USDA presented, Update on the USDA-APHIS-VS Chronic Wasting Disease Program. In FY 2007, 17,189 farmed or captive cervids were tested for chronic wasting disease (CWD), up from the previous three-year average of about 15,000. No new CWD positive farmed cervid herds were detected in FY 2007 nor were any herds depopulated. Four infected elk herds in Colorado and one infected white-tailed deer herd in Wisconsin currently remain. All are under state quarantine.

New York found no additional CWD positive free ranging cervids in 2007, but West Virginia found additional cases in Hampshire County. Wisconsin continues to aggressively battle CWD with over 130,000 animals submitted for testing since 2000 and over 850 positive deer identified. The infected area appears to be slowly spreading. During 2007, Canada discovered two positive captive elk herds and one positive captive white-tailed deer herd in Saskatchewan.

After considering a United States Animal Health Association (USAHA) Resolution to approve enzyme linked immunosorbent assay (ELISA) testing for captive cervids, a
decision was made to continue the use of immunohistochemistry (IHC) as the official test in order to maximize the chance of identifying positive herds and also maintain a method for oversight by the National Veterinary Services Laboratories (NVSL).

Submission of an ear with the official eartag attached or submission of fresh tissue accompanied by an appropriately executed chain of evidence document will allow DNA comparison in the event of a positive diagnosis. Archiving herd blood samples on special collection cards is also a way to compare DNA in the event of a positive diagnosis in the future. Memos describing acceptable DNA comparison procedures are in final review.

Rectal biopsy continues to be examined as a tool for CWD ante-mortem diagnosis. Many additional animals were tested in 2007 with the identification and removal of positive elk from infected herds. Eighty percent of the positive animals in a highly infected white-tailed deer herd were identified with rectal biopsy. The lower incidence of CWD in most infected elk herds complicates the evaluation of this test in elk. It appears that in deer, rectal lymphoid tissue becomes positive later than lymphoid tissue of the head suggesting that early cases may be missed with rectal biopsy. Positive rectal biopsy is indicative of disease but a negative rectal biopsy test does not rule out CWD in an individual or herd.

In FY 2007, APHIS-VS received approximately $16.6 million in appropriated CWD funding. All earmarks were removed from the FY 2007 appropriation that was passed as a yearlong continuing resolution. In addition to the $5.75 million made available to the states and tribes for CWD surveillance and management in wildlife, APHIS also provided $1.7 million in end-of-year funding to twenty states to supplement CWD activities in farmed and captive cervid program The FY 2008 appropriations have not been passed by Congress; The president’s budget requests $12.3 million for CWD.

In September 2006, APHIS-VS delayed implementation of the final CWD rule that had been published in July 2006. This delay was precipitated by three petitions to the rule received from organizations representing state agencies and officials including USAHA. On November 3, 2006, APHIS-VS published these petitions for public comment. After reviewing these comments, APHIS-VS requested additional information from the states in late June 2007 regarding their restrictions for the movement of cervids into their states. Based on all the information received, APHIS-VS
has begun drafting new proposed rule language and is circulating it internally for review.

Kurt VerCautern, National Wildlife Research Center (NWRC), Wildlife Services (WS), APHIS-USDA, presented Current Research at the Fence: An Update from the USDA-APHIS-WS, NWRC. The spread of CWD, bovine tuberculosis, and other diseases in wild and captive cervids is of great nation-wide concern. Research is needed to fill information gaps associated with questions pertaining to disease transmission at the interface between wild and privately owned cervids. We are working to address some of these questions and the goal of this presentation is to provide an update on two of our current efforts.

1. We are determining the minimum fence height that is essentially 100 percent effective in keeping wild white-tailed deer out and captive white-tailed deer in. The study is nearly complete and preliminary results show that while 91 percent of deer can jump a six-foot fence it is very rare for a deer to clear an eight-foot fence. More trials are currently being done at eight feet.

2. We are determining the effectiveness of electric fencing used with woven-wire fencing to limit fenceline contact, and the probability of disease transmission, by elk. Our electric fence is one meter from the woven-wire fence and runs parallel to it. We are evaluating the fence’s effectiveness with varying scenarios and motivation levels between elk in test pens. Preliminary results suggest that coupling a single woven-wire fence with electric fence virtually eliminates contact through the fence.

Our role is to find answers to questions that are of great interest to federal and state agencies responsible for managing and regulating wild and captive cervids as well as the privately owned cervid industry.

John Pilon, NWRC-WS-APHIS-USDA, presented Development of a Chronic Wasting Disease Vaccine: Progress and Promise. CWD is a transmissible spongiform encephalopathy (TSE) of domestic and wild cervids in North America. To address possible prevention regimens for CWD, we have taken an active vaccination approach using prion derived-peptide sequences, a carrier protein, and an adjuvant to overcome self-tolerance. Twenty CL57/BL6 mice per group were vaccinated and boosted with 50 µg of the carrier protein-peptide conjugate; all vaccines
produced a humoral immune response as measured by ELISA. After vaccination mice were challenged with the Rocky Mountain Laboratory (RML) mouse-adapted scrapie strain. The mouse-model results demonstrate that our method could generate titers toward the prion protein peptides and most importantly, improve the life span of RML mouse adapted scrapie challenged mice. Using the insights gained from this initial mouse-model study we have recently begun evaluating a vaccine candidate in the target species, mule deer (Odocileus hemionus).

Justin Greelee, National Animal Disease Center (NADC), ARS-USDA, presented prolonged CWD incubation time and unique PrP\textsubscript{d} profile in Prnp 132LL elk. The transmissible spongiform encephalopathies including CWD in deer and elk invariably result in fatal neurodegeneration and accumulation of PrP\textsubscript{d}, an abnormal form of the host prion protein PrP\textsubscript{C}. In some species, polymorphisms in the open reading frame of the Prnp gene are associated with differences in the manifestation of prion disease including relative susceptibility, clinical signs, incubation time, and neuropathology. The polymorphism (M/L) at Prnp 132 in Rocky Mountain elk (Cervus elaphus nelsoni) corresponds to the human (M/V) polymorphism at Prnp 129, where M has been associated with susceptibility to variant Creutzfeldt-Jakob Disease (vCJD). Elk with 132 M alleles are predisposed to CWD and heterozygosity is associated with a prolonged incubation time following experimental challenge. Previous studies suggest that elk homozygous for 132 L occur rarely and make up the extreme minority of elk affected with CWD. The effect of the 132 LL genotype on the development of CWD post-exposure was previously unknown. The purpose of this study was to define the course of disease in elk with various Prnp 132 allele combinations. Elk (n=8; 2MM, 2LM, 4LL) were orally inoculated at eight months of age with 15 ml of pooled brain homogenate from one 132 MM and one 132 LM elk. Elk were observed daily after inoculation and necropsies were done when clinical signs became unequivocal. IHC, western blot, and microscopic examination were used to confirm infection. Incubation time was dependent on genotype. Clinical signs were apparent in 132 MM elk after 23 months and 132 LM elk after 40 months. Rectal biopsies were done on the remaining 132 LL elk with three of four testing positive for PrP\textsubscript{d} by IHC indicating peripheral distribution of PrP\textsubscript{d} is apparent prior to the onset of clinical disease. Clinical signs were apparent in 132
CAPTIVE WILDLIFE AND ALTERNATIVE LIVESTOCK

LL elk after 59 to 63 months. One elk was euthanized 63 months post-inoculation without exhibiting clinical signs, but had PrP\textsuperscript{d} accumulation in the central nervous system (CNS) and peripheral lymphoid tissues. Differences between genotype were apparent after western blot analysis. The molecular weight of the proteinase K resistant bands of PrP\textsuperscript{d} is lower in the 132LL elk compared to 132MM or 132LM elk.

In summary, LL elk are susceptible to CWD, but have a prolonged incubation time and western blot profile unique from other genotypes of elk with CWD. Additional studies are planned to determine the mechanisms responsible for the distinct presentation of CWD in 132 LL elk.

John Fischer, Southeastern Cooperative Wildlife Disease Study (SCWDS), University of Georgia, presented Update on Epizootic Hemorrhagic Disease in Deer. Dr. Fischer reported that SCWDS has received an unprecedented number of samples for virus isolation originating from both penned and wild white-tailed deer this year. As of October 8, 2007, 214 virus isolations have been made at SCWDS. This number also is unprecedented and SCWDS continues to receive large numbers of samples as well as telephone reports and inquires every day. Nearly all virus isolations have been epizootic hemorrhagic disease virus-serotype 2 (EHDV-2) from white-tailed deer, although very low numbers of EHDV-1 and bluetongue virus (BTV)-10, -11, and -17 viruses have been isolated. The BTV-10 and 11 isolates are from Missouri and the BTV-17 isolate is from a mule deer in New Mexico. The current distribution of isolates is presented below. A distribution map that is updated weekly can be seen at the SCWDS web site, www.scwds.org.

Hemorrhagic disease (HD) occurs annually in the United States and as is occurring in 2007, most outbreaks in white-tailed deer are caused by EHDV-2. There is no reason to assume that this outbreak is associated with a particularly virulent strain; EHDV-2 can cause high mortality rates, especially when deer are infected in the northern United States. There are two aspects of this outbreak that have sparked speculation and discussion. The first involves a potential expansion of the traditional HD range due to climate change and the second involves clinical disease in cattle.

Is HD expanding its range?

The current distribution of reported HD (Figure 1) includes
much of the United States. It is important to note that this
distribution map is compiled from reports of clinical disease from
1980 to 2003. The map does not represent the entire distribution
of HD viruses because infections in white-tailed deer in some
areas, such as portions of Texas and Florida, often are subclinical.
Based on the historic distribution, it appears that the current
outbreak falls primarily within the historic range of HD, although
some expansion may be occurring.

Although it is premature to suggest that the 2007 activity
is a product of global climate change, we cannot ignore the fact
that the Southeastern United States is in an unprecedented
drought and that our initial cases in the eastern United States
were spatially associated with areas of especially severe drought
in Kentucky and Tennessee. But whether the current drought is
a result of climate change is an issue yet to be determined. The
drought/HD relationship is not new and has been suggested since
the 1980s. SCWDS currently is analyzing its historic data to better
understand this potential relationship.

Is EHDV causing disease in cattle?

Epizootic hemorrhagic disease is not a recognized disease
of cattle, but it is well established that they can be infected. There
are two contrasting observations that cause confusion related
to the issue of clinical disease in cattle. First, as is occurring this
year, suspected cattle disease associated with EHDV-2 infection
is a common occurrence during large scale EHDV epizootics.
Such reports occur routinely when the virus is causing deer
mortality in the northern United States. In most cases, cattle
show mild disease, but occasional reports of abortion and even
death (unconfirmed) do occur. Such reports are not obtained from
HD-endemic areas. Unfortunately, suspected cattle cases are
seldom confirmed and it needs to be clearly understood that the
presence of antibodies in such animals does not confirm EHDV
as a cause of either morbidity or mortality. On several occasions,
including one this year, we have isolated EHDV-2 from a cow with
bluetongue-like disease, but even this may not confirm that the
virus was the cause of the disease.

In contrast, clinical disease never has been associated
with experimental EHDV infections of cattle, including one
SCWDS study (Abdy, M.J., E.W. Howerth, and D.E. Stallknecht.
1999. Experimental infection of Calves with Epizootic Hemorrhagic
Disease Virus. American Journal of Veterinary Research 60(5)
621-626). The truth likely lies somewhere between the field
observations and the results of these experimental studies and the following hypothesis would fit with the limited data currently available: The reported disease in the field is bluetongue like and it is not unreasonable to speculate that EHDV would cause similar signs and lesions. With BTV infections, clinical disease in cattle is not common but is mild when it occurs. However, even mild disease is the exception rather than the rule. If EHDV causes a generally mild disease in a very small proportion of those cattle infected, it may well be that the disease would not be detected in the small number of animals included in experimental studies and would only be detected in the field under exceptional challenge conditions as is occurring now. If this hypothesis is correct, EHDV would be of minor concern to cattle producers, but could be responsible for sporadic disease in certain areas of the United States. All reports that received at SCWDS concerning suspected disease in cattle have been associated with the northern edge of the HD range (as defined by reported disease in white-tailed deer) and it is possible that such potential problem areas could be defined by vector distribution and herd immunity. 

The reports of suspected EHD in cattle and confirmed HD in wild and penned deer can lead to one group of producers/managers blaming the other for their problem cattle, wild deer, and penned deer can all be infected with EHDV and can serve as a source of virus to vectors. It is not cattle, penned deer, or wild deer that represent the reservoir for these viruses. Rather, all ungulate species can be involved in viral amplification. In reality, the population dynamics of the biting midge vector, Culicoides sonorensis, may be the most important factor in these outbreak situations.
Konstantin Lyashchenko, Chembio Diagnostic Systems, Inc. presented Update on Tuberculosis (TB) Serodiagnostics. Numerous animal species are susceptible to TB that has serious zoonotic and regulatory concerns. The current TB testing methodologies are inadequate for most non-domestic animals. To improve TB control programs, new diagnostic tools that would be simple, rapid, accurate, inexpensive, and host species-independent are urgently needed. Chembio developed a novel serological assay, ElephantTB STAT-PAK kit, using lateral-flow technology to detect specific antibody in elephants and other captive wildlife. This test was approved by USDA-APHIS-VS-Center for Veterinary Biologics (CVB) in 2007. In addition, the MultiAntigen Print ImmunoAssay (MAPIA) was proposed for elephants, particularly, as confirmatory test and treatment monitoring tool. The results of extended evaluation of the Chembio immunoassays in a number of zoo species (rhino, tapir, gazelle, and jaguar) as well as free-ranging wildlife (cervids, possum, wild boar, and lion) confirmed our earlier findings strongly suggesting the potential for rapid serodiagnosis of TB in multiple host species. Diagnostic potential of MAPIA for serologic detection of TB and non-TB mycobacterial infections in marine mammals (sea lion, whale, and dolphin) was also demonstrated.

Mitch Palmer, National Animal Disease Center (NADC), ARS-USDA, presented Update on TB Vaccines in Deer. The presence of tuberculosis due to Mycobacterium bovis in captive
and free-ranging wildlife remains one of the greatest challenges to eradication of tuberculosis in the United States. A possible addition to current control measures could be vaccination of deer to prevent infection, disease, or transmission. To evaluate the efficacy of *M. bovis* Bacillus Calmette-Guerin (BCG) vaccination of white-tailed deer, 61 yearling white-tailed deer were randomly assigned to one of three groups; two doses of $10^7$ colony-forming unit (CFU) of BCG (Pasteur) administered six weeks apart SC (n=11); one dose of $10^7$ CFU of BCG (Pasteur) SC (n=10), one dose of $10^9$ CFU BCG (Danish) orally in a lipid based bait (n=8), one dose of $10^9$ CFU BCG (Danish) orally in liquid suspension (n=8), one dose of $10^6$ CFU BCG Danish SC (n=7), and unvaccinated deer (n=17). Additionally to examine the comparative efficacies of BCG (Danish) and BCG (Pasteur), additional deer were vaccinated with $10^7$ CFU BCG (Pasteur) (n=9) or BCG (Danish) (n=8). All deer were intratonsilarly inoculated with 300 CFU of virulent *M. bovis* three months after vaccination. Decreased lesion severity scores compared to unvaccinated deer were seen in all orally vaccinated deer, deer receiving a single dose of BCG Danish and deer receiving two doses of BCG Pasteur. In protected deer, medial retropharyngeal lymph node granulomas were smaller, less necrotic with rare acid-fast bacilli compared to lesions in lymph nodes from unprotected deer. *Mycobacterium bovis* BCG administered parenterally or orally can be effective in reducing lesion severity in *M. bovis*-inoculated deer. Decreased lesion severity with less necrosis and fewer acid fast bacilli would likely decrease the ability of vaccinated deer to shed virulent *M. bovis* thus decreasing intraspecies and interspecies transmission. It is also evident from the current study that not all strains of BCG are equally protective in white-tailed deer.

Dave Hunter, Turner Enterprises, Inc., presented Veterinary Score Card: How Are Veterinarians Helping Your Industry?

Turner discussed how the Committee has evolved to include not only regulatory agencies and veterinarians concerned with wildlife, but industries that work with captive wildlife. He proposed that the Committee’s function was similar to the approach that should be taken to wildlife health and management, which should be holistic. The ecosystem health management should include all the stakeholders in livestock, wildlife, human,
Charley Seale, Exotic Wildlife Association, presented Scimitar Horned Oryx Reintroduction Program. This was an overview of the partnership that the private exotic wildlife industry in Texas has with the Sahara Conservation Fund in reintroducing endangered and rare species back to native countries. The first reintroduction was conducted in 2005 in which 44 dama gazelle, 40 addax, 35 markhor and 10 scimitar horned oryx were transported to Dubai. These animals originated from private ranches in Texas. Another reintroduction program is under negotiation for a reserve in Senegal. The success of the private game ranch industry in breeding rare and endangered species is an example of how private conservation can affect worldwide preservation.

The Committee reviewed and discussed five resolutions. All were approved and referred to the Committee on Nominations and Resolutions.
REPORT OF THE USAHA COMMITTEE ON DIAGNOSTIC LABORATORY AND VETERINARY WORKFORCE DEVELOPMENT

Co-Chair: Bennie I. Osburn, Davis, CA
Co-Chair: Robert E. Frost, Lincoln, CA

J Lee Alley, AL; Alex A. Ardans, CA; Thomas W. Bates, CA; Judith Bossé, CAN; H. Michael Chaddock, DC; Neville P. Clarke, TX; John R. Clifford, DC; Karen Conyngham, TX; W. Ron DeHaven, IL; Leslie A. Dierauf, WI; Brian R. Evans, CAN; Peter J. Fernandez, AE; J. Pat Fitch, MD; Frank Galey, WY; Tam Garland, MD; Pam J. Hullinger, CA; Paul Kitching, CAN; Elizabeth A. Lautner, IA; Randall L. Levings, IA; Bret D. Marsh, IN; Barbara M. Martin, IA; Mary T. McBride, CA; Richard H. McCapes, CA; Terry F. McElwain, WA; Donal O’Toole, WY; Gary D. Osweiler, IA; Willie M. Reed, IN; Y. M. Saif, OH; A. David Scarfe, IL; Brian T. Smith, DC; Kimothy Smith, DC; Mark Spire, KS; Alfonso Torres, NY; Lyle P. Vogel, IL; Richard D. Willer, AZ.

The Committee met on Monday, October 22, 2007, 7:00 pm to 9:30 pm at John Ascuaga’s Nugget Hotel, Reno, Nevada. The meeting, Co-Chaired by Bennie I. Osburn and Robert E. Frost, was attended by 15 Committee members and 66 observers. Following a welcome and brief opening remarks by the Co-chairs, Neville Clark, National Center for Foreign Animal and Zoonotic Disease Defense, Texas A and M University gave a report on Leading Products for Reducing the Risk of Engineered and Exotic Animal Diseases which is included in its entirety in these proceedings at the end of this Committee report.

Michael Chaddock reviewed the status of The Veterinary Public Health Workforce Expansion Act (VPHWEA) (H.R. 1232, S. 746), which previously came through the Committee to support obtaining resources to expand infrastructure at veterinary medical colleges to enable them to graduate more veterinarians. Senator Allard and Congresswoman Baldwin introduced a newer version of the bill in the 110th Congress expressing a need for more public practice/public health veterinarians. The Committee unanimously passed a Resolution supporting H.R. 1232, and S. 746.

The United States Animal Health Association (USAHA) and the American Association of Veterinary Laboratory Diagnosticians (AAVLD) Executive Committees and Committee on Government
REPORT OF THE COMMITTEE

Relations are urged to address the lack of capacity in the nation’s veterinary medical colleges and the need to pass the VPHWEA as introduced with members of Congress during regular visits to Washington. Also USAHA and AAVLD members are urged to formally support VPHWEA and actively advocate its passage with their individual members of Congress.

Bennie Osburn reviewed the state of the National Veterinary Medical Service Act (NVMSA), PL 108-161, which became law during the 108th Congress. The Secretary of Agriculture may designate areas underserved by veterinarians in rural and urban areas as well as government agencies and veterinary disciplines. The United States Department of Agriculture (USDA) has not yet promulgated rules for the program and Congress has not funded the program to the needed level for implementation. The Committee unanimously passed a Resolution calling for USDA to promulgate rules within 270 days of this Resolution and also called upon Congress to provide $20 million in funding to the NVMSA for FY 08 and FY 09.

The Committee Co-Chairs extended an invitation to USAHA members to attend an open Committee discussion about potential consequences to high containment bio-security laboratory facilities. The events leading up to the need for this discussion were:

1. The impact of a laboratory biosecurity breach resulting in a foot-and-mouth (FMD) outbreak in the United Kingdom,
2. A Government Accountability Office (GAO) report on high security laboratories, and
3. A hearing by the House Committee on Energy and Commerce – Subcommittee on Oversight and Investigations, into the growth of Biosecurity Level (BSL) 3 and Level 4 laboratories in the United States.

Karen Conyngham provided a review of the hearing which is provided in its entirety at the end of this Committee Report.

Norman Willis began the high containment laboratory discussion citing this era as a critical time for preparation and laboratory capacity efforts that must be made to address the challenges, threats and changes that will come rapidly. He stated the process of building either an individual laboratory or a national
laboratory network is not a one shot financial start up building program but rather a long term expensive maintenance funding effort emphasizing continued maintenance vigilance.

The USDA, Animal and Plant Inspection Service (APHIS) Veterinary Services (VS) and Agriculture Research Service (ARS) personnel John Clifford, Beth Lautner and Steve Kappes gave testimony emphasizing why we have laboratory facilities in the first place and expressed concern that testimony on the hill had grave omissions as to the benefits of high containment laboratories. They expressed their facilities have state of the art training programs and operating procedures in place and are open to internal and external audits.

Committee member and guest conversations provided numerous concerns, talking points and next steps which are summarized below.

- Realization that the House Committee lacks appreciation of why we have so many laboratories
- Education of Congress and the public on the importance of high containment laboratories
- Education process – a combined resolution and white paper effort
- Work with Association of American Veterinary Medical Colleges (AAVMC) and others to forward education information to Congress
- Importance of high containment laboratories to our National Animal Health Laboratory Network (NAHLN)
- Need for animal health BSL-4 capacity
- Impact a moratorium would have on laboratories below the BSL-3 level
- Need to collaborate with the Association of Public Health Laboratories
- White paper is needed on what regulation would look like
- Agreement that today’s oversight is not perfect, and that oversight is needed
- USDA needs to be involved with inspections of animal health laboratories
- Work force development – needed increase in veterinary population
Diana Whipple, National Animal Disease Center, ARS-USDA, gave a start-up review for the new 155,000 square foot, 21 animal room BSL-3 laboratory which is a part of the $466 million Ames federal reference laboratory modernization project. A deliberate process is being implemented for this high containment large animal facility by coordinating safety protocols, animal care, life safety, emergency response, facilities engineering and what if scenarios. Prior to going on line they will start with clean animals, conduct beta testing, move to BSL-2 procedures, and then go hot. This one-of-a-kind world class BSL-3 Ag facility is designed to contain domestic livestock and wildlife such as bison, deer and elk. Both ARS and VS will be able to utilize separate portions of this facility simultaneously. Dr. Whipple expressed USDA's appreciation for all the support USAHA and AAVLD put forth to make the new facilities a reality.

The Committee unanimously passed six Resolutions that were forwarded to the Committee on Nominations and Resolutions for consideration by the general membership.
LEADING PRODUCTS FOR REDUCING THE RISK OF ENGINEERED AND EXOTIC ANIMAL DISEASES

Neville P. Clarke
National Center for Foreign Animal and Zoonotic Disease Defense

In an era of terrorism, the United States requires products that defend the nation from the intentional use of animal borne diseases (such as Rift Valley Fever, Avian Influenza, and Foot and Mouth Disease) to cause catastrophic harm, as well as from the accidental or natural introduction of exotic animal disease. Recognizing this need, the Department of Homeland Security established in 2004 the National Center for Foreign Animal and Zoonotic Disease Defense (FAZD). The FAZD is an integrated, full-spectrum center charged with generating a stream of products to protect America from the exotic and engineered animal diseases that threaten public health and economic stability. These products offer the dual benefit of protecting against natural or accidental outbreaks. Organized by the diseases they address, here are examples of leading, cutting-edge FAZD Center products that will help members of the United States Animal Health Association (USAHA) reduce the risks posed by exotic animal disease.

Rift Valley Fever (RVF)

• Vaccines – In responding to RVF as an important emerging disease, the FAZD Center is developing candidate vaccines based on the human MP-12 vaccine that is being modified to provide the differentiating infected from vaccinated animals (DIVA) capacity – distinguish vaccinated from infected animals. Another modified live vaccine candidate uses a vaccinia platform with similar goals. These vaccines have performed well in laboratory challenges with small animals and large animal trials are anticipated in early 2008.

• Diagnostics – Companion diagnostic tests that detect the DIVA vaccinates from infected animals are also performing well in the laboratory and are ready for field testing. Important relationships with the private sector are being developed to take the products into production.

• Models – Quantitative epidemiologic and economic models based on experience with RFV in the Horn of Africa and
on the opinions of subject matter experts have been developed and applied to an early assessment of the national economic impact of RVF as part of the Biothreat Risk Assessment being done by the Department of Homeland Security for the White House.

Foot and Mouth Disease (FMD)
• Vaccines and Antivirals – The FAZD Center is collaborating with the Plum Island Animal Disease Center in the development of a next generation vaccine for FMD. A candidate component of the vaccine is a new antiviral from the FAZD Center that promotes “natural killer cells” that attack the FMD virus, providing protection within three days. The antiviral narrows the onset of immunity by three to seven days, thus severely reducing the time that animals are vulnerable to FMD infection.
• Diagnostics – The Center is also developing new inexpensive field (chute side) enzyme linked immunosorbent assay (ELISA) based antigen detection diagnostic tests that will support emergency responders in the event of an outbreak by providing immediate results to determine the presence of infection, thereby reducing unnecessary slaughter of healthy animals. This will also be a DIVA product to distinguish FMD vaccinates from infected animals. These tests will be complimentary to those being employed in the National Animal Health Laboratory Network (NAHLN) laboratories. Tests are ready for evaluation at the Plum Island Animal Disease Center.
• Models – National epidemiologic and economic models of FMD are being employed in early evaluation of options and alternatives for prevention of and intervention following outbreaks of FMD. Specific scenarios include modeling the intensive dairy industry in California and feedlots in Texas. The FAZD Center cooperates with the Department of Energy (DOE) national laboratories and USDA model developments in this area. A major new effort is underway to develop a national interstate transportation component model as a means of estimating rapid dissemination of FMD. Models will be used both for strategic planning and for informing decisions during emergency response during an outbreak. The FAZD Center is now involved in tracking and assessing the lessons learned relative to the U.S. from the FMD outbreak in the United Kingdom.
DIAGNOSTIC LABORATORY AND VETERINARY WORKFORCE DEVELOPMENT

• Public Policy – The FAZD Center has organized stakeholder workshops on mass animal mortality that address the existing gaps, bottlenecks and roadblocks in existing public policy that would hamper the safe and timely disposal of animal carcasses in the aftermath of pandemic (such as the 2001 FMD outbreak in the United Kingdom) or other catastrophe. These workshops brought together major stakeholders from the livestock industry: industry representatives, policymakers, scientists and regulators. Stakeholders examined current policy and suggested changes to improve response and recovery. Perhaps more importantly, they established working relationships that will prove invaluable during a crisis. Sessions have been held in Texas and California. A white paper resulting from the Texas workshop was presented to the Extension Disaster Education Network, and a state has inquired about holding a workshop of its own.

Avian Influenza
• Training – The FAZD Center is using products developed under its Avian Influenza School to provide hands-on training for extension agents, veterinarians, researchers and farmers that prepares them for potential outbreaks of Avian Influenza, thus improving response and recovery rates. The training modules are being employed both in the U.S. and internationally to meet the urgent need to train early responders in industry and government to be prepared to expediently deal with outbreaks of avian influenza. The school trains the trainers and provides training modules for use by extension agents, veterinarians, researchers and farmers – for prevention, intervention and recovery from outbreaks. Sessions have been conducted in multiple states. The training modules are also being used in a program aimed at small minority poultry operators in collaboration with multiple 1890 and 1994 minority serving institutions.
Committee member Karen Conyngham gave a brief report on the hearing held October 4, 2007 by the House Committee on Energy and Commerce – Subcommittee on Oversight and Investigations, into the growth of BSL 3 and 4 laboratories in the United States. The webcast of this hearing along with the prepared statements of the panel witnesses has been archived on the Committee’s web site: http://energycommerce.house.gov/cmte_mtg/110-oi-hrg.100407.BSL.shtml/.

The Subcommittee hearing was Chaired by Rep. Bart Stupak (D-Michigan). They took testimony from four panels of witnesses including the Government Accountability Office (GAO), Centers for Disease Control and Prevention (CDC), National Institutes of Health (NIH), Dr. Ed Davis, Interim President of Texas A and M University (TAMU), two biosecurity experts and one representative from the Sunshine Project, a non-governmental watchdog group that focuses on biodefense safety.

This hearing was the first in a series to investigate the proliferation of federal, state, academic and private BSL-3 and BSL-4 laboratories. Future hearings not scheduled as of the date of this Committee meeting will look into foreign laboratory safety including Pirbright in the United Kingdom (UK), and one hearing will be devoted to the future of the Plum Island Animal Disease Center (PIADC) and the proposed National Bio and Agro-Defense Facility (NBAF), currently undergoing final site selection. In his opening statement, Rep. Stupak said, “We must ask if all these labs are necessary. No one is in charge here”.

The Subcommittee received the results of a just-released Government Accountability Office (GAO) preliminary report (GAO-08-108T; available at www.gao.gov entitled High-Containment Biosafety Laboratories. This initial report found that the number of BSL-3 and BSL-4 laboratories have increased rapidly in the aftermath of the 2001 anthrax attacks and passage of the 2002
DIAGNOSTIC LABORATORY AND VETERINARY WORKFORCE DEVELOPMENT

Bioterrorism Act, but exact numbers of laboratories are unknown and most importantly, there is no one U.S. agency that has oversight for all laboratories, particularly those that operate without government funding. The GAO investigator was of the opinion that only one federal agency should oversee all laboratories, however that agency will then become a coordinating agency as well.

The GAO investigator cited several laboratory security breaches including the August 2007 FMD outbreak in the UK which has been attributed to the leak of contaminated wastewater from the Institute for Animal Health (IAH) facility at Pirbright.

The CDC/NIH panel testified that a needs assessment should be conducted before more labs are built and stressed the importance of a high level of biosafety training for all laboratories personnel. Human error is the cause of the majority of laboratory accidents. Risk-benefit analyses should be considered before new experiments are approved for funding. They recommended a no-fault accident reporting system be considered for all laboratories, to encourage transparency and allow laboratories to learn from each others experience.

Dr. Davis testified about the incident where a TAMU laboratory worker was infected with brucella; she has made a full recovery. This accident caught the attention of the Sunshine Project and prompted that organization to delve further into conditions in laboratories around the country. Dr. Davis stated that institutions with BSL-3 and BSL-4 laboratories need to practice good science, coordinate with other laboratories and provide absolute compliance with reporting and regulatory oversight.

Mr. Edward Hammond, Sunshine Project, a public advocacy group, testified that the U.S. needs a transparent and accountable biodefense system. He felt that the recent publicity surrounding the TAMU incident had prompted more disclosure by other laboratories. Hammond stated that the United States does not need 400 labs and 15,000 laboratory workers. He recommended that Congress impose a moratorium on new laboratories and outright kill plans for NBAF.
REPORT OF THE COMMITTEE ON THE ENVIRONMENT

Chair: Gavin Meerdink, Mahomet, IL
Vice Chair: Randall A. Lovell, Rockville, MD

Frank Galey, WY; L. Wayne Godwin, FL; John P. Honstead, CO; Laurent O’Gene Lollis, FL; Lee M. Myers, GA; Gary D. Osweiler, IA; Elizabeth J. Parker, DC; Jane F. Robens, MD; Larry J. Thompson, GA; Gary M. Weber, MD.

The Committee met from 3:30 to 5:45 p.m. on October 20, 2007, at John Ascuaga’s Nugget Hotel, Reno, Nevada. There were four members and 36 guests present. The following reports of current events were presented.

Melamine-Cyanuric Acid Pet Food Recall of 2007

History of the Recall

In early March, 2007, a company performing pet food palatability trials observed that several cats and dogs consuming the food became sick and a number of cats died shortly thereafter. At around this time, the company learned that wheat gluten imported from China was among the ingredients suspected of causing food problems. On March 16, the food company recalled approximately 60 million cans and pouches of wet food. On March 20, the Food and Drug Administration (FDA) confirmed 14 dog and cat deaths. On March 26, it is announced that melamine was discovered in the food. On March 30, melamine is announced as the leading suspect and wheat imports from the suspected company are restricted. At the beginning of April, 2007, one of the companies supplying wheat gluten to pet-food manufacturers recalls wheat gluten that had been imported from China. On April 5, the pet-food recall was expanded to include more products. On April 10, the recall was expanded further. On April 27, melamine in combination with cyanuric acid was reported to result in formation of crystals in the kidney and urine by the University of Guelph, Canada. On April 28, the United States Department of Agriculture (USDA) and FDA announced that a number of hogs had been fed melamine-contaminated feed. On April 30, the USDA and FDA announced that several million chickens had been fed contaminated feed. On May 7, the USDA and FDA issued a release with regards to the risk to humans in consuming meat from animals fed contaminated feed, concluding that there was a very low risk to human health in such cases involving pork and poultry. On May 18, remaining poultry were released from
quarantine. On May 30, the FDA announced that two U.S. animal feed manufacturers had been adding melamine to feeds as a binding agent.

Summary of Disease

Through cooperation of numerous state and federal agencies, laboratories and private industries in the United States and Canada, it was discovered that melamine alone in feeds was not sufficient to produce injury in animals eating the contaminated products. Rather, a combination of melamine and cyanuric acid in the feed is required to produce disease. When both melamine and cyanuric acid are consumed in feeds, the two compounds precipitate together forming large crystals in the kidneys which produces severe, acute renal damage resulting in the deaths of some cats and dogs. In experimental feeding trials, it was found that neither melamine nor cyanuric acid alone caused crystal formation or disease, but the crystals, clinical syndrome and lesions were reproduced in cats and swine using a combination of the compounds in the feed.

Summary of Presentations to the Committee

The American Academy of Veterinary and Comparative Toxicology (AAVCT) held a symposium entitled, Review of the Pet Food Recall of 2007: Melamine and Cyanuric Acid. Five speakers from the U.S. and Canada summarized events related the pet food contamination and recall. In addition, there were 5 platform and 1 poster presentations related to American Association of Veterinary Laboratory Diagnosticians (AAVLD) surveys on the numbers of confirmed animal cases, pathological findings, analytical methods development for melamine, cyanuric acid, and related chemicals, and on the results of experimental dosing studies. See the 2007 AAVLD Abstracts for details.

Biofuels and Animal Health Hazards

The potential of health hazards related to the feeding of grain co-products from ethanol and biodiesel production were reviewed. Since co-products are derived from a variety of crop sources and different processes, confusion over the acronyms and names does exist. Distiller’s dried grains with solubles (DDGS), corn gluten feed (CGF) and corn gluten meal (CGM) are common terms for corn co-products, but other terms, including distiller’s grains and brewers dried grains, exist. Wet milling and dry grind methods are most common in the conversion of corn to a wide variety of products including the co-product ethanol. By far, most
of the ethanol and DDGS is from dry grind plants. CGF and CGM co-products are derived from the wet milling process.

Approximately two thirds of the corn kernel is starch which is converted to ethanol. The remaining third of the kernel along with whatever comes with the kernel comprises DDGS. Thus, this co-product contains approximately three times the component concentrations of the original corn (minus the starch). Millions of tons of DDGS have been fed to livestock for many years. Variability has arisen as a concern. DDGS composition change associated with corn hybrid variety or growing conditions have been shown to be of minor concern. More significant variation in the DDGS co-product can occur related to differences in the production process. Within plant variations are smaller than the differences between plants. The co-product purchaser should make inquiries. Health effects have not been reported resulting from this variation, but nutritional concerns cannot be dismissed. As always, dietary changes should be made gradually.

Phosphorus (P) concentrations, approximately 0.3 % (dry matter) in corn, are about three times higher in DDGS and CGF co-products. Particularly when fed in a significant ration percentage, calcium (Ca) and P, as well as magnesium (Mg), should be monitored to assure appropriate mineral ratio. Urolithiasis has occurred when Ca:P ratios were inverted. Cases have also occurred when the co-product source was switched from wet to dry. Excess Mg may also be a complicating factor.

Sulphur concentrations in DDGS and CGF approximate 0.25 % to 0.33 %. Feed concentrations in this range are associated with a higher incidence of polioencephalomalacia in naive cattle. Additional copper and gradual adaptation of arrival animals helps to reduce the incidence.

Mycotoxins, three-fold higher in the co-product than the incoming corn, are an important consideration. Dairies, in particular, have experienced problems from aflatoxin B1 residues in milk. Fumonisins are an important consideration if these materials are to be fed to horses.

Lactrol® (virginiamycin and dextrose) is manufactured by PhiBro Animal Health (the sole producer of virginiamycin) for use in the fermentation process to control bacterial proliferation which impairs fermentation and optimum ethanol production. The FDA is empowered by the Food, Drug and Cosmetic (FDC) Act which does not cover industrial alcohol production. Thus, ethanol fermentation performance aids cannot be approved by the FDA.
ENVIRONMENT

Lactrol has been FDA reviewed and assigned a no objection status concerning use in industrial alcohol production and the use of resulting distillers’ by-products in stock feed. Testing (for the M1 component of virginiamycin) of DDGS in the US and Canada showed no residues detectable to the 1 ppm test limit. FDA has determined virginiamycin use in food animals does not present a significant transferable antimicrobial resistance risk. FDA has reviewed Lactrol use and resulting distillers by-products, and has issued the only formal no objection status for an antibiotic ethanol fermentation performance additive.

Biodiesel has gained prominence more recently. The primary source, at this time, is soybeans, however, other lipid sources from animal or plant sources or recovered waste oils are potential sources. The co-products from the biodiesel manufacture is questionable and depends on the sources used and their lipid purity. High amounts of glycerin (or glycerol) from triglyceride catabolism are created. This material can be fed to cattle, diet inclusion optimum levels are under study for cattle type. Methanol used in the conversion process is present in the co-product and its concentration is subject to regulation. A human diet limit is 150 ppm. Animals, particularly ruminants, are less sensitive to the effects of methanol than are humans. In fact, methanol is the source of methane released from the rumen. Depending on the sources used, residues such as dioxins and polychlorinated biphenyls (PCBs) could be a consideration in the use of these biodiesel co-products. Certainly, the production of biofuels is still evolving. Changes in sources such as cellulose materials and improvements in extraction for higher value products will continue. The safe use of these co-products for livestock production rests upon the user. Producers should develop a relationship with the source plant and stay appraised of product changes.

Annual Mycotoxin Report from the States

Fumonisins were a common finding in most of the crop production states in 2007. Although common, high concentrations (i.e., >10 ppm) were rare. In the southern grain belt where aflatoxin is routine the rainfalls this season evidently relieved some crop stress and concentrations of this mycotoxin were lower than usual. As usual, aflatoxin was detected in various foci where climate stress on crops favored production. Zearalenone and deoxynivalenol (DON) findings were consistent with past years. More DDGS samples were run in the last year. As one
might expect since the co-product represents three-fold increase of the source corn, levels of aflatoxin, fumonisin, zearalenone and DON were detected at levels higher than were found in corn.

Large scale health problems were not reported for the last year.
JOINT REPORT OF THE COMMITTEE ON FEED SAFETY AND COMMITTEE ON FOOD SAFETY

FEED SAFETY
Chair: Kevin G. Custer, Des Moines, IA
Vice Chair: Richard Sellers, Arlington, VA

FOOD SAFETY
Chair: Daniel E. Lafontaine, Columbia, SC
Vice Chair: Bonnie J. Buntain, Calgary, Alberta, Canada

Committee on Feed Safety Members
David C. Ailor, Dc; Richard E. Breitmeyer, CA; Roy D. Brister, AR; C. Ross Hamilton, TX; Jay Hawley, IN; Tom Holder, MD; Rex D. Holt, Ga; Elizabeth A. Lautner, IA; David L. Meeker, VA; Gary D. Osweiler, IA; Jane F. Robens, MD; James E. Stocker, NC; H. Wesley Towers, DE; Liz K. Wagstrom, IA; Doug Waltman, GA; Gary L. Waters, MT.

Committee on Food Safety Members
Deanna L. Baldwin, MD; Marilyn F. Balmer, MD; John R. Behrmann, PA; Joseph L. Blair, VA; Richard E. Breitmeyer, CA; Peggy N. Carter, VA; Jan Charmsinski, WV; Max E. Coats, Jr., TX; Carl W. Cushing, VT; Reta Dyess, TX; Kathleen D. Finnerty, NY; Robert F. Gerlach, AK; L. Wayne Godwin, FL; Donald E. Hoenig, ME; Tom Holder, MD; Rex D. Holt, Ga; Clyde B. Hoskins, SC; Danny R. Hughes, AR; John P. Huntley, NY; Lee C. Jan, TX; Robert F. Kahrs, FL; Susan J. Keller, ND; Sung G. Kim, NY; Spangler Klopp, DE; Elizabeth A. Lautner, IA; Laurent O'Gene Lollis, FL; Kelli S. Ludlum, DC; John R. MacMillian, WV; Michael M. Mamminga, IA; Bret D. Marsh, IN; David T. Marshall, NC; Kris Mazurczak, IL; James D. McKeen, IA; Katherine McNamara, VT; Andrea Mikolon, CA; Lee M. Myers, GA; Nicole Neeser, MN; Jill A. Nezworski, MN; Edwin M. Odor, DE; Carol A. Olmstead, MT; Kenneth E. Olson, IL; Gary D. Osweiler, IA; Gerardo Quaaassdorff, VT; John R. Ragan, MD; James T. Rankin, Jr., PA; Nancy J. Robinson, Mo; Kerry A. Rood, UT; Leon H. Russell, Jr., TX; John P. Sanders, WV; Glenn N. Slack, Ky; Harry Snelson, NC; Philip Stayer, MS; Bruce N. Stewart-Brown, MD; Stanley A. Stromberg, OK; Lyle P. Vogel, IL; Larry L. Williams, NE; Rob Williams, DC; Nora E. Wineland, CO; John F. Wortman, Jr., NM; Ria de Grassi, CA.
The Committees met in Joint Session on October 1, 2007 from 12:30 pm to 5:00 pm at John Ascuaga’s Nugget Hotel, Reno, Nevada. Committee on Feed Safety Vice Chair Richard Sellers and Committee on Food Safety Chair Daniel Lafontaine presided. Five Committee on Feed Safety members, nine Committee on Food Safety members and 41 guests were welcomed to the meeting by Sellers and Lafontaine. They introduced this year’s topic, Melamine Contamination of Animal Feed – Lessons Learned and Future Impact. After welcoming remarks, the Chairs discussed the intricate interrelationship between feed safety and food safety during the melamine contamination incident in the spring of 2007. This interrelationship prompted the decision to conduct a joint session at this year’s meeting. Following the Chairs’ remarks, the Committee received a series of presentations offering perspectives of the incident from the United States Food and Drug Administration (FDA); the United States Department of Agriculture (USDA), Food Safety and Inspection Service (FSIS), field operations and the laboratory system; the feed industry; and a state directly impacted by the incident.

The first Committee presentation offered the FDA, Center for Veterinary Medicine (FDA-CVM) perspective. It was delivered jointly by Drs. Lynn Post and Randall Lovell. Dr. Post is the Director for the Division of Surveillance, Office of Surveillance and Compliance at FDA-CVM. Dr. Lovell is a Veterinary Medical Officer in the Division of Animal Feeds, Office of Surveillance and Compliance. They detailed the timeline and findings of the FDA as related to working with affected manufacturers and the Chinese government during a pet food recall prompted by the discovery of melamine contamination in pet foods. In mid-March, FDA received reports from a pet food firm that animals fed the firm’s pet food in a palatability study died. Subsequent to this, FDA received 18,000 consumer complaints in two and one half months from pet owners claiming animals had died or were seriously ill from consumption of various pet foods. This is compared to the approximately 6,000 complaints per year the agency receives for all their regulated products. The agency continues follow-up on these complaints, which is made difficult by the frequent lack of veterinary involvement and/or reliable diagnostic testing or post mortem examinations. Working with corporate toxicologists, FDA and several state veterinary diagnostic labs discovered the toxic substance in pet foods was not melamine alone. Rather, it
was melamine combined with cyanuric acid to form an insoluble compound, melamine cyanurate, which forms crystals. Melamine and some of its analogs, one of which is cyanuric acid, was found to have been added to wheat gluten and rice protein concentrate. It is theorized that this was done to boost the protein levels in the ingredients imported from two firms in China. The melamine cyanurate was found to crystallize in kidney tubules, sometimes causing uremic toxicity, especially in cats. Further forensic studies by FDA determined that the ingredients imported as wheat gluten and rice protein concentrate were, in fact, both predominately wheat flour to which had been added melamine which breaks down to several metabolites including cyanuric acid, ammeline and ammelide.

Subsequent to this discovery, several pet food manufacturers reported distributing melamine contaminated pet food scraps to poultry and swine producers for incorporation into the feed for these animals. This was found to be a common practice for product that was not deemed suitable for the retail market, but was considered to have favorable nutritional attributes for animal feed, especially monogastric animals. Another firm reported that it had used melamine in place of urea-formaldehyde as a pellet binder used in aquaculture feeds. FDA required withdrawal of any aquaculture feed containing the binder, as well as any remaining binder. Many data sets showing the results of pet food analyses were presented. This was done to establish the thought process used to determine parameters for Class I, II and III recalls during this incident. Briefly, a Class I recall is declared for a situation in which there is a reasonable probability that the use of, or exposure to a violative product will cause serious adverse health consequences or death. A Class II recall is a situation in which use of, or exposure to a violative product may cause temporary or medically reversible adverse health consequences or where the probability of serious adverse health consequences is remote. A Class III recall is a situation in which use of, or exposure to a violative product is not likely to cause adverse health consequences. For this incident, FDA determined that a Class I recall for wet (>80% moisture) pet food was >100 parts per million (ppm) melamine provided that the wet pet food also contained similar levels of cyanuric acid. A Class II recall was established 33-100 ppm for wet pet food. A wet pet food containing less than 33 ppm of melamine was considered a Class III recall. For dry dog food, a Class I recall was >440 ppm
melamine, Class II was >145 - 440 ppm and <145 was considered a Class III recall.

As a result of this event, FDA posted considerable information on its website regarding the recall, including the recalled products, analytical methodology and other relevant information. Also, FDA held many media conference calls, working with interested stakeholders and state counterparts. The agency mobilized twenty district offices and four hundred employees. FDA created a new assistant commissioner for food security after this event. One of the concluding recommendations of the presentations was that FDA needs to develop a better dialogue between the agency and state health officials rather than simply issuing proclamations.

Kenneth Petersen, Assistant Administrator, Office of Field Operations, Food Safety and Inspection Service (FSIS), USDA, was scheduled to present the USDA-FSIS field operations perspective on this incident. Due to a last minute conflict, he was unable to attend. However, Patrick McCaskey, Executive Associate for Laboratory Services, Office of Public Health and Science, USDA-FSIS presented Petersen’s remarks for him. His remarks were presented in a chronological format of the five most critical weeks of the incident.

Week 1: For FSIS, the melamine contamination event started on April 17, 2007 when FDA alerted FSIS to the possibility that hogs had been fed pet food waste containing melamine. It was reported that some hogs may have gone to slaughter. On April 19 the FDA confirmed the presence of melamine in urine from 7 hogs.

Week 2: On April 26, FSIS and FDA issued a joint press release announcing they had notified state authorities that eight pork producers had been identified who had purchased scrap pet food containing rice protein contaminated with melamine and related compounds and had fed it to their pigs. Several facts were determined. First, there had been no reported ill effects from lab animal studies from melamine, with the exception of one study showing bladder tumors in a rat fed doses of melamine far exceeding their body weight. Second, melamine in wheat gluten or rice protein concentrate was a small component of pet food. Third, the contaminated waste pet food was only part of the feed that was fed to the hogs. Fourth, melamine is not known to accumulate in the bodies of hogs and is excreted in their urine. Fifth, even if
present in pork, pork is only a small part of the average American diet. Sixth, probably based on these dilution factors, there is no evidence of harm to the hogs fed from the contaminated feed. Further, being unaware of any human illness caused by exposure to melamine or related compounds, a subsequent press release was prepared. On April 28th, FSIS and FDA issued a joint press release regarding the continued investigation into imported wheat gluten and rice protein concentrate which has been found to contain melamine and melamine-related compounds. Based on the information currently available, USDA and FDA stated that the likelihood of illness is very low and that no recall would be issued. Also on April 28th, an Emergency Operations Center (EOC) was stood up at FDA headquarters in Rockville, Maryland. This was an effort to resolve conflicting information and conflicting internal interests of the agencies. FSIS was in attendance for the next 10 days.

Week 3: On April 30th, FSIS and FDA issued another joint press release, the third release in five days, stating that the investigation of adulterated feed had been expanded to include poultry in the state of Indiana and additional swine in several states. The release stated that 30 broiler farms and eight breeder poultry farms in Indiana were included. On May 1st, the agencies stood up a Fusion Cell at Department of Health and Human Services (DHHS) headquarters. The goal of this cell was to translate complex information into analyzed information that characterized the scope of the incident. Additionally, it was to allow the EOC to track and receive information without also having to generate reports. In six days the event had evolved from rice protein in a few on-farm pigs not in commerce, to the added issue of wheat gluten, and broilers, 2.7 million of which were in commerce. The media was now fully engaged on the issue. On May 3rd, FSIS and FDA held a joint press briefing to discuss developments connected to the investigation associated with adulterated feed which was fed to swine and poultry in several states.

Week 4: On May 7th, FSIS and FDA issued a joint press release announcing the results of a human health risk assessment conducted by scientists from five federal agencies. The key points of the release were that the assessment concluded that the health risk to humans was very low. Assuming consumption of potentially contaminated meat, the possible adulterant level was 2,500 times below the dose that was considered safe. FSIS and FDA held a
Joint press briefing on May 8th. This briefing announced that the scientific panel was reevaluating “the appropriate course of action regarding swine and poultry that consumed the contaminated feed.” Specifically, they were now conducting an animal health risk assessment. It was also announced that Illinois was added to the list of states affected by the event. Internally, the agencies determined that the Fusion Cell, stood up on May 1, was not working. It was not achieving the desired effect of centralization and analysis of data. On May 9th, there was a Congressional hearing before the full House Committee on Agriculture. A food and feed importation hearing was also conducted. At the May 10th press briefing, the situation remained the same. FDA bore the brunt of the questioning at this briefing because of the focus on human health risk.

Week 5: On May 15th, FSIS and FDA held a joint press briefing and news release. Petersen announced that FSIS now had validated the test for the presence of melamine in swine. Consequently, hogs fed contaminated feed are safe for human consumption. The hogs that were on hold could be released for inspection and processing. The announcement further stated that a separate test was being developed for poultry. The FSIS and FDA joint press release of May 18th announced that approximately 80,000 birds being held on farms in Indiana would be released and approved for processing due to the results from a validated test for the presence of melamine in poultry.

From the initial notification to FSIS by FDA until the May 18th press release, the event took about four weeks to run its course. On June 14, the FDA science board concurred with the findings and methods.

McCaskey then presented his own remarks to the Committees in a presentation entitled Melamine Contamination: Lessons Learned, Future Impact. As the incident first started, it appeared that the laboratories would be uninvolved bystanders. Initial indications were that pigs had been fed contaminated feed on or about April 18th, but that the pigs that had consumed this feed were retained. However, the story quickly unfolded from there. Reports indicated that some hogs had been slaughtered and carcasses may have been released. The contaminated ingredient importation dates became unclear. Previously imported product was also potentially contaminated. Then poultry products were involved. The lab became fully engaged. The incident had been ongoing for several days in California. The
California Animal Health and Food Safety Lab (CAHFS) reported a testing method sensitive down to 10 ppb of melamine in pork muscle. The immediate question from FSIS and FDA was how was the method validated? CAHFS sent their method to the FDA Forensic Chemistry Lab. However, FDA’s lab didn’t have the same equipment so they began work on separate methods. FSIS had a validated method but it was not currently supported by equipment or reagents and it lacked the required sensitivity. After numerous FSIS/ FDA/ CAHFS conference calls, several labs started identifying methods for melamine. The FSIS Western Lab (WL) began working on the CAHFS method. FDA later focused its efforts on fish feed methods. WL ran into problems immediately. It attempted to run CAHFS method liquid chromatography/mass spectroscopy /mass spectroscopy quadrapole (LC/MS/MS quadrapole). The extraction procedures were inefficient. They did not have the correct columns for LC/MS/MS quadrapole. They did not have the internal standard used in the CAHFS method. And they did not have a melamine standard. Consequently, FSIS shifted their focus and began using the Food Emergency Response Network (FERN) method validation Standard Operating Procedure, with a sensitivity of 10 parts per billion (ppb) as the target for the method.

While the lab efforts were progressing furiously, there were many ongoing concurrent activities. FSIS and FDA were conducting risk assessments in an effort to ascertain the correct level of concern. Challenges included a lack of data on human exposure, determining the levels in feed and determining the levels of significance in body tissues. Department of Homeland Security (DHS) input was sought. After two weeks of work and significant inter-lab collaboration on attempting to validate the 10 ppb protocol, risk assessment data was suggesting that sensitivity to that level was probably not required. The labs’ focus shifted to initiating validation at the 50 ppb level based on established tolerance. On May 8th, the GC/MS method for feed was validated and posted on e-lexnet. The liquid chromatography/mass spectroscopy (LC/MS) method preliminary work was completed and they started the “official” pork method validation. Lab personnel worked overnight to complete the validation work (normally 3 days worth of work). On May 9th, FSIS submitted the modified CAHFS method to the FERN method validation committee and started the validation process for poultry. On May 12th, FSIS was advised that they needed to redo the pork validation based on feedback from FERN Methods group.

291
Finally, on May 14th, a FERN “Approved” validated method for Emergency Level 1, PORK was completed. This was followed on May 18th by a FERN “Approved” validated method for Emergency Level 1, POULTRY.

Experience gained during the incident revealed several issues:

- Lack of a validated method
- Lack of proper columns for the LC/MS
- Inadequate extraction procedures
- Lack of internal standards
- Lack of appropriate negative control samples

In this incident, the effects on public health were nil. But it highlighted many unresolved concerns. What if:

- Somebody intentionally wanted to hurt us…
- Had the time and money needed
- Used food as a vehicle
- Gained access to a variety of foods and/or the food distribution systems
- The agent was of significant public health concern and people became ill or died
- They used an unknown agent or combination of agents

There are over 80,000 chemicals; many biological, radiological agents; and over 50,000 food matrices. Any combination of these is possible. There is a lack of analytical methodologies and a lack of laboratory capacity to rapidly develop valid methodologies. This event shows that teamwork works, but significant continued efforts are needed.

Following Dr. McCaskey’s remarks, three leaders in the feed industry provided their insight regarding the incident and detailed their actions and responses to findings by FDA and FSIS. Richard Sellers, Vice President of Feed Regulation and Nutrition, American Feed Industry Association (AFIA), explained his organization’s actions and response to reports from USDA and FDA. He explained that his association’s primary focus was to provide accurate, timely information to its members and to highlight the association’s Safe Feed/Safe Food Certification Program to government. Further, AFIA is holding a National Dialogue on Import Ingredient Safety, November 8-9, 2007 to determine the best course of action for firms importing ingredients. The results of this meeting will be the development of draft
FEED SAFETY AND FOOD SAFETY

guidance for the industry that will be presented to the FDA for action. AFIA has urged the federal government to partner with industry stakeholders in advocating and supporting third-party feed/food safety program. He also detailed the Food and Drug Amendments Act of 2007 (HR 3580), which contains multiple references to both human and pet food safety, specifically, Section 1003 details communication requirements to be followed during recalls of pet and human foods.

Nancy Cook, Vice President for Technical and Regulatory Affairs for the Pet Food Institute (PFI), provided insight into her institute’s view of the melamine actions. She cautioned that she was not able to delve into extensive details due to pending lawsuits. She noted that this recall amounted to about one day’s consumption of pet food throughout the United States. She expressed concern that FDA was unable to provide the industry updated information due to the fact it was conducting an investigation. She further noted that industry initiated a recall much more quickly than FDA would have done. She provided an interesting perspective about how a contamination incident of this nature could have gotten directly into the human food chain. Wheat gluten provides protein and assists in holding the shape of many products, not just pet food. About 600 million pounds of wheat gluten is used in the United States annually and it only produces 20 percent of the total used. The pet food industry uses about 25 percent of the total 600 million pounds. So, it was essentially the luck of the draw this time that the contaminated gluten went into pet food. It begs the question of how many human food products are routinely tested for melamine. In closing, she detailed the formation of the National Pet Food Commission chaired by Angele Thompson. The commission consisted of a mixture of academics, industry experts and an FDA advisor. She will provide the report of the commission soon.

David Meeker, Vice President for Scientific Services, National Renderers Association, presented his organization’s view on the issue focusing on his industry’s Code of Practice. The rendering industry adopted the Rendering Code of Practice in 2004 to ensure that biosecurity is maintained and that finished products are safe and in compliance with all state and federal regulations and tolerances. The Code of Practice uses Hazard Analysis and Critical Control Points (HACCP)-like process
control programs and good manufacturing practices that require (1) an evaluation of the entire rendering process; (2) identification of potential biological, physical, or chemical hazards; (3) identification of critical points in the process where the hazard(s) can be controlled; and (4) development of procedures to control these processes and ensure the hazard is eliminated or reduced to acceptable levels for each product. As of October 15, 2007, there are 63 plants (more than 80% of the rendering production capacity in the United States) certified in the Rendering Code of Practice by independent third party auditors. He also noted that the rendering industry is part of the food industry too. Some of his organization's firms processed meat scraps that ended up in pet food that was subsequently caught up in the contamination incident and sent to poultry/swine farms.

Concluding the formal program, Clyde Hoskins, Assistant Director, South Carolina Meat-Poultry Inspection Department then presented, Melamine Contamination of Feed – State Perspective. For South Carolina, the melamine incident started on April 20, 2007 when the State Veterinarian was notified of two issues regarding potentially contaminated feed. First, some pet food scraps regularly purchased by a South Carolina hog farmer were from contaminated lots. Second, fifty-two hogs fed contaminated feed at a farm in North Carolina were delivered to a South Carolian slaughter house on April 19. The hogs at the slaughter house were immediately retained. Feed samples were collected by South Carolina Department of Agriculture, under FDA contract. Samples from the pet food plant (collected previously) had tested positive for melamine contamination. Three feed samples were collected from the farm on April 0. A trace forward was initiated on forty-one hogs shipped from the hog farm. Fifteen hogs went to a South Carolina-inspected slaughter and processing facility. The owner verbally agreed to voluntary restriction, suspending further hog movement. Signed affidavits from the hog farmer stated that, based on production and delivery dates, contaminated feed was not fed to his hogs. On-site visits by state meat-poultry inspection compliance officers supported the farmer's statement. Thirteen urine samples were collected from the South Carolina hog farm and delivered to a FERN lab in Richmond, Virginia. The urine sample results were reported as positive; ranging from 184 ppb – 3 ppm. But the three feed sample results, from the farm, were reported as negative by the
FEED SAFETY AND FOOD SAFETY

FDA lab in Atlanta. Written confirmation was requested. The significance of these results was undetermined during a State-requested FSIS/ FDA/ State conference call. On April 26, FDA reconfirmed that the initial feed sample tests from the hog farm were negative, but were now deemed incomplete. Further testing was directed by FDA-Washington, using a revised testing protocol for melamine and melamine analogs. On the same day, USDA announced that compensation was going to be made available for depopulation of hogs exposed to potentially contaminated feed. Consequently, on April 27 the initial planning for depopulation of the hog farm in South Carolina began. Initial steps were animal inventory planning, pre-planning visits to land fills and initial contact to various affected agencies. On April 30 the hogs at the slaughter facility were ear tagged and shipped from the South Carolina slaughter facility back to the North Carolina farm of origin under Animal and Plant Health Inspection Services (APHIS) seal. At that time, they had been retained at the slaughter facility for eleven days. On May 2, USDA-APHIS-Veterinary Services and Clemson University Livestock Poultry Health (CULPH) personnel inventoried the hogs on the farm to assist in determining depopulation compensation. A full depopulation planning meeting was held later that day. Primary stakeholders present included: the State Veterinarian, USDA-APHIS, CULPH, South Carolina Department of Health and Environmental Control, Public Affairs POCs, and the County Sheriff’s Department. It was noted that similar efforts were in various stages in other affected states. On May 7, 7:00 a.m., a joint USDA-FDA press release announced that hogs on farms with negative fed samples could be released for inspection and processing, citing a “… very low risk to human health.” However, hogs on farms with positive or undetermined feed samples should continue to be withheld from processing. Depopulation compensation was suspended, pending completion of an animal health risk assessment. During a conference call that afternoon, the South Carolina State Veterinarian requested clarification of the status of hogs on the South Carolina farm. During that conference call, another call advised that further testing of feed samples from the South Carolina farm revealed positive results for melamine and melamine analogs. Therefore, the hogs were to remain on voluntary restricted movement. Based on the May 7 press release, citing a “… very low risk to human health …” the State Veterinarian formally stated his position to FDA that he lacked legal authority to hold animals if the farmer...
ceased voluntary restriction. His state law states that he can hold animals “… which present significant health hazard to humans …” On May 11, USDA-FSIS was advised of the State Veterinarian’s position. The response was that an announcement clarifying the situation would be issued soon. On May 15 USDA and FDA announced that hogs fed contaminated feed are safe for human consumption and can be released and approved for processing. The hog farmer was contacted. Hogs were released for movement after twenty-six days of voluntary restriction. On May 17 the ear-tagged hogs from the North Carolina farm were returned to the South Carolina slaughter facility for processing.

The direct impacts on South Carolina were:

- Over five hundred hogs were voluntarily restricted from movement for 26 days. There was an associated decrease in market value, added feed costs, compensation delays and difficulty in subsequent marketing due to public perception.
- Fifty-two hogs retained at South Carolina slaughter house for 11 days. Direct costs and public perception were factors.
- Meat from 15 hog carcasses at South Carolina plant was held for 22 days (frozen).

Indirect impacts were associated with incident management. There was frustration and difficulty in getting information and updates. This led to complications in assessing of breadth and scope of the problem. Coordinating for the planned depopulation, while an interesting exercise, ended up being a significant manpower drain. There were delays in providing compensation to the affected farmer. Sample testing, method validation and result interpretation all led to confusion and concern.

Recommendations stemming from this event are:

- Implement ICS early and include affected states in assessment and planning.
- Establish clear chains of command and lines of communication.
- Coordinate press releases with affected states since they must deal with the media also.
- Consider the impact of national level decisions on local news releases.
- Resolve the issue of authority to initiate restricted movement, quarantines, etc.

There was subsequent discussion about how states and the
FEED SAFETY AND FOOD SAFETY

federal government could cooperate better and share information in future incidents that have heavy state involvement. Chair Lafontaine provided summary comments of the day’s presentations.

In a separate meeting, the Committee on Feed Safety heard a report on the recent Joint Expert Meeting on the Impact of Animal Feed on Food Safety and the World Organization for Animal Health (OIE) report on feed safety. There was also a note on the Codex Alimentarius Commission’s (CAC) circular letter that requests comments by March 2008 regarding the formation of a new working group on good animal feeding. A Code of Good Animal Feeding Practice was approved at by the CAC in 2004.
REPORT OF THE COMMITTEE ON FOREIGN AND EMERGING DISEASES

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

Helen M. Acland, PA; John B. Adams, VA; Bruce L. Akey, NY; Wilbur B. Amand, PA; Sandra Amass, IN; Gary A. Anderson, KS; Alex A. Ardans, CA; Joan M. Arnoldi, WI; Marianne Ash, IN; Charles A. Baldwin, GA; Thomas W. Bates, CA; Karen M. Becker, MD; Tammy R. Beckham, NY; John R. Behrmann, PA; Derek J. Belton, NZ; Bob H. Bokma, MD; Philip E. Bradshaw, IL; Richard E. Breitmeyer, CA; Deborah L. Brennan, MS; Becky L. Brewer-Walker, OK; William W. Buish, NC; Suzanne L. Burnham, TX; Jerry J. Callis, NY; Tony A. Caver, SC; Yung Fu Chang, NY; David M. Chico, NY; Neville P. Clarke, TX; Ronald R. Clarke, CAN; Leslie E. Cole, OK; Thomas F. Conner, OH; Robert A. Cook, NY; Joseph L. Corn, GA; Paula L. Cowen, CO; Robert A. Crandell, TX; Stephen K. Crawford, NH; Fred DeGraves, OH; Linda A. Detwiler, NJ; Edward J. Dubovi, NY; Anita J. Edmondson, CA; Dee Ellis, TX; Francois C. Elvinger, VA; John I. Enck, Jr., PA; Luis Alberto Espinoza, ; Peter J. Fernandez, AE; Steven Finch, MD; J. Pat Fitch, MD; James M. Foppoli, HI; Rose Foster, MO; W. Kent Fowler, CA; Anthony M. Gallina, FL; John E. George, TX; Robert F. Gerlach, AK; Paul Gibbs, FL; Colin M. Gillin, OR; Joel Goldman, LA; Mara Elma E. Gonzalez, ; Robert Ross Graham, VA; Nancy E. Halpern, NJ; Jeffrey J. Hamer, NJ; Percy W. Hawkes, UT; Gregg Hawkins, TX; Larry L. Hawkins, MO; Ruud Hein, DE; David W. Hertha, AL; Richard E. Hill, IA; Donald E. Hoenig, ME; Sam D. Holland, SD; Thomas J. Holt, FL; Floyd P. Horn, MD; Dennis A. Hughes, NE; John P. Huntley, NY; John L. Hyde, NY; Robert F. Kahrs, FL; Thomas R. Kasari, CO; Patrice N. Klein, MD; Elizabeth A. Lautner, IA; Randall L. Levings, IA; David J. Ligda, IN; Martha A. Littlefield, LA; Linda L. Logan, APO; Janet Maass, CO; Edward T. Mallinson, MD; Bret D. Marsh, IN; Mary J. Marshall, UK; Barbara M. Martin, IA; Sarah J. Mason, NC; MaryAnn T. McBride, NC; Robert G. McLean, CO; James O. Mecham, WY; David L. Meeker, VA; Andrea Mikolon, CA; Thomas J. Myers, DC; Terry L. Nipp, DC; James E. Novy, TX; Bruno Oesch, SWE ; Richard E. Pacer, MD; Charles Palmer, CA; Andres Perez, CA; Kelly R. Preston, TX; Gerardo Quaassdorff, VT; Deidre A. Qual, ND; Keith Roehr, CO; James A.. Roth, IA; Mo D. Salman, CO; A. David Scarfe,
The Committee met from 8:00 a.m. to 5:30 p.m. on October 3, 2007 at John Ascuaga’s Nugget Hotel, Reno, Nevada. Attendance varied through the day, from 80 to 10 attendees, with 149 signing the attendance sheets collected at the end of the day. Drs. Corrie Brown and Alfonso Torres presided over and conducted the meeting.

Opening comments were provided by the Chair and Vice-Chair. The purpose statement of the Committee was reviewed as well as protocol for membership on the Committee. Alfonso reviewed the highlights of last year’s meeting and responses to 2006 Resolutions were reviewed.

Presentations began with a Panel on avian influenza (AI). Eric Hoffman, Associate Deputy Administrator, United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), International Services (IS) presented Capacity Building Efforts on behalf of Dan Sheesley, Deputy Administrator, APHIS-IS. APHIS has a new initiative called International Technical Regulatory Capacity Building (ITRCB). The ITRCB supports the United States policy objectives by enhancing developing countries’ ability to trade and encompasses training, meetings, foreign visits, workshops and other areas. Rich Pacer will be the first ITRCB Program Manager.

The Highly Pathogenic Avian Influenza (HPAI) International Coordination Group, (ICG) commonly referred to as the Fusion Group activities were reviewed by Joe Annelli. The group started with a Presidential Initiative, National Strategy for Pandemic Influenza. That strategy had 27 action items specific for agriculture and the ICG was created to address these. The initial goal was to
eradicate H5N1 from the world to prevent human pandemic, and has since been modified to carry out long-term capacity building, with the goal of establishing sustainable and reliable disease control program. The ICG is organized around a National Incident Management System (NIMS) concept and they have been active in supporting multiple endeavors in the parts of the world where HPAI is a problem or a risk.

USDA-IS Experiences with HPAI in Egypt, was given by Linda Logan, APHIS Coordinator for Middle East, North Africa and East Africa. Of the 30 countries in this region, 13 have had H5N1. HPAI was first recorded in Egypt in February of 2007 and spread rapidly throughout the country. Commercial sector, which had grown significantly in recent years, was drastically impacted. HPAI is entrenched now and humans are the sentinels. Currently there is funding from the U.S. Agency for International Development (USAID) and the agricultural sector is receiving support from the United Nations Food and Agriculture Organization.

USDA Support of HPAI Control in Southeast Asia was presented by Dr. Petrus Wicaksana, Indonesia, and Bunna Um, Cambodia. Numerous staff have been added since the outbreaks began and there have been many programs instituted to help with HPAI control in the region, including wet labs, workshops, epidemiology training, and laboratory enhancements.

A panel on foot-and-mouth disease (FMD) followed next. The Committee’s Time-Specific Paper, Development, of new vaccine strategies to control FMD, was delivered by Marvin Grubman. The paper is presented in its entirety in these proceedings.

An Own Goal – FMD in the United Kingdom, 2007, was given by Paul Gibbs, which was a chronology of the FMD outbreak in the UK in 2007. The disease discovered in cattle on August 3, 2007, was caused by a virus that was used in a batch of vaccine manufactured on July 16 at Merial, a facility that shares the compound with Pirbright Institute for Animal Health. Over the course of the next five weeks, there were a few outbreaks - each was quickly contained. The path of the source virus was determined. At Pirbright, virus escaped from a manhole that had a poorly fitting cover with gaps around the edges. The effluent
FOREIGN AND EMERGING DISEASES

should have already been contaminated by citric acid but it wasn’t. The rains flooded virus to the surface. Two soil heaps that had been removed from the area around the manhole covers were put into trucks taken out and driven past the index farm.

FMD Modeling and Surveillance, presented by Andres Perez, was a review of the developing system for global animal disease surveillance. The main objective has been to provide a tool for decision making. Information streams were tapped, databases organized, and daily FMDNews listserv established. Models of disease were created. Bioportal, a global surveillance system, was demonstrated.

Emerging diseases of fish was the next panel. First was viral hemorrhagic septicemia (VHS), delivered by Alfonso Torres, Cornell University, on behalf of Paul Bowser. A rhabdoviral disease of fish, VHS has moved from Europe to North America, and is now causing massive die-offs in the Great Lakes. There are several genotypes of Vesicular stomatitis virus (VSV) – IVb is the strain seen in the recent outbreaks. Origin may have been from marine fish off the Atlantic Coast, moving through the St. Lawrence River, or through transport of fish. Virus has been seen so far in 28 different species of fish. There is concern about spilling into the commercial industries.

White spot disease of crustaceans was presented by Don Lightner. The disease emerged in Asia in 1992, spread to many parts of the world, probably reaching the Americas in frozen products that were imported for value-added reprocessing. The causative viral agent affects at least 50 species. In February of 2007, the disease broke in Louisiana. Current management strategies include increased biosecurity, use of Specific Pathogen Free (SPF) shrimp stocks, restricting farming to the cool season.

A panel on Federal Programs on Foreign Animal Diseases was next. Research updates, Foreign Animal Disease Research Unit, Plum Island Animal Disease Center (PIADC), was given by Luis Rodriguez, Research Leader, Agriculture Research Service (ARS), USDA. The empty capsid vaccine was already reviewed by Grubman. Elizabeth Reider has developed a recombinant killed FMD virus vaccine that is still in the proof-of-concept stage. Manuel Borca has made an attenuated differentiating infected from vaccinated animals (DIVA) chicken syncytial virus (CSV)
vaccine that is moving through to the early development phase. Infrared thermography is being used for diagnosis of FMD in infected animals three days prior to the onset of visible lesions, and has good promise for use in an outbreak. VSV studies using black flies have determined site-specific means of transmission.

Research updates, Southeast Poultry Research Laboratory was given by David Swayne, Center Director. Wild bird monitoring for avian influenza (AI) in North American waterfowl continued. Inoculation of the Asian strain of H5N1 produced disease in many wild bird species. Data suggests the wood duck would represent a sensitive indicator species for H5N1 HPAI should it enter North America. Swans were very susceptible with high mortality. Geese had lower mortality but were better as asymptomatic shedders than swans. For diagnostics involving AI, modifications to the reverse transcrptase-polymerase chain reaction (RT-PCR) protocol to decrease inhibitors helped to markedly decrease the percentage of false negatives. In Newcastle disease research, flies fed on exotic Newcastle disease-laden milk carried the virus in their gastrointestinal tract for as long as three days, indicating that fly control will be critical in eradication campaigns.

National Veterinary Services Laboratories (NVSL) Updates, were provided by Beth Lautner, Director, NVSL, VS-APHIS-USDA. Construction continues on the Ames Modernization projects, with great progress. In July 2007, the BSL-3 Ag Large Animal Housing and Training Facility opened. The Laboratory and Administration Building will be completed in February 2008. Accreditation to ISO17025 was received in December 2006. A North American Animal Health Network to harmonize diagnostics among U.S., Canada and Mexico was launched in February of 2007. Last year, there were 130 FAD investigations, of which seven were Priority 1. International capacity building was conducted this year with Kazakhstan, Afghanistan, Republic of Georgia, providing excellent opportunities for laboratory staff to work with field samples. The NAHLN continues to add new laboratories, and there are now 37 labs in 33 states. Robotic equipment has been supplied to over 30 laboratories to provide scale-up capabilities for high throughput.

Department of Homeland Security (DHS) Update on biologic countermeasure development was given by Larry Barrett, PIADC Center Director, and Tam Garland, Branch Chief for
FOREIGN AND EMERGING DISEASES

Agriculture Security, Science and Technology. The top goal of the Targeted Advanced Development (TAD) Program is to minimize infection, transmission, and economic impact of a natural or intentional introduction of FMD among U.S. livestock. DHS at Plum Island focuses on the countermeasures pipeline, with the goal of putting products into the National Veterinary Stockpile. There are three initiatives in Modeling. The Joint Modeling Operations Center (JMOC) maintains stabilized, version-controlled models for use by policy and decision makers. Also The Research and Policy for Infectious Disease Dynamics (RAPIDD) is being developed in collaboration with Fogarty International Center, National Institute of Health (NIH). The Center for Research at the Interface of Mathematical and Biological Sciences (CIMBS) is a joint project with NSF scientists.

Linda Detwiler reviewed Efforts to Enhance Recruitment through Liaisons with Veterinary Schools. Funded by APHIS, the program has been run through the Center for Public and Corporate Veterinary Medicine at the University of Virginia-Maryland, and became active in January of 2006. The role of the program is to promote careers with APHIS-VS, and to coordinate externships. Over the last year, Linda has visited all of the schools of veterinary medicine, delivering the message to over 2000 students. Number of applicants to paid summer positions and externships continues to grow. Feedback is excellent.

Alfonso Torres briefed the Committee on the Performance, Vision, and Strategy (PVS) program of the World Organization for Animal Health (OIE). This program was funded by a grant from the World Bank, and early development was at the Inter-American Institute for Cooperation of Agriculture (IICA), under the direction of Kevin Walker. The PVS is a tool for good governance and can be used to establish a baseline of strengths and gaps, through a standardized assessment of national veterinary services. About 80 people have been certified by OIE to evaluate countries. There are four main categories for evaluation: human and financial resources; technical authority and capability; interaction with stakeholders; access to markets.

Vicki Bridges gave an overview of the Foreign Agricultural Organization (FAO) Crisis Management Center (CMC). The purpose of the CMC is to improve rapid response to local
REPORT OF THE COMMITTEE

problems with potential global repercussion. CMC is a joint FAO-OIE effort, and includes additional linkages with the World Health Organization (WHO). CMC has been used to send teams out into the field for HPAI. Further developments needed include more training on Incident Command System, expanded roster of trained experts, and enhanced linkages with permanent country representatives.

Paula Cowen, Professional Development Staff (PDS), USDA-APHIS, reported on Veterinary infrastructure building in Iraq and Afghanistan. Accomplishments in Afghanistan have included: establishment of a veterinary pathology laboratory, field necropsy training, first Afghan Veterinary Association Conference, National Animal Health Program planning, and sending key Afghan veterinarians for training in the U.S. Activities in Iraq have included a workshop to rebuild veterinary infrastructure, bringing Iraqi veterinarians to the U.S. for short-term training, and the development of a National Animal Health Plan. For both countries, several shipments of textbooks have been organized for dissemination.

Eric Hoffman presented Dan Sheesley’s paper on the Screwworm Program in Panama. APHIS completed construction of a new screwworm rearing facility in Panama. This new plant would address political concerns as well as inefficiencies of transporting the flies from the current facility in Mexico. The first x-ray sterilizing unit arrived in Panama by mid-2007 and is fully operational. Sustainable production levels of sterile flies already started. By December 2008, the Agency should have this facility with 100 percent sustainable production levels of sterile flies.

Bruce Akey reported on Accelerated Implementation of Integrated Surveillance. National Animal Health Surveillance System (NAHSS) Steering Committee was a direct outgrowth of the Animal Health Safeguarding Review. National Surveillance Unit (NSU) at Center for Epidemiology and Animal Health (CEAH), coordinates VS surveillance activities. NAHSS Steering Committee represents stakeholders and guides and supports surveillance design, planning, and implementation. NAHSS is working toward a comprehensive, integrated system.
Abstract

Foot-and-mouth disease (FMD) is a highly contagious disease of cloven-hoofed animals. The etiologic agent, FMD virus, is a member of the picornavirus family. Disease outbreaks have a significant economic impact on affected countries because of trade restrictions, loss of animals, and decrease in animal productivity. The development of an inactivated whole virus vaccine helped eliminate FMD from Western Europe, but FMD-free countries hesitate to use this vaccine in an outbreak situation. We have developed an alternative vaccine candidate that addresses many of the limitations of the inactivated vaccine and have demonstrated, in laboratory studies, that it can successfully protect cattle and swine. Currently we are engaged in collaborative research with the Department of Homeland Security and GenVec, Inc., to develop and test this product for inclusion in the U.S. Veterinary Vaccine stockpile.

Introduction

Foot-and-mouth disease (FMD) is a highly contagious disease of domestic and wild cloven-hoofed animals including cattle, swine, sheep, goats, and deer. The disease is characterized by fever, lameness and vesicular lesions of the tongue, feet, snout and teats resulting in high morbidity but low mortality in adult animals. However, mortality can be high in young animals since the disease can affect the heart (1). The causative agent, FMD virus (FMDV), the type species of the Aphthovirus genus, of the Picornaviridae family, contains a single-stranded, positive-sense RNA genome of approximately 8500 bases surrounded by an icosahedral capsid with 60 copies each of 4 structural proteins, VP1-4 (1). The virus is antigenically highly variable and consists of seven serotypes and multiple subtypes(1). One of the hallmarks of FMDV infection is its rapid replication and spread to in-contact susceptible animals (1) making it difficult to control disease dissemination.

FOREIGN AND EMERGING DISEASES

FOOT-AND-MOUTH DISEASE VIRUS VACCINES: DEVELOPMENT OF A MARKER, MULTIEPITOPE SUBUNIT VACCINE

Marvin J. Grubman
Foreign Animal Disease Research Unit
Agricultural Research Service
REPORT OF THE COMMITTEE

Development of inactivated vaccines to control FMD outbreaks

Outbreaks of FMD have significant economic impact on affected countries because of trade restrictions, compensation to farmers for lost animals, and a decrease in animal production, as well as a negative impact on other aspects of the economy including all agriculturally related industries, even tourism in some cases. In the U.S., agriculture and allied industries are worth 13% of our GDP. Prior to the development of an FMD vaccine there were tens of thousands of disease outbreaks in Western Europe. In 1951 Frenkel developed an inactivated vaccine by infection of bovine tongue epithelial explants derived from healthy animals and subsequent inactivation with formaldehyde. The introduction of this vaccine to The Netherlands in 1952 led to a dramatic drop in the number of cases of FMD in this country (2). Subsequent production of FMD vaccines by infection of BHK-21 cells and inactivation with binaryethyleneamine allowed for large-scale vaccine manufacture and resulted in the elimination of FMD from Western Europe by 1989 (2). As a result the European Union adopted a no-vaccination policy in 1992.

Concerns with use of inactivated vaccines

Inactivated FMD vaccines are produced by infection of tissue culture cells with virus, concentration of supernatant fluids from infected cells, depending upon the manufacturer “purification” of this material, e.g., column chromatography, chemical inactivation with imines, and addition of an adjuvant (3). Vaccine manufacture requires handling of large amounts of infectious material and therefore FMD vaccines can only be produced in expensive, high-containment facilities. Current federal law only allows work with FMDV at the Plum Island Animal Disease Center which has no vaccine production capacity, so the U.S. cannot produce FMD vaccines and is dependent on foreign manufacturers.

Since current FMD vaccines are derived from the supernatants of infected tissue culture cells they contain varying degrees of contaminating BHK-21 proteins as well as viral nonstructural (NS) proteins that are produced as a result of virus infection. For this reason vaccinated animals can develop antibodies to viral NS proteins and serologically appear as if they have been infected. As a result the World Organization for Animal Health, OIE, and its member countries require that countries using vaccination-to-live as a part of their FMD control strategy must wait 6 months after the last outbreak before they can regain FMD-free status, while
countries that slaughter in-contact susceptible animals or vaccinate and then slaughter these animals only require 3 months before regaining this status. To overcome this economic disincentive, vaccine manufacturers have been attempting to eliminate viral NS proteins from the vaccine (3), and government as well as private laboratories have been developing diagnostic tests to reliably differentiate vaccinated from infected animals.

An additional concern with the current vaccine is that vaccinated animals exposed to live virus can become asymmetrically infected and cattle can develop a persistent infection and become long-term virus carriers. As a result FMD-free countries have hesitated to use a vaccination or a vaccination-to-live policy during an outbreak.

Unfortunately in the past 10 years there have been economically devastating FMD outbreaks in countries that had been FMD-free including Taiwan in 1997, the UK and The Netherlands in 2001, Uruguay and FMD-free zones in Argentina and Brazil, and the current outbreak in the UK. In both outbreaks the UK did not vaccinate and slaughtered all in-contact susceptible animals, while The Netherlands vaccinated but slaughtered all these animals. Many of the slaughtered animals were not infected and as a result citizens in these countries have objected to a slaughter only policy.

Development of new FMD vaccines to address current concerns

An ideal FMD vaccine candidate would allow unequivocal differentiation of vaccinated from infected animals, i.e., a marker vaccine, not require infectious FMDV for production and thus not require expensive, high-containment facilities, be effective with one inoculation, prevent the development of carrier animals, induce rapid protection and be cost effective. This vaccine would allow countries to protect animals in an outbreak situation without resorting to slaughter of in-contact susceptible animals and yet not suffer any adverse economic consequences.

We have attempted to achieve these objectives by utilizing recombinant DNA techniques to produce a multiepitope subunit immunogen. Viral empty capsids are natural products of virus infection, contain all the viral structural proteins, but lack infectious viral nucleic acid. This immunogen can be produced by cloning only a portion of the viral genome. Thus, this product does not contain infectious material and furthermore is missing the information for many of the viral NS proteins. Animals vaccinated with this
immunogen can therefore be unequivocally differentiated from infected animals with currently approved diagnostic assays.

We have examined a number of methods to deliver viral empty capsids to both swine and cattle and in our experience the replication-defective human adenovirus vector induces the highest FMDV-specific neutralizing antibody response. In our studies we have found that swine and cattle inoculated with one dose of Ad5-A24, a construct containing the capsid protein coding region of FMDV A24 Cruzeiro, are protected from direct inoculation challenge as early as 7 days postvaccination (4, 5).

In collaboration with the Department of Homeland Security (DHS) and the biotech company GenVec, Inc. we are developing these products for potential use in the U.S. Veterinary Vaccine Stockpile. GenVec has produced Ad5 vectors containing the empty capsid construct from 2 FMDV serotypes. Cattle inoculated with these vectors and challenged 7 days later were protected against either direct inoculation challenge or contact challenge. Additional efforts are directed to development of Ad5 vectors against other FMDV serotypes as well as isolates that are currently in the field.

References
REPORT OF THE COMMITTEE ON
GOVERNMENT RELATIONS

Chair: Don Hoenig, Belfast, ME
Vice Chair: Richard Breitmeyer, Sacramento, CA

Bruce L. Akey, NY; J Lee Alley, AL; Tony G. Frazier, AL; Steven L. Halstead, MI; William L. Hartmann, MN; James W. Leafstedt, SD; Bret D. Marsh, IN; Dr. Lee M. Myers, GA; Ms. Nancy J. Robinson, MO; Dr. Keith Roehr, CO;

Members Present: Bruce L. Akey, NY; J Lee Alley, AL; Steven L. Halstead, MI; William L. Hartmann, MN; James W. Leafstedt, SD; Bret D. Marsh, IN; Dr. Lee M. Myers, GA; Ms. Nancy J. Robinson, MO; Dr. Keith Roehr, CO;

Committee Chair Participants: Amelita Facchiano, TX; Robert Tully, KS; Daniel Lafontaine, SC; Scott Wells, MN; James Watson, MS

AAVLD Participants: Barbara Powers, CO; Donal O’Toole, WY; Alex Ardans, CA; Bruce Akey, NY

The Committee met February 26-27 in Washington, D.C., jointly with the American Association of Veterinary Laboratory Diagnosticians (AAVLD). A total of 17 members and guests attended, though some were unable to attend due to weather and travel problems. On February 26, the meeting convened at the American Veterinary Medical Association offices.

Dr. Steven Sundlof, Center for Veterinary Medicine (CVM), Food and Drug Administration (FDA), addressed the group on a number of topics. First was bovine spongiform encephalopathy (BSE). The CVM is committed to publishing a final rule on BSE but is still wading through some 850 comments received on the rule. Many comments accused FDA of underestimating the economic and environmental impacts of the rule, including the major issue of carcass disposal and disposal of additional banned materials. There is concern especially if rendering disappears as an option for disposal and other disposal options have not been identified. The final rule will include provision for time to come into compliance prior to the implementation of the rule and for the development of alternative disposal methods.

Second was the National Antimicrobial Resistance
Monitoring System (NARMS). The NARMS is part of the national public health surveillance system focused on the development of antimicrobial resistance in enteric bacteria of human and animal health significance. It is a collaboration at the federal level between the FDA, the Centers for Disease Control and Prevention (CDC) and the U.S. Department of Agriculture (USDA). Data collected describe the extent and temporal distribution of resistance, is used as a platform for research and helps inform FDA's decisions on approval of veterinary and human antimicrobial drugs. One particular focus of NARMS is tracking changes in resistance for pathogens such as Salmonella in cattle, chickens, turkeys and swine to drugs such as Ceftiofur which are the last, best treatment of choice for some human infections. Ceftiofur resistance rose markedly in cattle and chicken Salmonella isolates from 1997-2005. The National Antimicrobial Resistance Monitoring Service (NARMS) data also reveal shifts in the most prevalent species of Salmonella over time. The NARMS annual report is available on the CVM website, www.fda.gov/cvm.

Third was the Minor Use/Minor Species (MUMS) Act. Like the Orphan Drug Act for human drugs, the MUMS provides a pathway to bring drugs for minor species or uncommon diseases to market. It includes a provision for Conditional Approval of a drug so that it can be brought to market based on safety data alone so that effectiveness data can be gathered from the marketplace. Not all aspects of the MUMS are in effect yet, the final rule on Conditional Approval for example is due in February of 2008. Guidance documents for industry are in preparation, there will be a grants program developed and the MUMS Office will be conducting stakeholder outreach and minor use determinations.

The fourth topic was Integrated Consortium of Laboratory Networks (ICLN). The ICLN is comprised of laboratories from multiple federal agencies including the Food Emergency Response Network (FERN, some 134 labs) of the FDA. A counterterrorism exercise is being planned in conjunction with the USDA labs in the ICLN. The goals of the ICLN are to heighten food defense awareness and identify gaps in testing capabilities.

Finally, Dr. Sundlof addressed the Cloning Risk Assessment. The CVM is also tasked with evaluating the safety of meat and milk from cloned animals and their offspring for use as food. In general cloning is being viewed like other assisted reproductive technologies but a moratorium remains in effect until the risk assessment is concluded. No timeline was given for this effort.
The Department of Homeland Security (DHS) presented a number of speakers and topics to the Committee, highlighting the current structure and initiatives of DHS. Tam Garland, Science and Technology (S&T) presented the S&T Mission, which is to protect the homeland by providing Federal and local officials with state-of-the-art technology and other resources. This includes development of systems, equipment, protocols, training procedures, assessment methods, technical standards to prevent, detect and mitigate attacks. In the Agriculture Security arena, the goal is to determine diseases of high risk, and develop diagnostic assays, vaccine and other countermeasures to overcome these risks. These diseases are identified as foot and mouth disease (FMD), classical swine fever (CSF), avian influenza (AI) and Rift-valley fever (RVF). Assays and training for high throughput testing for FMD through the National Animal Health Laboratory Network (NAHLN) has been done in two laboratories. FMD vaccines are being investigated and production planned for 2007-8. On-going FAD work at Plum Island on Agriculture Security; New Director interviews in progress; working with USDA and Lawrence Livermore National Laboratory on research of new assays and vaccines. DMS working with the National Center for Foreign Animal and Zoonotic Disease Defense centered at Texas A and M and Food Protection and Defense Center of Excellence at the University of Minnesota. On-going development of the Plan for the National Bio- and Agro-Defense Facility (NBAF) is underway.

Willie Johnson and David Ostlund, discussed DHS' Grants and Training (G&T). The G&T training program identifies gaps in training, fills those gaps, builds ‘train the trainer’ programs, measures competence and builds partnerships. To-date, 1,377,713 responders trained and another 5,700,000 need training. With training partners, courses and modules have been developed. Some courses approved by USDA prior to release, others in progress of development. Training ToolKit developed at website FirstResponderTraining.gov. This has course templates and guides, and “lessons learned” after action reports. The G&T also incorporates the National Preparedness Goal to achieve and sustain risk-based target levels of capability to prevent, protect against, respond to and recover from major events. Within the Target Capabilities list is Food and Agriculture Safety and Defense. G&T directs Homeland Security grants and has provided billions to state and national programs. Equipment
REPORT OF THE COMMITTEE

grants related to agriculture available. There is also a Homeland Security Exercise and Evaluation Program that coordinates, plans, delivers and evaluates exercises. Another program is the Homeland Security Preparedness Technical Assistance Program.

Jeff Grode, provided an overview on Customs Border and Patrol (CBP). CBP does Agriculture Inspections, transferred from USDA to DHS in 2002. Agriculture Specialists develop and implement programs and policies to prevent pests and diseases from being introduced. It is estimated that 1,872 inspectors are needed at ports of entry and DHS has 400 vacancies short of this goal. The Agriculture Specialists inspect, seize and issue violations, as well as conduct special operations to uncover smuggling operations. They work with USDA, Fish and Wildlife Services (FWS), FDA and CDC to develop rules and share data. Compared to 2004, the number of interceptions has increased by 16 percent, averaging 4,500 intercepts a day.

The Committee met in the afternoon with the Animal Ag Coalition (AAC). John Adams presented a new title for the Farm Bill on Emergency Management. AAC intends to propose authorization of following items (below). Comments from USAHA/AAVLD Chairs should be as soon as possible to provide feedback to John Adams. The following items are included in the new subtitle for the bill.

- Food sector continuity of business all hazard national demonstration project to DHS, to be coordinated by USDA-APHIS.
- Coordinated livestock mortality and specified risk material (SRM) disposal plan, with Secretary of Ag's authority.
- USDA to provide funding for demonstration projects to provide disposal options from livestock mortality.
- Adequate funding to modernize labs under National Animal Health Lab Network (NAHLN). Suggest funding come through APHIS not the Cooperative State Research, Education and Extension Service (CSREES).
- Enhance National Veterinary Stockpile to inventory and deliver vet supplies within 24 hours emergency in case of foreign animal disease agents
- Research initiative on development and commercialization of vaccines and antivirals.
GOVERNMENT RELATIONS

against foreign animal diseases, including APHIS, ARS, and DHS resources at Plum Island.

- Ensure that current research and development activities conducted at Plum Island be continued in future laboratory facility
- New Current Research Information System (CRIS) project for ARS to perform research related to contamination of food and dairy products.
- Permanently fund Food Animal Residue Avoidance Database (FARAD) by CSREES.
- National Animal Health Emergency Management Center in APHIS.
- Direct CSREES to implement the National Veterinary Medical Service Act to attract young veterinarians in food animal veterinary practice in shortage areas.
- National indemnification and insurance program to insure producers can sustain operations in case of foreign animal disease outbreak.
- Increased operational support for the National Veterinary Services Laboratory (NVSL) to support animal health.

For 2007 Budgets, Adams shared that Continuing Resolution was passed, with $12 million for Johne’s Disease to APHIS. The group discussed veterinary workforce expansion. Brian Smith indicated that the bill is to be presented in Congress this week titled the Veterinary Public Health Workforce Expansion Act, a new name with $150 million per year for 10 years. The goal to is train more veterinarians in veterinary schools to increase capacity. As a point of interest, the AAVMC Symposium has been scheduled at CDC in April 2007. Details to follow.

Regarding AAC 2007 Budget priorities, because the continuing resolution just passed, and agencies have not yet made decisions regarding funds decisions. AAC will be evaluating this.

On the President’s 2008 Budget proposals, Congress plans to ignore and add earmarks which leaves too many questions to provide further discussion.

Drs. Caird Rexroad and Steve Kappes addressed the GRC this year on behalf of the Agriculture Research Service (ARS). Dr. Cyril Gay was on the road and not available. Dr. Rexroad reported
that the FY07 budget for ARS is flat. There will be no new construction during this period. The National Centers for Animal Health’s BSL-3Ag building for large animal containment is coming on line. There is concern in ARS that so much of its budget consists of earmarks (~$200M added since 2001 as ‘earmarks’)- this part of its budget is vulnerable as the president wants to redirect earmarks. A handout was passed out that contained ARS’s budget for FY2008. Its request was for a budget of $1.128B. The Office of Management and Budget (OMB) suggests this be cut by $212M. The emphasis of ARS will be on functional genomics, HPAI, FMD and the TSEs on animal side.

Dr. Kappes reported that Dr. Rob Heckert has left to work with a private company. The position has been advertised and should be filled by Oct 2007. ARS reduced the number of focused diseases from 56 to 49. Current focus areas are immune modulators and innate immunity; host and pathogen genomes; neonatal immunity and colostral interference; virulence factors esp. in diseases such as CSF; validation of an FMD vectored vaccine; improvement of diagnostic assays for Asia strains of H5N1; pre- and post-harvest food safety.

The attendees asked several questions of Drs. Rexroad and Kappes:
Q: Can ARS scientific personnel write competitive grants?
A: Yes, they can now. This used to be discouraged as double dipping for federal support, but is not currently. It is considered a good learning experience.
Q: How does ARS see the current push in congress to have a single food safety agency?
A: This was not answered directly - ARS sees animals as multipliers of organisms, and maintains an interest in both plants and animals in food safety. No statement was made about the desirability of a single food safety agency, but it might be difficult to deliver due to the number of agencies involved and differences in culture.
Q: How much BSL-3Ag space does ARS need? Can ARS partner with states in developing BSL-3 space?
A: Legally, ARS can’t mix federal funds with state funds to create BSL-3 space. It can however lease state BSL-3 space and can also build adjacent to state facilities. ARS has not quantified the amount of BSL-3Ag space it needs. It now has space in the new National Centers for Animal Health (NCAH). The next set of BSL-3Ag space will be in whatever replaces the Foreign Animal
GOVERNMENT RELATIONS

Disease Diagnostic Laboratory (FADDL) (i.e., NBAF), and in the southeast poultry research center.

Q: ARS was asked to clarify the difference between a project and a program review.
A: A project review is comparable to a grant proposal. ARS project reviews are done for the most part by academics and are generally prospective and follow the National Institutes of Health (NIH) model. Animal health program reviews are retrospective assessments of past accomplishments. This is done by a 50/50 split of stakeholders and scientists.

Q: What is holding up the development of the perfect FMD vaccine?
A: Several answers were given: absence of facilities in which to do the animal work (NBAF is ‘10 years away’); there is a delay in getting the product to market since there must be a pass on to a private company of ARS test vaccine; there are substantial scientific challenges including the number of FMD strains; need to use immunomodulators; species differences; carrier state of vaccinated animals.

On Tuesday, February 7 convened at the U.S. Department of Agriculture’s Whitten Building.

Drs. Mark Robinson and Gary Sherman presented information on the Cooperative State Research, Education and Extension Service (CSREES). Also attending was Ralph Ott, Assoc. Administrator, CSREES. Sherman reported on the FY 2007 budget, saying there will be no earmarks in this budget. This will “zero out” the minor use animal drug program as well as FARAD. There will be a one year bump up in the Hatch line item of $180 million and how this is handled will be at the direction of the Experiment Station directors. Regarding the National Veterinary Medical Services Act (NVMSA): there is $495,000 appropriated for FY ’07 while the NAHLN has $9.9 million to be divided between plants and animals. Sherman detailed how a working group was assembled and has been discussing some innovative ideas to distribute this funding as soon as possible. Phase 1 will be temporary until Phase 2 rules can be written. Phase 1 is under legal review and, if approved, there may be some recipients within the year but he was not at liberty to allow us to make these plans public yet.

Dr. Curt Mann, Deputy Undersecretary, Office of Food
Safety, USDA, addressed the group next. He spoke of his recent experience as chair of the Government Coordinating Council (GCC). Former Secretary of Homeland Security Tom Ridge often stated that “you can’t do homeland security from DC” and Curt has used this as his philosophy also. After September 11, agriculture wasn’t even on the table but currently agriculture has been recognized as part of the national security apparatus of the country and this is a huge change. Unfortunately, for food and agriculture, 100% of the infrastructure is privately owned which makes protecting it very difficult. The Sector Coordinating Council was therefore formed to delve into these issues.

As chair of the GCC, Curt made some changes to the charter and set some strategic goals which allowed some short term gains so people could feel good about progress. The 2006 goals set for the SCC were to improve 2-way communication to industry and state, clarify what are agriculture and food systems and discuss continuity of business operations. He mentioned CARVER shock assessments.

Lee Myers asked that now that the chair has changed to FDA, who do we turn to for assistance? David Acheson is the point of contact. It might be helpful to have a meeting with him and Jeremy Stumpf in the Secretary’s office. Rich Breitmeyer noted that the model of CDC and state health agencies should be adopted by DHS for state agriculture agencies and Curt responded that the funding for now will continue to flow through DHS. Curt also stated that the contact for us should be the infrastructure protection section of DHS noting that Sebastian Heath has been detailed there as a USDA liaison to staff up the food and agriculture desk. Somehow, states need to be more involved and Greg Christie from Florida has been detailed up to DC to work at DHS. We may want to meet with him at some point also. USAHA and AAVLD should actively support the continuation of this position.

Dr. Beth Lautner, NVSL, presented an update on NVSL. She reported that the Deputy Director position for NVSL is about to be announced. Also, they will be hiring an LPA person on March 19.

At Plum Island Animal Disease Center (PIADC), Tom McKenna is FADL leaving to take a position in Wisconsin and they are advertising for a new director. In the interim, they will be rotating heads filled by the current staff. The partnership with DHS
is moving forward on selecting a new head of the PIADC.

On the National Bio and Agro Defense Facility (NBAF) site selection, the list has been narrowed down to 18 sites and they will all be visited in May. These will be further narrowed down to 2-3 sites by July after which environmental impact statements will need to be done and the current timetable is to announce a final selection by October 2008 with construction to begin in 2010, becoming operational in 2013.

Beth provided a handout provided on NCAH VS Memo 580.4 will be updated to allow NAHLN labs to conduct screening tests with final testing to still be done at Ames. ISO 1725 certification was recently achieved by NVSL.

The NAHLN review is underway and the plans are for this to be completed by the annual meeting in Reno. The goal continues to be a NAHLN lab with BSL 3 Ag space in all 50 states.

Dr. Heidi Schleicher, NAHLN, provided more information regarding the NAHLN, and some of its initiatives with improving its information technology resources. Schleicher also provided an update on surveillance activities, such as with BSE

Dr. David Goldman, Acting Administrator, Food Safety Inspection Service (FSIS), USDA addressed the Committee. FSIS is developing methodology to begin risk-based inspections of meat and poultry processing plants. All plants would continue to be visited daily, however, the inspection time and intensity at each plant would be based on plant regulatory compliance and the type products produced. The concept will be evaluated at 250 plants beginning in April 2007. This new concept is not applicable to slaughter plants.

A baseline study for the presence of \textit{E. coli} 0157:H7 in raw ground beef components (i.e. beef trim) has been completed. A baseline study is starting for qualitative and quantitative presence of \textit{Salmonella} and \textit{Campylobacter} on chicken broiler carcasses.

A public health data system is being developed which will dedicate resources to analyze existing data (e.g. PulseNet, FoodNet, etc.) to create a “dashboard” of pertinent information for management personnel.

State meat and poultry inspection programs are considered important partners to FSIS. It is anticipated there will be an increase in FY 2007 funding for state programs.

The need for lifting the prohibition against state inspected meat and poultry products shipped interstate was discussed
REPORT OF THE COMMITTEE

extensively. Committee members explained this statutory prohibition needs to be removed based on a very comprehensive review of all state programs during the last three years and an USDA report to the U.S. Congress that state programs are considered “at least equal to” the federal program.

Dr. Jose Diez, Associate Deputy Administrator, USDA-APHIS-VS, along with his associate Dr. John Slack, next met with the Committee.

Diez addressed 2006 USAHA Resolution 6: Continuity of Business Plan. Jose indicated that he met with John Adams of the AAC and that he is on board with the concept of COBP that will be put forth by the AAC.

Regarding the ESF 11 rewrite, all hazards approach, VS will be involved in pet rescue but are they going to be involved in all animals, all hazards? Who does it, who pays? It seems from Jose’s comments that these important issues have yet to be sorted out. Resolution 7 was discussed and the issue of how much DHS will be involved and who will be in charge. VS Animal Care will take leadership on the pet rescue.

Diez discussed the coordination of test exercises: He related that this was one of his major initiatives, to attempt to put some coordination and sense into the test exercise process. He told us that CAN was due to conduct 60 AI exercises around the country but when they modeled the “game” they had proposed to use, the participants were not impressed so they’re going back to the drawing board. It’s the role of the AEC’s to make the AVIC’s and the state vets aware of exercises and training so we can tap into these opportunities. Yet the frustration at the state level is that there is a need for people to do the work! Many of us need bodies. There will be three more AEC’s per region next year. Keith reported that the performance measures for the AEC’s are great but that the NAHEMS guidelines are not being followed.

Secretary of Agriculture Mike Johanns took a moment to hear key concerns from USAHA and AAVLD. The group limited our discussion to the funding stream for the NAHLN which currently goes through CSREES. Secretary Johanns asked Dr. DeHaven to convene a working group with the CSREES folks to discuss the issue and report back to him.

Drs. John Clifford and Ron DeHaven reviewed budget
expectations for FY 2007, based upon the passage of Continuing Resolution, and the removal of all earmarked items. They shared that the APHIS budget is estimated at $842 million, including money designated for avian influenza. The loss of earmarked funding results in $16 million in cuts for Veterinary Services (VS). Clifford shared a list of programs that are impacted by this loss, and their funding amounts. They would be submitting the spending plan within 30 days. The funding process with the Office of Management and Budget was also explained, citing programs such as Johne’s as an example.

The National Centers for Animal Health, Ames, Iowa, operation funding was discussed. Clifford indicated that the operating budget is included in the 2008-2009 requests, and shared among participating agencies.

The process of Cooperative Agreements with USDA was brought up, noting some of the challenges in the application process. Members asked for more support in simplifying the process, and also indicated that the training and templates provided by USDA are useful. Also, opportunities for cross-collaboration on projects needs to be assessed from a big-picture perspective.

The NBAF was further discussed, following up on Dr. Lautner’s information. Clifford and DeHaven indicated that any strategic input on the facility can be sent to their attention. The budget proposal is $450 million, which includes all aspects of the facility. DHS is expected to have a growing role in the center, including research. The concern about FMD testing in the new facility was discussed, and a change in laws regarding its presence on the mainland.

Members inquired about the national plan for the generic database and its evolution. Clifford indicated he would set up a conference call with the National Assembly, USAHA and AAVLD to share their status and goals. The need for federal information technology support was stressed. VS has a strategic plan forthcoming, to address areas of surveillance, rapid detection and rapid response. Data portability is a key concern for the laboratories, referencing the database process used in the exotic Newcastle disease outbreak in California. A need for a federal champion of this project was identified.

DeHaven and Clifford noted that animal ID is still a priority for the Secretary, and the administration is committed to the program.
REPORT OF THE COMMITTEE ON IMPORT-EXPORT

Chair: Dr. Charles E. Brown, II, DeForest, WI
Vice Chair: George O. Winegar, Howell, MI

Dan Baker, CO; Bob H. Bokma, MD; Suzanne L. Burnham, TX; Tim R. Cordes, MD; Linda A. Detwiler, NJ; Mark Engle, TN; William H. Fales, MO; Bob Frost, CA; Chester A. Gipson, MD; Mara Elma E. Gonzalez, ; Percy W. Hawkes, UT; Steven G. Hennager, IA; Robert B. Hillman, NY; Robert Hilsenroth, PA; Donald E. Hoenig, ME; Robert F. Kahrs, FL; Oscar Kennedy, VA; Ralph C. Knowles, FL; Elizabeth A. Lautner, IA; Jay C. Lemmermen, FL; Amy W. Mann, DC; Richard D. Mitchell, CT; Lee M. Myers, GA; Elizabeth J. Parker, DC; James E. Pearson, IA; Kelly R. Preston, TX; Gerardo Quaassdorff, VT; Paul E. Rodgers, CO; Susan W. Tellez, TX; Lynn Anne Tesar, SD; Lee Ann Thomas, MD; Peter J. Timoney, KY; Charles D. Vail, CO; James A. Watson, MS; Gary M. Weber, MD; David W. Winters, TX; Cindy B. Wolf, MN.

The Committee met at 8:00 a.m., Wednesday, October 24 at John Ascuaga’s Nugget Hotel, Reno, Nevada. There were 28 members and guests in attendance. Committee Vice-Chair George Winegar chaired the meeting in the absence of Chair Charles Brown, who was unable to attend.

The program consisted of an update of the United States Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services, National Center for Import and Export. The report included import and export statistics for the fiscal year 2007. Tables of the data are included in this report.

The Committee approved four Resolutions to be submitted to the Committee on Nominations and Resolutions.
Annual Report to USAHA
FY 2007
National Center for Import and Export
Dr. Jacek Taniewski
Assistant Director
Export Animals
## Aquaculture Imports
**FY 2005 - 2007**

<table>
<thead>
<tr>
<th></th>
<th>FY05</th>
<th>FY06</th>
<th>FY07</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fish Eggs</td>
<td>0</td>
<td>0</td>
<td>4,554</td>
</tr>
<tr>
<td>Fish Live</td>
<td>5,500</td>
<td>0</td>
<td>13,241,962</td>
</tr>
</tbody>
</table>

---

## Aquaculture Exports
**FY 2005 - 2007**

<table>
<thead>
<tr>
<th></th>
<th>FY05</th>
<th>FY06</th>
<th>FY07</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fish Eggs</td>
<td>145,906,179</td>
<td>195,117,836</td>
<td>279,415,760</td>
</tr>
<tr>
<td>Fish Live</td>
<td>15,427,862</td>
<td>15,068,897</td>
<td>7,484,269</td>
</tr>
</tbody>
</table>
### Bison Imports From Canada
**FY 2005 - 2007**

<table>
<thead>
<tr>
<th></th>
<th>FY05</th>
<th>FY06</th>
<th>FY07</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feeder then direct to Slaughter</td>
<td>56</td>
<td>3,565</td>
<td>3,941</td>
</tr>
<tr>
<td>Immediate Slaughter</td>
<td>850</td>
<td>8,460</td>
<td>15,160</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>906</td>
<td>12,025</td>
<td>19,101</td>
</tr>
</tbody>
</table>

### Bison Exports
**FY 2005 - 2007**

<table>
<thead>
<tr>
<th></th>
<th>FY05</th>
<th>FY06</th>
<th>FY07</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Mexico</td>
<td>0</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>0</td>
<td>7</td>
<td>2</td>
</tr>
</tbody>
</table>
### Camelid Exports
#### FY - 2007

<table>
<thead>
<tr>
<th>Country</th>
<th>FY07</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mexico</td>
<td>224</td>
</tr>
<tr>
<td>Canada</td>
<td>47</td>
</tr>
<tr>
<td>Rest</td>
<td>14</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>285</strong></td>
</tr>
</tbody>
</table>

### Camelid Imports
#### FY - 2007

<table>
<thead>
<tr>
<th></th>
<th>FY07</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada</td>
<td>688</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>688</strong></td>
</tr>
</tbody>
</table>

Source: USDA - Import/Export Animals Staff
## Poultry Imports FY 2005 - 2007

<table>
<thead>
<tr>
<th></th>
<th>FY05</th>
<th>FY06</th>
<th>FY07</th>
</tr>
</thead>
<tbody>
<tr>
<td>Live Poultry</td>
<td>17,595,266</td>
<td>15,106,633</td>
<td>12,220,533</td>
</tr>
<tr>
<td>Hatching Eggs</td>
<td>15,759,279</td>
<td>17,514,916</td>
<td>21,643,678</td>
</tr>
<tr>
<td>Commercial Birds</td>
<td>186,605</td>
<td>172,429</td>
<td>452,188</td>
</tr>
</tbody>
</table>

Source: CRIS/CACFA, Fort Collins, CO

## Poultry Exports FY 2005 - 2007

<table>
<thead>
<tr>
<th></th>
<th>FY05</th>
<th>FY06</th>
<th>FY07</th>
</tr>
</thead>
<tbody>
<tr>
<td>Live Poultry</td>
<td>37,276,029</td>
<td>30,817,881</td>
<td>35,751,797</td>
</tr>
<tr>
<td>Hatching Eggs</td>
<td>70,800,222</td>
<td>71,298,721</td>
<td>81,948,342</td>
</tr>
<tr>
<td>Day-old Chicks</td>
<td>37,911,553</td>
<td>29,703,249</td>
<td>25,332,751</td>
</tr>
</tbody>
</table>

Source: CRIS/CACFA, Fort Collins, CO
### Cervine Imports from Canada
#### FY 2005 - 2007

<table>
<thead>
<tr>
<th></th>
<th>FY05</th>
<th>FY06</th>
<th>FY07</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deer - Live</td>
<td>15</td>
<td>274</td>
<td>292</td>
</tr>
<tr>
<td>Deer - Semen</td>
<td>296</td>
<td>52</td>
<td>296</td>
</tr>
<tr>
<td>Elk - Live</td>
<td>79</td>
<td>1162</td>
<td>957</td>
</tr>
<tr>
<td>Elk - Semen</td>
<td>1,432</td>
<td>146</td>
<td>0</td>
</tr>
</tbody>
</table>

### Cervine Exports
#### FY 2005 - 2007

<table>
<thead>
<tr>
<th></th>
<th>FY05</th>
<th>FY06</th>
<th>FY07</th>
</tr>
</thead>
<tbody>
<tr>
<td>México (Elk and Deer)</td>
<td>200</td>
<td>176</td>
<td>176</td>
</tr>
<tr>
<td>Honduras (Elk and Deer)</td>
<td>0</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Canada (Elk and Deer)</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>290</td>
<td>179</td>
<td>179</td>
</tr>
</tbody>
</table>
### Equine Live Animal Imports

<table>
<thead>
<tr>
<th>Country</th>
<th>FY 05</th>
<th>FY 06</th>
<th>FY 07</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada</td>
<td>32,406</td>
<td>25,928</td>
<td>19,027</td>
</tr>
<tr>
<td>Mexico</td>
<td>3,087</td>
<td>3,438</td>
<td>2,966</td>
</tr>
<tr>
<td>Netherlands</td>
<td>2,436</td>
<td>2,527</td>
<td>2,065</td>
</tr>
<tr>
<td>Germany</td>
<td>1,453</td>
<td>1,608</td>
<td>1,444</td>
</tr>
<tr>
<td>Argentina</td>
<td>901</td>
<td>897</td>
<td>905</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td>40,283</td>
<td>34,398</td>
<td>26,407</td>
</tr>
</tbody>
</table>

**Source:** USDA, Import-Export Animals Staff

### Equine Live Animal Imports
#### Top 5 Countries-FY 2007

![Bar chart showing the top 5 countries for equine live animal imports in FY 2007.](chart)

**Source:** USDA, Import-Export Animals Staff
# Equine Live Animal Exports

<table>
<thead>
<tr>
<th></th>
<th>FY 05</th>
<th>FY 06</th>
<th>FY 07</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada</td>
<td>45,375</td>
<td>48,145</td>
<td>54,352</td>
</tr>
<tr>
<td>Mexico</td>
<td>13,673</td>
<td>16,557</td>
<td>32,136</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>1,055</td>
<td>1,092</td>
<td>1,064</td>
</tr>
<tr>
<td>Venezuela</td>
<td>455</td>
<td>758</td>
<td>750</td>
</tr>
<tr>
<td>Ireland</td>
<td>355</td>
<td>472</td>
<td>646</td>
</tr>
<tr>
<td>Totals</td>
<td>60,913</td>
<td>67,024</td>
<td>88,948</td>
</tr>
</tbody>
</table>

Source: USDA - Foreign Agricultural Service

---

# Equine Live Animal Exports

<table>
<thead>
<tr>
<th></th>
<th>FY 05</th>
<th>FY 06</th>
<th>FY 07</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada</td>
<td>45,375</td>
<td>48,145</td>
<td>54,352</td>
</tr>
<tr>
<td>Mexico</td>
<td>13,673</td>
<td>16,557</td>
<td>32,136</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>1,055</td>
<td>1,092</td>
<td>1,064</td>
</tr>
<tr>
<td>Venezuela</td>
<td>455</td>
<td>758</td>
<td>750</td>
</tr>
<tr>
<td>Ireland</td>
<td>355</td>
<td>472</td>
<td>646</td>
</tr>
<tr>
<td>Totals</td>
<td>60,913</td>
<td>67,024</td>
<td>88,948</td>
</tr>
</tbody>
</table>

Source: USDA - Foreign Agricultural Service
IMPORT-EXPORT

Equine Live Animal Exports
Top 5 Countries-FY 2007

<table>
<thead>
<tr>
<th>Country</th>
<th>Exports</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada</td>
<td>64,582</td>
</tr>
<tr>
<td>Mexico</td>
<td>22,130</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>6,064</td>
</tr>
<tr>
<td>Venezuela</td>
<td>750</td>
</tr>
<tr>
<td>Ireland</td>
<td>646</td>
</tr>
</tbody>
</table>

Source: CEM, USDA, Fort Collins, CO

---

Equine Embryos Imported
Top 5 Countries-FY 2007

<table>
<thead>
<tr>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada</td>
</tr>
<tr>
<td>Netherlands</td>
</tr>
<tr>
<td>United Kingdom</td>
</tr>
</tbody>
</table>

Source: CEM, USDA, Fort Collins, CO
REPORT OF THE COMMITTEE

Equine Embryos Exported
Top 5 Countries-FY 2007

Equine Semen Imported
Top 5 Countries-FY 2007

Source: USDA, Import-Export Animals Staff.
Equine Semen Exported
Top 5 Countries-FY 2007

Canada Feeder Cattle
Imported by Port - FY 2007

<table>
<thead>
<tr>
<th>Port</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dunseith, ND</td>
<td>98,743</td>
</tr>
<tr>
<td>Eastport, ID</td>
<td>20,077</td>
</tr>
<tr>
<td>Niagara Falls, NY</td>
<td>3,012</td>
</tr>
<tr>
<td>Crossville, WA</td>
<td>25,301</td>
</tr>
<tr>
<td>Pembina, ND</td>
<td>59,070</td>
</tr>
<tr>
<td>TOTAL</td>
<td>381,891</td>
</tr>
</tbody>
</table>

Source: USDA, Import-Export Animals Staff
# REPORT OF THE COMMITTEE

## Mexico Feeder Cattle Imported by Port - FY 2007

<table>
<thead>
<tr>
<th>Port</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Columbus</td>
<td>3,185</td>
</tr>
<tr>
<td>Del Rio</td>
<td>126,309</td>
</tr>
<tr>
<td>Douglas</td>
<td>31,431</td>
</tr>
<tr>
<td>Eagle Pass</td>
<td>117,130</td>
</tr>
<tr>
<td>El Paso</td>
<td>258,320</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Port</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hidalgo</td>
<td>103,071</td>
</tr>
<tr>
<td>Laredo</td>
<td>45,320</td>
</tr>
<tr>
<td>Nogales</td>
<td>142,175</td>
</tr>
<tr>
<td>Presidio</td>
<td>116,632</td>
</tr>
<tr>
<td>San Luis</td>
<td>19,238</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>1,014,809</td>
</tr>
</tbody>
</table>

Source: USDA - Import/Export Animal Staff

## Canada Slaughter Cattle Imported by Port - FY 2007

<table>
<thead>
<tr>
<th>Port, State</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alexandria, NY</td>
<td>43,242</td>
</tr>
<tr>
<td>Champlain, NY</td>
<td>1,800</td>
</tr>
<tr>
<td>Detroit, MI</td>
<td>5,959</td>
</tr>
<tr>
<td>Dunseith, ND</td>
<td>42,692</td>
</tr>
<tr>
<td>Eastport, ID</td>
<td>283,484</td>
</tr>
<tr>
<td>Highgate Springs, VT</td>
<td>15,179</td>
</tr>
<tr>
<td>Houlton, ME</td>
<td>493</td>
</tr>
<tr>
<td>Niagara Falls, NY</td>
<td>39,041</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Port, State</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oroville, WA</td>
<td>8,003</td>
</tr>
<tr>
<td>Pembina, ND</td>
<td>26,303</td>
</tr>
<tr>
<td>Port Huron, MI</td>
<td>94</td>
</tr>
<tr>
<td>Port, ND</td>
<td>63,406</td>
</tr>
<tr>
<td>Raymond, MT</td>
<td>9,545</td>
</tr>
<tr>
<td>Sumas, WA</td>
<td>1,364</td>
</tr>
<tr>
<td>Swantown, MI</td>
<td>251,124</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>784,988</td>
</tr>
</tbody>
</table>

Source: USDA - Import/Export Animal Staff
SEMEN & EMBRYO IMPORTS
FY 2007

<table>
<thead>
<tr>
<th>SPECIES</th>
<th>EMBRYO</th>
<th>SEMEN</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bovine</td>
<td>1,794</td>
<td>5,620,074</td>
<td>5,621,868</td>
</tr>
<tr>
<td>Caprine</td>
<td>0</td>
<td>266</td>
<td>266</td>
</tr>
<tr>
<td>Caprine</td>
<td>0</td>
<td>256</td>
<td>256</td>
</tr>
<tr>
<td>Equine</td>
<td>3</td>
<td>18,182</td>
<td>18,185</td>
</tr>
<tr>
<td>Donkey</td>
<td>0</td>
<td>1,616</td>
<td>1,616</td>
</tr>
<tr>
<td>Porcine</td>
<td>0</td>
<td>76,834</td>
<td>76,834</td>
</tr>
<tr>
<td>Totals</td>
<td>1,797</td>
<td>5,717,261</td>
<td>5,719,058</td>
</tr>
</tbody>
</table>

Bovine Semen and Embryos
Imported FY 2005-2007

Source: CRIS/CARD, Fort Collins, CO
REPORT OF THE COMMITTEE

Bovine Semen Imported
Top 5 Countries-FY 2007

Bovine Embryos Imported
Top 5 Countries-FY 2007

Source: CRIS/CARDA, Fort Collins, CO
REPORT OF THE COMMITTEE

Equine Semen and Embryo Imports
FY 2005-2007

Ovine Semen and Embryo Imports
FY 2005-2007
IMPORT-EXPORT

Porcine Semen and Embryo Imports FY 2005-2007

SEMEN & EMBRYO EXPORTS FY 2007

<table>
<thead>
<tr>
<th>SPECIES</th>
<th>EMBRYO</th>
<th>SEMEN</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bovine</td>
<td>47,976</td>
<td>12,645,791</td>
<td>12,693,767</td>
</tr>
<tr>
<td>Caprine</td>
<td>0</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Ovine</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Equine</td>
<td>22</td>
<td>42,730</td>
<td>42,752</td>
</tr>
<tr>
<td>Porcine</td>
<td>227</td>
<td>18,882</td>
<td>19,109</td>
</tr>
<tr>
<td>Totals</td>
<td>48,225</td>
<td>12,707,427</td>
<td>12,755,652</td>
</tr>
</tbody>
</table>
REPORT OF THE COMMITTEE

Bovine Semen and Embryo Exports FY 2005-2007

Caprine Semen and Embryo Exports FY 2005-2007
Cervine Semen and Embryo Exports FY 2005-2007

Equine Semen and Embryo Exports FY 2005-2007
REPORT OF THE COMMITTEE

Ovine Semen and Embryo
Exports FY 2005-2007

![Graph showing Ovine Semen and Embryo Exports FY 2005-2007]

Porcine Semen and Embryo
Exports FY 2005-2007

![Graph showing Porcine Semen and Embryo Exports FY 2005-2007]
# Bovine Exports

**Top 5 Countries of FY2007**

<table>
<thead>
<tr>
<th>Country</th>
<th>FY 2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada</td>
<td>17,220</td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td>8,520</td>
</tr>
<tr>
<td>Mexico</td>
<td>4,565</td>
</tr>
<tr>
<td>Morocco</td>
<td>1,105</td>
</tr>
<tr>
<td>Honduras</td>
<td>255</td>
</tr>
</tbody>
</table>

# Caprine Exports

**Top 5 Countries of FY2007**

<table>
<thead>
<tr>
<th>Country</th>
<th>FY 2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mexico</td>
<td>20,603</td>
</tr>
<tr>
<td>Canada</td>
<td>167</td>
</tr>
<tr>
<td>The Bahamas</td>
<td>36</td>
</tr>
<tr>
<td>Guyana</td>
<td>35</td>
</tr>
<tr>
<td>Dominican Republic</td>
<td>33</td>
</tr>
</tbody>
</table>
### Ovine Exports
**Top 5 Countries of FY2007**

<table>
<thead>
<tr>
<th>Country</th>
<th>FY 2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mexico</td>
<td>142,355</td>
</tr>
<tr>
<td>Canada</td>
<td>23,954</td>
</tr>
<tr>
<td>Jamaica</td>
<td>94</td>
</tr>
<tr>
<td>Bahamas</td>
<td>44</td>
</tr>
<tr>
<td>Ecuador</td>
<td>3</td>
</tr>
</tbody>
</table>

### Porcine Exports
**Top 5 Countries of FY2007**

<table>
<thead>
<tr>
<th>Country</th>
<th>FY 2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mexico</td>
<td>126,055</td>
</tr>
<tr>
<td>Canada</td>
<td>1,536</td>
</tr>
<tr>
<td>Republic of Korea</td>
<td>775</td>
</tr>
<tr>
<td>Dominican Republic</td>
<td>527</td>
</tr>
<tr>
<td>Philippines</td>
<td>456</td>
</tr>
</tbody>
</table>
Zoo Animal Exports
Top 5 Countries of FY2007

<table>
<thead>
<tr>
<th>Country</th>
<th>FY 2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>China, Republic of</td>
<td>35</td>
</tr>
<tr>
<td>Canada</td>
<td>22</td>
</tr>
<tr>
<td>Spain</td>
<td>6</td>
</tr>
<tr>
<td>France</td>
<td>6</td>
</tr>
<tr>
<td>Mexico</td>
<td>2</td>
</tr>
</tbody>
</table>

Source: CEA-SCADA, Fort Collins, CO
The Bovine Viral Diarrhea Virus (BVDV) Control Subcommittee on Infectious Diseases of Cattle, Bison and Camelids met and focused its discussions on testing methodology and surveillance for BVDV in cattle and genetic variation observed in BVDV isolates from alpaca. BVDV causes both persistent and acute infections in ruminants. As persistently infected (PI) animals are the main means of introduction of BVDV to naïve populations, elimination of PI animals is a basic tenet of BVDV control/reduction efforts. The standard for positive determination of persistent infection (PI) status is two positive tests from samples collected at least three weeks apart.

Dr. Robert Fulton, Oklahoma State University, reported on a BVDV surveillance study of beef cattle conducted in 31 herds in the southwest. BVDV vaccines were used in all herds in the study. In this study more than 4,344 calves were tested, of which seven were determined to be PI. These seven animals resided in six different herds. Based on this study and previous research, Dr. Fulton reported that herds using vaccines PI animals tended to occur as single individuals rather than in groups. A commercial
antigen capture enzyme-linked immunosorbent assay (ACE) test, immunohistochemistry (IHC) and virus isolation were used in this study to confirm PI status. The ACE tests calls for soaking skin biopsy samples, most frequently ear notch samples, in phosphate buffered saline (PBS) solution for a minimum of two hours. The ACE test is then conducted on the PBS solution rather than on the skin biopsy directly. Dr. Fulton reported that freezing of the skin biopsy in the PBS prior to testing eliminated false positives. Dr. Fulton recommended, when using the ACE test, samples giving a raw optical density (OD) reading below that of the positive control provided by the manufacturer be retested. Dr. Fulton also noted in their study that increasing the primary antigen concentration used in IHC reduced false negatives. Dr. Daniel Givens, Auburn University, reported on the isolation and characterization of a BVDV isolate that could not be detected by the two monoclonal antibodies used in the commercially available ACE test and in most diagnostic laboratories doing IHC. A unique mutation in the region coding for the BVDV structural protein Erns was detected in this isolate. This isolate was detectable using a commercial ACE test that is licensed for use in Europe. This test is based on detection using a cocktail of monoclonal antibodies. The ACE test available in the United States, that failed to detect this isolate, uses just one monoclonal antibody for detection. Dr. Givens is currently screening samples submitted to the Alabama BVDV Control Program to determine the incidence of BVDV isolates that are not detected using the commercial ACE test available in the United States. Dr. Bruce Brodersen, University of Nebraska – Lincoln, reported that for the last five years 10,000 to 12,000 IHC tests per month have been conducted in his laboratory. The percentage of positive samples has been trending downward over the last three years. The percentage of samples testing positive has gone from 0.4 percent to 0.2 percent. Dr. Brodersen also reported that they have found that in rare cases nonpersistently infected cohort animals housed in herds harboring more than three percent PI animals accumulate BVDV antigen in skin that may persist over extended periods of time. These animals are not PI but may be incorrectly identified as PI. Such animals may be differentiated from true PI animals based on IHC staining patterns.

Dr. Dave Dargatz, Centers for Epidemiology and Animal Health (CEAH), Veterinary Services (VS), Animal and Plant Health Inspection Service (APHIS), U.S. Department of Agriculture (USDA), reported that the National Animal Health Monitoring System (NAHMS) will be conducting a BVDV study in cow/calf operations in 24 states. There are three components to the NAHMS study.
REPORT OF THE COMMITTEE

The first is an educational component that will introduce the goals and protocols of the NAHMS study to potential participates. This component will begin in November 2007. The second component is a questionnaire surveying vaccination practices. This component will be conducted January through March of 2008. The third component is a sampling of all spring calves born in participating herds in 2008. The testing of these samples will begin in June of 2008 and will be based on ACE tests conducted on individual ear notch samples.

Dr. Sabrina Swenson, National Veterinary Services Laboratory (NVSL), presented information on a voluntary nationwide BVDV check test. NVSL, in collaboration with the National Animal Disease Center (NADC), developed a proficiency panel for detection of BVDV. Animals positive for BVDV were identified for inclusion in the panel by two positive tests by either ACE, IHC or Polymerase Chain Reaction (PCR). At least two weeks after the initial identification, virus isolation (VI) from buffy coat was performed at NADC and all isolated viruses were genotyped based on comparison of 5' UTR data. Nine animals were selected from across the United States included genotypes 1a (1 animal), 1b (2 animals), 1a and 1b (2 animals), 2a (2 animals), and negative (2 animals). Panel samples consisted of serum or buffy coat. Thirty-two laboratory participants used the panel for BVDV detection by ACE, virus isolates (VI), and/or PCR. Overall 10 of 27 laboratories identified all samples correctly by ACE with eight of the 16 samples identified correctly by all laboratories. Three of 19 labs identified all samples correctly by VI with eight of the 16 samples identified correctly by all laboratories. Fourteen of 26 labs identified all samples correctly by PCR with eight of the 16 samples identified correctly by all labs. Laboratories consistently identified negative samples, with one false positive by ACE, two false positives (from 1 lab) by virus isolation, and no false positives by PCR.

Dr. Edward Dubovi, Cornell University, reported the results of testing 12,000 alpaca samples for the presence of BVDV. This testing occurred between January 2006 and the present. His laboratory confirmed PI in 18 alpacas (0.15 percent). In addition they detected serum neutralizing antibodies in 14 percent of 268 alpaca serology samples. Phylogenetic analysis of 43 BVDV strains isolated from alpaca in a wide geographic region reveal that 42 of
these strains could be grouped into two different genetic groups. Strains within these two groups were highly similar suggesting that the majority of BVDV outbreaks examined in this study could be traced to one of two point source. The one exception was a strain isolated from an alpaca residing in Canada. The results suggest that eradication of BVDV from alpacas is achievable via testing and elimination of infected animals and that vaccination is counter indicated as it would preclude surveillance for reintroduction of BVDV by serology.

Dr. James Evermann, Washington Animal Disease Diagnostic Laboratory, has been tracking the causes of coronaviral associated diarrhea in alpaca crias since 2005. There has been increased recognition of neonatal cria-diarrhea in Northwestern farms. The predominant age range is four days to four weeks of age. The seasonal prevalence appears to be higher in March to April and August to September. In addition to neonatal diarrhea, coronavirus has been associated with alpacas after shows (coronaviral-associated show diarrhea). The predominant mode of diagnosis is electron microscopy (EM) on fecal samples. There is a lack of coronaviral diagnostic assays, which severely limits the detection of coronavirus in many laboratories. The industry needs more rapid and accurate diagnostic assays for coronaviral induced disease, such as antigen ELISA. Coronaviral infections of zoo animals and captive wildlife have also been highly dependant upon EM. Some research laboratories, according to Dr. Linda Safe, Ohio State University, have isolation capabilities which allows for detection of unique coronaviruses. More recent detection of unique coronaviruses has included ferret, mink, pygmy rabbit, bats and giraffe.

Dr. Konstantin Lyashchenko, Chembio Diagnostic Systems, Inc., presented information on serologic detection of tuberculosis (TB) in bison and camelids. The intradermal tuberculin test has serious limitations in non-bovid species. Chembio developed a novel serological assay, ElephantTB STAT-PAK kit, using lateral-flow technology to detect specific antibody in elephants and other captive wildlife within 20 minutes. This animal-side test was approved by USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), Centers for Veterinary Biologics (CVB) in 2007. In addition, the Multi-
Antigen Print ImmunoAssay (MAPIA) was proposed for elephants, particularly, as confirmatory test and treatment monitoring tool. Extended studies with ElephantTB STAT-PAK (100 percent sensitivity and 97 percent specificity in elephants) confirmed its potential to be a valuable animal-side diagnostic test in multiple zoo animals as well as in a number of free-ranging wildlife species involved in maintaining bovine TB reservoirs worldwide. Several serological studies on animals naturally infected with *Mycobacterium bovis* (bison, camel, and llama) or *M. microti* (llama, alpaca) were shown to be detectible by the Chembio rapid test and MAPIA for early detection of TB in these species in which the skin test has failed.

Three resolutions were passed unanimously by the Committee and submitted to the Committee on Nominations and Resolutions. They addressed 1) Funding and Planning of Integrated and Comprehensive Animal Health Surveillance, 2) Bovine Viral Diarrhea Virus (BVDV) Control Cost Benefit Analysis in Beef and Dairy Production, and 3) Establishment of Check Test Panel for Testing Cattle for Bovine Viral Diarrhea Virus (BVDV) Persistent Infection (PI).
REPORT OF THE COMMITTEE ON
INFECTIOUS DISEASES OF HORSES

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

Helen M. Acland, PA; Debbie Barr, CAN; Derek J. Belton, NZ; Carter Black, GA; Shane A. Brookshire, GA; Jones W. Bryan, SC; Suzanne L. Burnham, TX; Clarence L. Campbell, FL; Craig N. Carter, KY; Tony A. Caver, SC; Max E. Coats, Jr., TX; Leroy M. Coffman, Fl; Tim R. Cordes, MD; Ed Corrigan, WI; Stephen K. Crawford, NH; Leonard E. Eldridge, WA; Dee Ellis, TX; J Amelita Facchiano, TX; Dave E. Fly, NM; W. Kent Fowler, CA; Tony G. Frazier, AL; Paul Gibbs, FL; Keith N. Haffer, SD; Nancy E. Halpern, NJ; Steven L. Halstead, MI; Jeffrey J. Hamer, NJ; Gregg Hawkins, TX; Burke L. Healey, NC; Carl Heckendorf, CO; Steven G. Hennager, IA; Michael E. Herrin, OK; Robert B. Hillman, NY; Don P. Knowles, WA; Ralph C. Knowles, FL; Maxwell A. Lea, Jr., LA; Donald H. Lein, NY; Mary J. Lis, CT; Martha A. Littlefield, LA; Amy W. Mann, DC; Patrick L. McDonough, NY; Richard D. Mitchell, CT; Donald S. Munro, PA; Lee M. Myers, GA; Sandra K. Norman, IN; Don L. Notter, KY; Eileen N. Ostlund, IA; Robert E. Pitts, GA; Jewell G. Plumley, WV; Jeanne M. Rankin, MT; Keith Roehr, CO; Earl Rogers, UT; Michael A. Short, FL; Robert C. Stout, KY; David Thain, NV; Belinda S. Thompson, NY; Kerry Thompson, DC; H. Wesley Towers, DE; Susan C. Trock, NY; Charles D. Vail, CO; Taylor Woods, MO; Ernest W. Zirkle, NJ.

The Committee met from 12:30 p.m. to 5:45 p.m. on Sunday, October 21, 2007 at John Ascuaga’s Nugget Hotel, Reno, Nevada. In attendance were 31 Committee members and 46 visitors for a total of 77 persons. The meeting was Chaired by Peter Timoney with the assistance of Vice Chair, James Watson. In his introductory remarks, the Chair made reference to three Resolutions approved in 2006, responses to which had been circulated among the Committee membership in advance of the meeting. Any discussion of the responses would be deferred to the Business Session. The Agenda for this year’s meeting addressed a number of diseases and health-related issues, some of which were considered of special economic significance to the equine industry at this time. By limiting the number of presentation topics, greater opportunity was provided for discussion of each agenda item.
REPORT OF THE COMMITTEE

Peter Timoney, standing in for George Allen, Gluck Equine Research Center, University of Kentucky, presented the Time-Specific Paper entitled Recent Advances in Our Knowledge of Equine Herpesvirus-1 (EHV-1) Myeloencephalopathy. The paper provided an overview of the latest information on the emerging significance of the disease, unique characteristics of the mutant neuropathogenic strains of equine herpesvirus-1, the pathophysiologic basis for their enhanced pathogenicity, advances in diagnostic testing for the disease, the immunologic basis of protective immunity, and finally, prospects for disease prevention through vaccination. The full text of this paper is included in these proceedings.

In addition, Dr. Timoney deputized for Charles Issel, Gluck Equine Research Center, University of Kentucky and gave his presentation entitled, Control of Equine Infectious Anemia Should Take New Directions at the Joint United States Animal Health Association (USAHA) American Association of Veterinary Laboratory Diagnosticians (AAVLD) Scientific Session, Monday, October 22. The paper proposed a series of new approaches to the control of equine infectious anemia embracing more targeted testing to identify carriers of the causal virus in the currently untested reservoir equid population, greater efficiency and accuracy in diagnostic testing, and regionalization of states with equivalent infection status so as to minimize the frequency of testing required of horses moving between those states. The text of this paper will be included in the USAHA/AAVLD Scientific Session section of these proceedings.

Josie Traub-Dargartz, Colorado State University and Centers for Epidemiology and Animal Health (CEAH), Veterinary Services (VS), Animal and Plant Health Inspection Service (APHIS), United States Department of Agriculture (USDA) reported on a project being conducted by the Center for Emerging Issues (CEI) at CEAH on equine herpesvirus-1 neurological disease. On review of the increased frequency of occurrences of this disease in recent years, the CEI concluded that equine herpesvirus myeloencephalopathy met the criteria for a potentially emerging infectious disease. A disease is considered emerging when it meets at least one of three criteria: (1) disease is identified for the first time; (2) disease changes in virulence, host range or other pathogen behavior, or (3) disease changes in geographic
range or incidence within a range. The current situation with equine herpesvirus myeloencephalopathy outbreaks reflects a change in virulence and behavior of the causal virus. In 2007, the disease was the focus of presentations at both the American College of Veterinary Internal Medicine and meetings of the American Horse Council. CEAH developed a project to identify what could be learned from outbreaks of equine herpesvirus myeloencephalopathy that would enhance current understanding of the disease as well as improve strategies for handling future outbreaks of other emerging diseases. Equine herpesvirus specialists and animal health officials involved in mitigation of these outbreaks were interviewed to gather information about methods used in outbreak management and the need for educational materials and research studies. A report summarizing lessons learned and common themes in the mitigation of outbreaks will be produced. The project will provide the equine industry, equine practitioners and animal health officials with a concise summary of approaches used to manage such outbreaks which hopefully would enhance the response of USDA-APHIS-VS when confronted with new or emerging diseases in the future. Considerable discussion followed both presentations on equine herpesvirus myeloencephalopathy. There was a widespread interest in how best to manage outbreaks of equine herpesvirus myeloencephalopathy especially at racetracks or other venues where horses are congregated in close proximity to one another. Concerns were expressed over interpretation of positive diagnostic test findings in the absence of clinical evidence of disease. Exclusion of such animals was questioned under the current case definition of the disease used in the National Animal Health Reporting System (NAHRS).

Two presentations followed on the USDA Review of the U.S. Contagious Equine Metritis (CEM) Import Program that was carried out in 2007. The goal of the review was to identify program improvements that would mitigate the risk of release of CEM carrier stallions or mares into the United States. Edward Arza, USDA-APHIS-VS, provided the background that prompted the review, identified the ten areas involving import activities which served as the focus of the report, and gave an executive summary of the major recommendations for each of the program activity areas that were evaluated. The risks involved in reintroduction of CEM into the United States are very real, especially for those...
Ellen Buck, National Import Center, VS-APHIS-USDA, provided a detailed response by way of an action plan to the recommendations provided in the CEM Import Program Review report. Among the areas highlighted in the Action Plan were required changes to the Code of Federal Regulations, review and updates of policy documents and memoranda, inclusion of a CEM program review in Station Reviews, enhancement of existing systems of record-keeping and communication, improvement in the reliability of diagnostic testing for this disease by CEM-approved laboratories, provision for specific training and accreditation of veterinarians who perform sampling for the disease, and finally, a risk assessment of Spanish Purebreds and Racing Thoroughbreds which are currently exempt from CEM quarantine and testing in the United States.

Ellen Buck then gave a presentation on the Proposed Rule for Importation of Non-Competitive Entertainment Horses into the United States from CEM affected countries. The comment period on the proposed rule was now closed, with a very limited number of comments being received. A primary concern that had been expressed was the risk of losing track of such horses following importation into the country. Adequate safeguards would be required to ensure that horses imported under the proposed rule were effectively tracked and monitored throughout their period of residency in the United States, regardless of duration. A complete review will be conducted of the primary requirements that need to be met under the proposed rule.

Steve Halsted, Michigan Department of Agriculture, and Chair of the Subcommittee on Equine Infectious Anemia, gave the report of the activities of the Subcommittee. It had been an active year for the Subcommittee, highlighted by a National Direction Meeting on Equine Infectious Anemia that was held in Denver, Colorado, May 21-22, 2007. In concluding his report, Halsted called on Stanley Bruntz, CEAH-VS-APHIS-USDA, to comment on current progress in improving data compilation and analysis under the National Animal Health Reporting System (NAHRS) with specific reference to equine infectious anemia. It is anticipated that improvements to the existing system will be implemented before the end of 2007, enabling the provision of summarized national
data on this disease on a monthly basis. The Subcommittee Report was approved by the full Committee the Report of the National Equine Infectious Anemia Direction Meeting is included in these proceedings.


Thomas Chambers, Gluck Equine Research Center, University of Kentucky, presented an update on the international equine influenza situation with specific reference to major occurrences of the disease in Japan and Australia since mid-August, 2007. In both countries, the disease was caused by a strain of equine influenza A/equine 2 virus that is reported to be very closely related to one originally isolated during an outbreak of influenza in Wisconsin in 2003. In the case of Japan, this has been the second major occurrence of equine influenza since the first known incursion of the disease into that country’s equine population in 1972. The number of infected horses in the current series of outbreaks has been estimated at a little over 600, significantly less than the figure of 7,000 involved in 1972. The reduced incidence is believed to be the result of a twice-yearly vaccination program against influenza mandated since the previous occurrence of the disease in the country. Vaccination
is believed to have decreased the morbidity rate, mitigated the clinical severity of the disease and limited dissemination of the virus through reduced nasal shedding by infected horses. The recent occurrence resulted in cancellation of numerous race meetings and a ban on horse movements. Current field data would indicate that the 2007 occurrence has essentially run its course and racing is being resumed on a select basis and under specific conditions.

The occurrence of equine influenza in Australia was the first known incursion of the disease into that country’s equine population. Vaccination against equine influenza was not permitted in Australia since the disease had hitherto been exotic to the country. Equine influenza is believed to have been introduced in a shipment of horses imported through the post-arrival quarantine station in Sydney. Since the second to third week in August, the virus spread widely in the racing and breeding horse populations in New South Wales and Queensland, the two states in which the disease has been confined to this point. Race meetings have been cancelled and there has been major disruption of the countries’ thoroughbred and standardbred breeding industries. The equine industry in affected states is continuing to experience huge economic losses from the epidemic of equine influenza. As of October 17, 2007, 4,619 infected premises had been identified in New South Wales and a further 1,291 in Queensland, and additional new outbreaks are still being reported. The total number of infected horses is currently estimated at over 40,000. There is very recent evidence of infection with equine influenza virus in dogs on a very limited number of affected premises. A strictly controlled program of vaccination with a commercial canary-pox vectored vaccine has been implemented in selected populations of racehorses and performance horses in the two affected states as well as in the state of Victoria. Federal and state animal health officials still maintain that eradication of equine influenza is an achievable goal, notwithstanding the continue spread of the virus in New South Wales and Queensland. It remains to be seen whether eradication can be accomplished or whether equine influenza will become endemic in Australia.

Kent Fowler, California Department of Food and Agriculture (CDFA) and Chair of the Subcommittee on Equine Piroplasmosis presented the Subcommittee report. In spite of the best efforts of the Subcommittee, no progress had been achieved since 2006
in being able to carry out a serosurveillance study for equine piroplasmosis in the U.S. slaughterhouse population due to closure of the three remaining horse slaughter plans in Texas and Illinois before the survey could get underway. A couple of alternative options were being pursued in an effort to accomplish the goal of establishing what the status of the US equine population was with respect to this disease. The Subcommittee Report was approved by the Committee and is included as part of this Committee Report.

Donald Knowles, Washington State University and USDA Agricultural Research Service (ARS), Animal Disease Research Unit (ADRU) gave a progress report on treatment studies of *Babesia caballi* infection in horses. The objective of the study is to analyze with current parasite detection methodologies, the ability of imidocarb dipropionate to clear horses of persistent *B. caballi* infection. The source of the parasite was *B. caballi* infected *Dermacentor nitens* ticks obtained from Puerto Rico. Following successful establishment of persistent infection in four horses, two were treated with the drug and two were left as controls. While infection in the untreated controls remained detectable by real time polymerase chain reaction (PCR) assay, parasite DNA remains undetectable by PCR in the treated horses. Anti-*B. caballi* antibody continues to be detectable by competitive enzyme linked immunosorbent assay (cELISA) and indirect fluorescent antibody (IFA) assay. Three months’ post-treatment transfusion of 100 ml of blood from each treated and untreated horse to four naïve horses resulted in transmission from the untreated controls but not the imidocarb treated horses. Both treated and untreated horses are currently being tested for their ability to transmit *B. caballi* by *D. nitens*. It remains to be established whether treatment with imidocarb renders horses nontransmissible for *B. caballi*.

Jeffrey Nelson, National Veterinary Services Laboratory (NVSL), VS-APHIS-USDA, presented a brief report on the treatment of *B. equi* experimentally infected horses with imidocarb dipropionate. The source of the parasite used in the study originated from a horse imported into the United States several years ago from Peru. Species of *Boophilus* ticks will be used in later tick transmission studies with the parasite. As the study is still at a preliminary stage, few experimental findings were available for review.
REPORT OF THE COMMITTEE

Following conclusions of the scientific program, the Committee went into Business Session and The Committee considered and approved three resolutions on equine piroplasmosis that were forwarded to the Committee on Nominations and Resolutions for approval by the general membership.
The Subcommittee met by conference call through 2007. The primary activity of the Committee in 2007 was to convene a second EIA National Direction meeting (the first being held in March, 2006) of a small group of State animal health officials to further consider the most appropriate and acceptable direction in which to guide the nation’s EIA management efforts. The recommendations and conclusions of the participants are detailed in the attached report, and can be summarized as follows:

- Areas where the EIA program works well are those of uniformity, compliance, prevalence modeling, and available regulatory tools.
- Areas of concern include low interest in pushing for further prevalence reduction; passive attitude about EIA, low enthusiasm for program change, and educational gaps within some segments of the industry; resource shortages, and disproportionate testing across all segments of the national equine herd.

The attendees recommended the following next steps to address the above concerns and to capitalize on the program successes:

1. **Develop National dialogue about refining and standardizing testing requirements nationally**— standardize the testing requirements and base the minimum testing requirement on the general (testing or estimated) prevalence of the disease in the state.
   - Require change-of-ownership testing nationally
   - Set the minimum testing for states with lower prevalence at 2 years
   - Set the minimum testing for states with higher prevalence at 1 year
   - Movement among lower prevalence states or from a lower prevalence state to a higher prevalence state would be allowed with a current test (within 2 years)
   - Movement among higher prevalence states or from a higher prevalence area to a lower prevalence state would be allowed with a current test (within 1 year)
REPORT OF THE COMMITTEE

The group suggested that the chair of the EIA Subcommittee discuss these proposals with and among the members of the National Assembly and the APHIS Senior Staff Veterinarian for Equine programs discuss the proposals with the APHIS VS AVICs. After those meetings, the National Assembly members and/or AVICs would discuss the proposals with pertinent stakeholders in their state:

- State veterinarian
- State horse councils
- Farm bureau as appropriate
- State veterinary medical associations
- State equine practitioners
- State breed associations

At the same time, the group suggested that members of the EIA Subcommittee discuss these proposals with the following:

- American Horse Council at their June meeting in Washington DC.
- State Horse Councils—there will be an opportunity to address the state horse councils the first day of the AHC meeting in June 2007
- American Association of Equine Practitioners (AAEP) at their national meeting on December 1 through 3 in Orlando FL as part of the AAEP Infectious Diseases Committee meeting
- National breed associations

2. Suggestions for further EIA Subcommittee consideration and action—the group suggested the EIA subcommittee pursue a number of other areas as well, some of which support the change in the testing requirements described above and some are meant as national program improvements. These suggestions are summarized from the meeting report that follows:

Ensure accuracy of prevalence model—the group would like more discussion about the CEAH prevalence model, especially with states that would be considered to be higher prevalence.

Additional testing requirements—explore the feasibility of pursuing state specific legislation to require uniformly a current EIA test for gatherings in state. A current test would be one that has been done in the last 1 year or 2 years depending if the state
is a low or high prevalence state.

**Laboratory moratorium**—there is a perception that NVSL will not allow any more labs to do EIA work. NVSL however, has a set of criteria for approving new labs when they are needed. The group encourages NVSL to clearly communicate that it is a moratorium and not a ban and what the criteria are for getting a new lab approved. This would be especially helpful to those in states where prevalence is higher.

**Reporting and compiling of test results**—as part of the approval process labs need to be required to report the results in a way that enhances accurate compilations, including having labs report test results to both the state where the horse resides and the state where the lab is located to help ensure accurate compilations and avoid double counting.

**Revision of the VS 10-11**—poll lab personnel, field veterinarians and others who use the form to make sure the new form meets their needs before making official revisions. Also, talk with those states who do not use the APHIS form to learn why and to make the form more useful.

**Use of VS 10-11 at the borders**—make use of VS 10-11 for imported horses from Mexico and Canada. In addition, explore the use of the VS 10-11 for BLM horses. In both cases, the use of the electronic form would be ideal.

**EIA Summit**—consider holding a summit to discuss the direction, iron out problems and improve the national effort to control EIA. This should include the range of key stakeholders including state, federal and industry personnel and practitioners including accredited veterinarians

**EIA free zones**—explore the idea of having EIA free zones in higher prevalence states so horses could move with fewer restrictions. While the group was not opposed to the idea there was concern that the regulatory work involved in making sure the zone stayed free might out-weigh the benefits of having the zone in the first place

**Guidance/regulation**—follow through on plans to update the
REPORT OF THE COMMITTEE

UM&R for the program and incorporate the UM&R into the CFR
Pursue Federal funding—the group encourages APHIS to pursue
funding for a national EIA program and to use a portion to provide
cooperative agreement money for states.
Background

As a result of a recent meeting of the Equine Infectious Anemia (EIA) Subcommittee of the United States Animal Health Association (USAHA) Infectious Diseases of Horses Committee (IDOHC) the chair of the subcommittee invited a number of people to join him for a national direction setting meeting in Denver on May 21 and 22, 2007. See Appendix 1 for a list of those who attended.

The agenda for the meeting included several updates on work being done on EIA and several discussions guided by a series of questions. The updates include the following:

- National Direction Meeting in 2006
- Recap of 2007 EIA Subcommittee work
- Follow up from IDOHC – Resolution 8
- Progress on Uniform Methods and Rules (UM&R) and the development of an EIA rule in the Code of Federal Regulations (CFR)
- Prevalence Modeling
- Work related to EIA by the National Surveillance Unit (NSU)
- Changes to National Animal Health Reporting System (NAHRS) related to EIA
- Results of the Equine NAHMS study related to EIA
- EIA / VS 10-11 Revision

The key questions used to guide the discussion included the following.

- What excites you about the progress made so far?
- What concerns you about the progress made so far?
- What crossroads are we facing?
- What are the possibilities for the future of dealing with EIA?
- What future do we want to create?
- What are the next steps (short and long term)?

Areas that seem to be working well

The group identified areas of EIA program that are going well.
REPORT OF THE COMMITTEE

Some of the ideas that came up included:

- **Uniformity**—even though there are areas that need more standardization, what has been accomplished has been good
- **Compliance**—some of the state veterinarians say that there is good compliance in their states on change of ownership requirements. In fact this regulation may be the best educational tool they have. People begin to do the policing themselves by not accepting a sale without a current Coggins test.
- **Low prevalence**—the testing that occurs shows that the tested horses have a low prevalence
- **UM&R**—the UM&R is pretty good
- **Potential for changes**—there is the possibility of making some changes that would make sense and move the program forward

Areas of concern

The group identified areas of concern about the EIA program and efforts:

- **Reduction in prevalence**—because the infection has gone down, some thought the program needs to do some things differently to take it to the next level
- **Industry/Owner support and incentives**—there is little incentive for pleasure horse owners to participate. The industry is generally not enthusiastic about the program. Some thought the national program is the result of top-down pressure rather than a groundswell of support. There is no public health threat, so zoonotic diseases get more attention. Because of the low tested prevalence, it is hard for people to get excited about controlling or eradicating the disease. The perceived risk to owners and the industry at large is low.
- **Education is needed**—there is concern that people don’t know enough about the disease. According to two NAHMS studies some progress has been made between 1998 and 2005 in making people more aware of the disease but little change in those that were knowledgeable. See the following table. Participants thought more progress could be made if people were more knowledgeable.
<table>
<thead>
<tr>
<th>Level of Familiarity</th>
<th>% ops in 1998 (Std error)</th>
<th>% ops in 2005 (Std error)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Had not heard of it</td>
<td>16.7 (1.9)</td>
<td>9.8 (0.6)</td>
</tr>
<tr>
<td>Recognized name but not much else</td>
<td>14.5 (1.6)</td>
<td>18.7 (0.8)</td>
</tr>
<tr>
<td>Knew some basics</td>
<td>23.9 (2.1)</td>
<td>25.9 (0.9)</td>
</tr>
<tr>
<td>Knowledgeable</td>
<td>44.9 (2.7)</td>
<td>45.6 (1.0)</td>
</tr>
</tbody>
</table>

- **Direction**—it is not clear what direction the national program is taking. The possibilities include 1) the status quo, enhanced control and eradication. While many supported working for eradication, participants recognized that even the word eradication would cause concern among certain horse owners and the industry in general.

- **Resources**—there is little slaughter capacity for horses in the United States. As a result there are fewer options for dealing with animals that test positive.

- **Written guidance and regulations**—the biggest concern is the lack of standards for the EIA efforts nationally. Also, while generally good, some thought the UM&R needs some work. There is no regulation for EIA in the Code of Federal Regulations, though regulations are expected to be completed and published within a year.

- **Testing**—some are concerned that the horses being tested are just the same ones over and over. The amount of money spent on EIA testing is out of kilter compared to the risk of the disease (the horse industry is spending too much). There is concern about the lack of standards about the intervals between testing. There was concern that even though the change of ownership requirements for a current Coggins test is effective the requirement is not standardized nationally. Some thought the focus on time intervals was wrong and the testing should focus on testing based on movements and risk.

- **Laboratories and Reporting**—there was concern that the current moratorium on new EIA testing laboratories is resulting in not having labs available where and when they are needed. A participant from NVSL pointed out that there are guidelines for getting new laboratories approved and that the moratorium is not a total ban. There was also concern about how results get reported to states and nationally to APHIS, VS.
REPORT OF THE COMMITTEE

Crossroads
There are a number of key areas of the program that are at crossroads

- **Overall direction**—the control of EIA could go in one of three general directions 1) Continue with the status quo 2) enhance/streamline the control program 3) Work for eradicating EIA.
- **Frequency of testing**—the variation that exists nationally needs to be resolved in a rational, science-based way
- **Basis of testing**—most of the basic testing guidance is based on time rather than movement and risk.
- **Possible regionalization**—with prevalence differences nationally, there is an opportunity to regionalize, that is regulate differently based on the prevalence and the risk in various states or groups of states

Next Steps
The group decided there are two major categories of next steps for managing EIA. The first involves a national dialogue about refining and standardizing testing requirements nationally that would begin soon after this meeting ends. The second involves a number of improvements the group would assign to the EIA subcommittee for further consideration and action:

1. **National dialogue about refining and standardizing testing requirements nationally**—the group suggested that the program standardize the testing requirements and base the minimum testing requirement on the general (testing or estimated) prevalence of the disease in the state.
   - Require change-of-ownership testing nationally
   - Set the minimum testing for states with lower prevalence at 2 years
   - Set the minimum testing for states with higher prevalence at 1 year
   - Movement among lower prevalence states or from a lower prevalence state to a higher prevalence state would be allowed with a current test (within 2 years)
   - Movement among higher prevalence states or from a higher prevalence area to a lower prevalence state would be allowed with a current test (within 1 year)

The group suggested that the chair of the EIA Subcommittee discuss these proposals with and among the members of the National Assembly and the APHIS Senior Staff Veterinarian for
Equine programs discuss the proposals with the APHIS VS AVICs. After those meetings, the National Assembly members and/or AVICs would discuss the proposals with pertinent stakeholders in their state:

- State veterinarian
- State horse councils
- Farm bureau as appropriate
- State veterinary medical associations
- State equine practitioners
- State breed associations

At the same time, the group suggested that members of the EIA Subcommittee discuss these proposals with the following:

- American Horse Council at their June meeting in Washington DC.
- State Horse Councils—there will be an opportunity to address the state horse councils the first day of the AHC meeting in June 2007
- American Association of Equine Practitioners (AAEP) at their national meeting on December 1 through 3 in Orlando FL as part of the AAEP Infectious Diseases Committee meeting
- National breed associations

2. Suggestions for further EIA Subcommittee consideration and action—there are a number of other issues the group suggested the EIA subcommittee pursue. Some support the change in the testing requirements described above and some are meant as national program improvements. The EIA Subcommittee would help ensure follow up:

Ensure accuracy of prevalence model—the group would like more discussion about the CEAH prevalence model especially with states that would be considered to be higher prevalence. Getting national agreement on a way to tell what states should be considered higher prevalence and what states should be considered lower prevalence is key. Also, there needs to be a way of determining when a state moves from one category to the other.

Additional testing requirements—the EIA subcommittee would discuss the feasibility of pursuing state specific legislation to require uniformly a current EIA test for gatherings in state. A current test would be one that has been done in the last year or two years depending if the state is a low or high prevalence state.
Laboratory moratorium—there is a perception that NVSL will not allow any more labs to do EIA work. NVSL however, has a set of criteria for approving new labs when they are needed. The group encourages NVSL to clearly communicate that it is a moratorium and not a ban and what the criteria are for getting a new lab approved. This would be especially helpful to those in states where prevalence is higher.

Reporting and compiling of test results—as part of the approval process labs need to be required to report the results in a way that enhances accurate compilations. One suggestion is to have the labs report test results to both the state where the horse resides and the state where the lab is located to help ensure accurate compilations and avoid double counting.

Revision of the VS 10-11—poll the lab personnel, field veterinarians and others who use the form to make sure the new form meets their needs before making the official revision. Also, talk with those states who do not use the APHIS form to learn why and to make the form more useful.

Use of VS 10-11 at the borders—make use of VS 10-11 for imported horses from Mexico and Canada. In addition, explore the use of the VS 10-11 for BLM horses. In both cases, the use of the electronic form would be ideal.

EIA Summit—consider holding a summit to discuss the direction, iron out problems and improve the national effort to control EIA. This should include the range of key stakeholders including state, federal and industry personnel and practitioners including accredited veterinarians

EIA free zones—explore the idea of having EIA free zones in higher prevalence states so horses could move with fewer restrictions. While the group was not opposed to the idea there was concern that the regulatory work involved in making sure the zone stayed free might out-weigh the benefits of having the zone in the first place

Guidance/regulation—follow through on plans to update the UM&R for the program and incorporate the UM&R into the CFR
Pursue Federal funding—the group encourages APHIS to pursue funding for a national EIA program and to use a portion to provide cooperative agreement money for states.

Appendix 1: List of Attendees

<table>
<thead>
<tr>
<th>Name</th>
<th>Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amelita Facchiano</td>
<td>USDA APHIS CEAH</td>
</tr>
<tr>
<td>Henry Moreau</td>
<td>State Veterinarian – Louisiana</td>
</tr>
<tr>
<td>Taylor Woods</td>
<td>Missouri Department of Agriculture</td>
</tr>
<tr>
<td>Dee Ellis</td>
<td>Texas Animal Health Commission</td>
</tr>
<tr>
<td>Carl Heckenforf</td>
<td>Colorado Department of Agriculture</td>
</tr>
<tr>
<td>Kerry Rood</td>
<td>Vermont Agency of Agriculture</td>
</tr>
<tr>
<td>Warren Hess</td>
<td>Utah Department of Ag and Food</td>
</tr>
<tr>
<td>Valerie French</td>
<td>University of Liverpool/ USDA-NCAHCM</td>
</tr>
<tr>
<td>Kent Fowler</td>
<td>California Department of Food and Ag</td>
</tr>
<tr>
<td>Don Hoenig</td>
<td>Maine Department of Agriculture</td>
</tr>
<tr>
<td>Bev Schmidt</td>
<td>USDA, APHIS, NVSL</td>
</tr>
<tr>
<td>Leonard Eldridge</td>
<td>Washington Department of Agriculture</td>
</tr>
<tr>
<td>Ernie Zirkle</td>
<td>Retired State Veterinarian and consultant</td>
</tr>
<tr>
<td>Steven Halstead</td>
<td>Michigan Department of Agriculture</td>
</tr>
<tr>
<td>Peter Timoney</td>
<td>University of Kentucky</td>
</tr>
<tr>
<td>Chuck Issel</td>
<td>University of Kentucky</td>
</tr>
<tr>
<td>Tim Cordes</td>
<td>USDA, APHIS, VS</td>
</tr>
<tr>
<td>Josie Traub-Dargatz</td>
<td>Colorado State University/USDA APHIS CEAH</td>
</tr>
<tr>
<td>Aaron Scott</td>
<td>USDA APHIS CEAH</td>
</tr>
<tr>
<td>Stan Bruntz</td>
<td>USDA APHIS CEAH</td>
</tr>
</tbody>
</table>
REPORT OF THE COMMITTEE

Report of the Subcommittee on Equine Piroplasmosis

Kent Fowler, Chair
California Department of Food and Agriculture

Subcommittee members include:
Kent Fowler, Peter Timoney, Lee Coffman, Tim Cordes, Leonard Eldridge, Steve Hennager, Bob Hillman, Ralph Knowles, Amy Mann, Richard Mitchell, Don Knowles, Mike Short, Robert Stout, Tim Boone, Kerry Thompson,

The Equine Piroplasmosis (EP) Subcommittee was formed in March, 2006 to better identify the risk of EP becoming an endemic disease within the U.S. Additional direction of the Subcommittee was based upon identified needs to estimate the prevalence of seropositive EP horses within the U.S. and to identify a more cohesive policy at both state and federal level for identification and disposition of EP seropositive imported horses.

As a result of the activities of the Subcommittee and the preceding work of others, the following conclusions have been drawn:

1) The current status of EP in the United States is in question. For many years, EP has been classified as a Foreign Animal Disease to the United States. Prior to February 1, 2004, the “official test” for Piroplasmosis, conducted on all equines presented for temporary or permanent importation into the United States was the complement fixation (CF) test, a test that is known to occasionally provide “false negative” results. Unscrupulous owners, importers or agents compounded the problem by purposely treating EP infected horses with immunosuppressive medications which would cause them to give a false negative reaction in the CF test. To improve diagnostic efficacy the CF test was replaced by an upgraded c-ELISA test that was specified as the “official test” on August 22, 2005. The c-ELISA is less likely to yield “false negative” results on adult horses. Because of the compromised reliability of the CF test to detect long-term carriers of B. caballi or B. equi, it is plausible that infection from either parasite exists at an undefined
prevalence level in horses that have been imported into the United States over a significant number of years and perhaps also in horses native to the United States.  
2) Potential tick vectors of both causal agents exist, but the dynamics for transmission remain unclear. EP infected horses may exist in the United States at a sufficient prevalence level to infect various competent resident tick vectors and potentially result in the establishment of endemicity of \textit{B. caballi} or \textit{B. equi} in the resident equine population in the United States.  
3) Treatment is not a validated viable option. There is no conclusive evidence currently available that treatment of a carrier of either or the two causal agents of EP (\textit{Babesia caballi} and \textit{Babesia equi}) is a viable option in successfully eliminating the carrier state.  
4) Validated research risk assessment is required. It is crucial to: a) maintain stringent import restrictions that prevent the importation of seropositive and carrier horses into the United States, b) develop a cohesive and acceptable policy at both federal and state levels for identifying and dealing with resident EP seropositive horses, and c) request funding for research to devise effective treatment protocols for EP.

The Equine Piroplasmosis Subcommittee introduced five proposed resolutions at the 2006 USAHA Annual Meeting. The following two resolutions were accepted by USAHA:

1) USAHA Resolution 9 urges USDA to expand the funding for research to find an effective and safe treatment for elimination of the carrier state for \textit{Babesia caballi} and \textit{Babesia equi}.  
2) USAHA Resolution 10 calls for a national serosurvey of slaughter horses to determine the prevalence of equine piroplasmosis (EP) in the U.S.

This past year two Subcommittee meetings took place via telephone conference call. The following represent the outcome of discussions to result from those meetings:

1) The EP Subcommittee believed the slaughter horse
REPORT OF THE COMMITTEE

survey to be the best methodology available to address the much-debated issue of establishing prevalence of EP in the U.S.
2) An estimated sample size of approximately 14,000 horses was suggested based on an anticipated low prevalence of EP.
3) Horse slaughter plant management in Illinois and Texas agreed to assist with the serosurvey and approved the collection protocol.
4) It was agreed that Dr. Don Knowles direct the laboratory component of this project through collaboration between his laboratory and NVSL as follows:
   a) NVSL Ames would receive the serum samples and provide storage accommodation.
   b) ARS Pullman would procure bulk-rate VMRD kits
   c) NVSL Ames would provide labor and utilize available wells in the course of their routine testing program.
   d) ARS Pullman would do confirmatory testing if needed.
5) Dr. Don Knowles estimated the cELISA cost for one well per horse to be $1.65. Based on a total of 14,000 horses the total cost would be $23,000 for testing for each parasite and then doubled to test for both *B. equi* and *B. caballi*.
6) Dr. Don Knowles offered to provide an ARS match for APHIS’ funding of this project. Each agency would provide $23,000.
7) A working group would then be formed to develop recommendations for dealing with EP in the U.S. based on their evaluation of the survey results.

Unfortunately, U.S. District Court rulings in Texas and Illinois shut down U.S. horse slaughter plants before a representative number of samples could be obtained to conduct the survey.

With the slaughter horse survey no longer a viable option, the Subcommittee consensus was to identify other meaningful sources of equids to survey. The first recommendation was to request CEAH that residues of sera collected during the 1998 NAHMS survey be tested by c-ELISA for the presence of antibodies to EP. These sera would contain no identification whatsoever. A letter outlining this request was sent to Dr. Nora
WINELAND at CEAH on July 19, 2007 and no response had been received as of October 17, 2007.

The second recommendation was to request regional NAHLN laboratories to make available and submit residual banked EIA serum samples to NVSL for testing by c-ELISA for the presence of antibodies to EP. Again, it was determined crucial that these samples contained no individual identification whatsoever, including the State or region from where they were obtained. A letter was sent to 33 NAHLN Directors on October 5, 2007, and as of October 17, 2007 seven supportive responses were received offering EIA residual serum samples to be sent to NVSL.

Upon majority consensus of the Subcommittee and industry interaction, the following resolutions for progressively dealing with the current status of EP in the United States are as follows:

1) Resolve that the Committee/USAHA initiate a request to CEAH that residues of sera collected during the 1998 NAHMS survey be tested by c-ELISA for the presence of antibodies to EP. The sera would carry no identification whatsoever as to animal name/numerical ID, premises of origin, or state from which they originated.

2) Resolve that the Committee/USAHA initiate a request to regional NAHLN laboratories to make available and submit residual banked EIA or other equine serum samples to NVSL for testing by C-ELISA for the presence of antibodies to EP. The absolute requirement is that all samples submitted for evaluation carry no identification whatsoever as to animal name/numerical ID, date of collection, premises of origin or the laboratory or state from which they originated.

3) Resolve that the Committee/USAHA requests USDA to determine what constitutes a representative number of samples to evaluate from the above NAHLN submissions to provide meaningful estimates of the current prevalence of EP in the U.S. resident horse population or accept the previously statistically recommended number of 15,000 samples and to use previously identified funding which was to have been obtained through the slaughter surveillance initiative.

Pending ratification of these proposals by the Committee
and USAHA, challenges confronting the Subcommittee include gathering continued feedback from the equine industry and developing science-based recommendations for dealing with all existing and evolving issues pertaining to the impact of EP on the United States. The goal of the Committee should be to do what it takes to ensure that EP does not become endemic in the resident horse population of the United States.
Introduction

When an equine viral pathogen evolves and, in so doing, increases its virulence, and if there are no effective prevention or treatment options for use against the new virus strain, the potential for negative impact on equine welfare and for economic losses to the U.S. horse industry are great. The increasing incidence of EHV-1 neurological disease currently poses such a threat and is of national concern. Because vaccination and antiviral drugs offer little assistance in blunting the morbidity and mortality rates of EHV-1 myeloencephalopathy, the emerging disease presents a new and significant equine health problem to U.S. animal health officials. This report summarizes the recent, and largely unpublished, progress that has been made in our understanding of this emerging herpesviral disease of the horse.

Evidence for designation of equine herpesvirus-1 myeloencephalopathy as an emerging disease of the horse

The recent increase in reported occurrences of epizootics of EHV-1 myeloencephalopathy in assemblages of horses in the U.S. and the discovery that the majority of such recent neurologic disease outbreaks were caused by a mutant, hypervirulent strain of the herpesvirus have fueled concerns that we are witnessing the beginnings of an emerging viral disease of the horse (United States Department of Agriculture [U.S.D.A.], 2007). During the first 7 years of the current millennium (2000 – 2006), the disease has struck, in heretofore unprecedented numbers and with alarming clinical severity, groups of horses around the country congregated at venues for racing, eventing, boarding, pleasure riding, veterinary care, and university equitation training. Contributing to the uneasiness about this apparent upsurge of outbreaks of EHV-1 neurologic disease in the U.S. is the recent finding that the etiologic herpesvirus mutant has established a significant and well entrenched presence in the current biological reservoir of latently
REPORT OF THE COMMITTEE

infected horses. Of 132 Thoroughbred broodmares in central Kentucky screened during necropsy examination for the presence of latent EHV-1, 8% of the animals harbored a neuropathogenic strain of the virus as a latent infection (Allen et al, 2007). Eighteen percent of the total reservoir of mares latently infected with EHV-1 carried a mutant, neuropathogenic strain of the virus. Such a high prevalence of latency by the neuropathogenic mutant of EHV-1 rules out any hope for eradication of neurobiovar-carrier horse subpopulations from horse herds and provides a large and permanent pool of the mutant virus for initiating future outbreaks and perpetuating the neurologic disease. Analysis of virus isolates from recent U.S. epizootics of EHV-1 neurologic disease has demonstrated that the majority of the outbreaks were caused by a genetic substrain of EHV-1 unique to the North American continent (Nugent et al. 2006).

Subsequent molecular characterization of 450 archived isolates of EHV-1 recovered from Kentucky Thoroughbred fetuses that were aborted during the 50-year time span from 1956 through 2006 revealed a statistically significant, time-related increase in the proportion of such herpesviral isolates that possess the genetic marker (ORF30 A\textsubscript{2254} → G mutation) which identifies neuropathogenic strains of EHV-1 (Smith, 2007). Phylogenetic analysis of a large, worldwide collection of EHV-1 isolates indicates that the neurologically associated mutation has arisen and been selected on numerous occasions and in multiple evolutionary lineages of the virus, suggesting that the mutant phenotype possesses a survival advantage over parental, wild-type strains of EHV-1 (Nugent et al., 2006).

The recent, dramatic resurgence of large-scale epizootics of EHV-1 neurologic disease with a widespread geographic distribution and the evolving increase in virulence of the causative herpesviral agent have led to the designation by U.S.D.A. of the hypervirulent, mutant strain of EHV-1 as a potentially emerging herpesvirus pathogen of the horse (U.S.D.A. 2007).

Enhanced neuropathogenicity of ORF30 A\textsubscript{2254} → G mutant strains of EHV-1

A number of opinions have recently been expressed and published, in lay and online press articles and in agency-based guidelines for EHV-1 vaccination, stating that any strain of EHV-1 has the potential for causing neurological disease in horses and, further, that the only difference between myeloencephalopathic
epizootics caused by mutant and wild-type EHV-1 strains is their frequency of occurrence. The results of comparison of both naturally occurring and experimentally generated outbreaks of EHV-1 neurologic disease by the two virus genotypes fail to support these stated views.

Recent experimental inoculations, with a wild-type, abortion-storm isolate of EHV-1, of 12 elderly horses possessing no detectable cellular immunity against the herpesvirus and demonstrated to be highly susceptible to neurologic disease following infection with a mutant strain of EHV-1 (67% neurologic attack rate and 75% neurologic mortality) failed to elicit clinically observable neurologic signs in any of the 12 horses (Allen, 2007a). Likewise, analysis of two recent, natural epizootics of EHV-1 myeloencephalopathy associated with infection by a wild-type strain revealed a neurologic attack rate of less than 2% with no instances of mortality or required euthanasia. Compared to the magnitude of the neurologic disease threat posed by neuropathogenic strains of EHV-1, that posed by wild-type strains is relatively innocuous. Clearly, epizootics of myeloencephalopathy caused by wild-type and mutant strains of EHV-1 exhibit significant differences in neurologic morbidity and mortality and in their potential for negative impact on the welfare of the horse and on the equine industry.

Pathophysiologic basis for increased neuropathogenicity of ORF30 mutant strains of EHV-1

The pathogenic signature of ORF30 mutant strains of EHV-1 is characterized by a greater potential for epidemicity, an increased risk for neurologic morbidity, and a higher neurologic mortality. The mechanistic basis for such an increase in virulence of mutant EHV-1 strains, relative to that of wild-type strains, lies in the enhanced replicative capacity of the mutated variant of the virus (Nugent et al., 2006). The point mutation – a single amino acid substitution within the DNA polymerase enzyme that replicates the viral genome – endows mutant strains of EHV-1 with exaggerated replicative powers. As a consequence, the hypervirulent mutants replicate more efficiently in the infected horse to achieve 10-fold higher levels of leukocyte-associated viremia, relative to those generated by wild-type EHV-1 infections (Allen and Breathnach, 2006; Allen, 2007a). The end pathologic result of such high levels of viremia is ischemic damage to the central nervous system (CNS) of the infected horse, ignited by
a widespread and intense inflammation within virus-infected endothelial tissue of blood vessels that supply the CNS (Whitwell et al., 1992).

As a result of their replication-facilitated increase in the level of nasal shedding of infectious virus, mutant EHV-1 strains have also acquired the ability to spread more efficiently from horse to horse and, as a consequence, to cause more extensive epizootics of infection.

Because vaccine-stimulated, immune effector mechanisms of the horse are overwhelmed by the massive viremic load that develops during infection with neuropathogenic strains of EHV-1, immunization of horses with current-generation, inactivated vaccines is unable to prevent the high level of post-infection viremia and thus offers little protection against development of the lesions of vasculitis that lead to ischemic neurologic disease (Henninger et al., 2007).

**Diagnostic testing of horses for infection by neuropathogenic strains of EHV-1**

Rapid, laboratory-based diagnosis of horses infected with neuropathogenic strains of EHV-1 is essential for guiding the planning and implementation of strategies for controlling epizootics of the disease. The laboratory test that yields the most rapid and sensitive diagnostic results is the polymerase chain reaction (PCR). Equine samples of choice for testing are nasopharyngeal secretions and buffy coat leukocytes recovered from venous blood collected in anticoagulant. Since the post-exposure, temporal profiles of the presence of EHV-1 in nasal secretions and circulating leukocytes of the horse do not completely overlap, the collection and testing of both clinical specimens is necessary for achieving maximal diagnostic sensitivity.

Because of significant prognostic differences in the clinical outcome of horses infected with ORF30 A\textsubscript{2254} wild-type and G\textsubscript{2254} mutant strains of EHV-1, delineation between the two genetic biovars during diagnostic examination provides relevant and useful ancillary information to veterinary clinicians and regulatory officials. Facilitation of such EHV-1 genotype discrimination in the diagnostic laboratory has recently been achieved by a real-time PCR-based test procedure (Allen 2006b).

In the context of an ongoing epizootic of EHV-1 CNS disease, positive PCR test results on horses associated with the epizootic by physical proximity, a history of exposure, and/or
clinical signs consistent with infection by EHV-1 can reliably be interpreted as evidence of active infection by the herpesvirus. The interpretation of positive PCR results on nasal secretions or blood leukocytes from horses not linked to an outbreak of EHV-1 infection and tested only for purposes of general herd screening, health certificate requirements, or pre-transport monitoring for virus shedding is more problematic and carries less certitude. A part of that interpretative uncertainty derives from lack of any information on the positive or negative predictive values of EHV-1 PCR tests. Adding to the confusion are recently expressed suppositions that PCR detection of EHV-1 DNA in blood leukocytes may result from the presence of non-viable virus particles, recent vaccinations, or latent virus DNA. However, strong evidence now exists that latent EHV-1 does not reside in circulating leukocytes of the horse at levels detectable by conventional, diagnostic methods of PCR (Allen 2006). In 24 horses demonstrated by nested PCR to harbor latent EHV-1 in their submandibular lymph node tissue, viral DNA was not detected in an equivalent mass of blood leukocytes from any of the same horses. Equally compelling is the recent report that of 590 blood samples collected from 40 mares on a farm on which EHV-1 was endemic, none of the blood samples tested positive for EHV-1 by PCR (Brown et al 2007). Therefore, horses whose blood leukocytes test positive for EHV-1 DNA by PCR are most likely to be actively infected by the virus.

**Immunologic requirements for vaccine-induced protection from EHV-1 myeloencephalopathy**

Studies have recently been carried out to clarify the immunological mechanisms that horses use for controlling the magnitude of EHV-1 cell-associated viremia and its vasculitis-mediated sequela of ischemic damage to the equine central nervous system. Such information has provided insight into the types of immunologic effector responses required to be elicited by vaccines for successful immunoprevention of EHV-1 paralytic disease and has identified reliable, *in vitro* immune correlates of vaccine protection against the neurologic disease. Results of the investigations revealed that horses possessing high levels of pre-existing, EHV-1 specific cytotoxic T lymphocyte precursors (CTLp), regardless of age, strain of virus, or SNA titer, were more likely to control the magnitude of post-infection, leukocyte-associated viremia and the subsequent development of EHV-1...
REPORT OF THE COMMITTEE

neurologic disease (Allen, 2007a). Such results emphasize that a critical-mass reservoir of circulating memory CTL, in place at the moment and location of virus exposure and capable of being activated into functional CTL with specific cytolytic activity against EHV-1, is required for controlling EHV-1 neurological disease. These observations serve to identify CTLp as one of the critical immune requirements for protective immunity to EHV-1 induced myeloencephalopathy. It follows that, to achieve protective efficacy against EHV-1 myeloencephalopathy by vaccination, the vaccines must be able to drive the equine immune response toward the production of such cytolytically functional, effector CTL.

Prospects for eliciting protective immunity against EHV-1 myeloencephalopathy by vaccination

A particular concern of members of the equine establishment about the emergent nature of EHV-1 myeloencephalopathy is that the cornerstone for prevention of infectious diseases – prophylactic vaccination – offers little assistance for preventing epizootics of the paralytic herpesviral disease. Reports of EHV-1 neurological disease outbreaks in fully vaccinated horses are commonplace (Henninger et al., 2007), and there is limited scientific evidence that any currently marketed vaccine for EHV-1 will provide significant protection against the neurological disease caused by neuropathogenic strains of the virus.

The highest priority of ongoing research activities on this emerging viral pathogen of the horse is development of an efficacious vaccine. Efforts to develop such an improved vaccine for controlling the neurologic manifestations of EHV-1 infection are underway and are focusing on (1) identification of the specific immune defenses of the horse that are most active against the mutant EHV-1 strain, and (2) construction of a safe and effective, live-virus vaccine able to stimulate such protective immune mechanisms. Recent, proof-of-concept studies on the efficacy of live-virus EHV-1 vaccines have demonstrated that experimental horses inoculated intranasally with a live, virulent, wild-type strain of EHV-1 develop an immunity that is fully protective against the development of central nervous system signs after subsequent challenge inoculation (3 months later) with a highly neuropathogenic, mutant strain of the herpesvirus (Allen, 2007c).
INFECTIONOUS DISEASES OF HORSES

References


The Committee met on Monday, October 22, 2007, at John Ascuaga’s Nugget Hotel, Reno, Nevada. The meeting, chaired by Richard D. Willer and supported by Vice Chair Norman G. Willis, was attended by 12 Committee members and over 53 guests. Following a welcome and brief opening remarks by the Chair, the Chair reported on the status of the 2006 Resolution supporting funding for the United States to participate in foot-and-mouth disease (FMD) research identified as a priority by the Global FMD Research Alliance (GFRA). The resolution was sent to the Secretary of Agriculture, to whom the Resolution was directed. When the response from the Secretary was received, it became apparent from the response that the Resolution really should have been directed to the Administrator of the Agriculture Research Service (ARS), the arm of the United States Department of Agriculture (USDA) that conducts FMD research. In July 2007, the Resolution was forwarded to Edward Knipling, Administrator of ARS, and a response was received on August 8th. Knipling indicated that ARS was aware of the United States Animal Health Association’s (USAHA) support for GFRA funding and had considered it as the ARS formulated their FY 2009 budget request to the Secretary of Agriculture. The status of the ARS funding request will not be known until spring of 2008 when the President’s budget is released to Congress.

Vice Chair Norman Willis then provided a brief review of the discussion topics from the 2006 meeting of the Committee.
and Plant Health Inspection Service (APHIS), USDA made a presentation on the process for regionalizing a country for a given disease using Uruguay and FMD as a model.

Uruguay officially requested that APHIS allow the importation of fresh (chilled or frozen), deboned, and matured prime beef cuts from Uruguay, into the United States. Uruguay vaccinates its cattle population against FMD and planned to continue vaccination at least until 2003. Given the history of the disease in Uruguay and the fact that Uruguay requested authorization to export a commodity rather than recognition of FMD freedom, APHIS conducted a quantitative risk assessment to evaluate the likelihood of FMD introduction through importation of beef from Uruguay. The November 2002 quantitative risk assessment for beef from Uruguay is included at the end of this report.

In the example of Uruguay, she indicated that even though the country had an FMD outbreak in 2001 and restarted vaccination, the site visit confirmed that the country was capable of controlling the outbreak. In 2003, no further outbreaks had occurred, and a quantitative evaluation outlined mitigating measures that should be applied to the meat. Applying a risk model concluded that the risk was not significant, as opposed to significant or economically significant, thus allowing the process to proceed more rapidly to rule making. In 2003, a final rule allowed the market to reopen.

Michael David, Director of Sanitary International Standards, NCIE, US, APHIS-USDA, presented a recap of United States activities at the 75th Annual General Session of the World Organization for Animal Health (OIE) held in May 2007 in Paris, France. David indicated the OIE was identified in 1994 by the World Trade Organization (WTO) as the international body for setting animal health standards, reporting global animal health events, and presenting guidelines and recommendations on measures relating to animal health.

Specialist Commissions and Working Groups

Dr. David stated that the United States remains active and involved with many of the activities and initiatives of the OIE including maintaining members on three of the four Specialist Commissions of the OIE - the Terrestrial Animal Health Standards Commission (President Alex Thiermann), the Biological Standards Commission
INTERNATIONAL STANDARDS

Commission (Vice-president Beverly Schmitt), and the Aquatic Animal Health Standards Commission (Permanent Observer Donald Lightner).

The United States also has members in at least one of the three permanent Working Groups - Wildlife Diseases Working Group (John Fischer), and has provided subject matter experts for the OIE ad hoc groups on Epidemiology, Avian Influenza, Newcastle Disease Surveillance, Anti-microbial Resistance, Compartmentalization, Biosafety and Biosecurity, and Biotechnology.

Active participation in these ad hoc groups helps the organization develop guidelines and recommendations that are both grounded on sound science and feasible to implement. In addition, comments to the various proposed Code chapter and Appendix changes of the Terrestrial Animal Code and Aquatic Animal Code and of the Terrestrial and Aquatic Manuals are submitted, after consultation with the many stakeholders, to the OIE at least twice yearly.

This year the member countries approved an OIE Collaborating Center for Research on Emerging Avian Diseases at the Southeastern Poultry and Research Laboratory, Athens, Georgia. There are now four OIE collaborating centers located in the United States.

The United States has also been involved with the OIE’s regional activities, and has sent technical experts to attend the Regional Commission committee meetings on avian health, aquatic health, and veterinary biologics. All these committees have met at least once during the past year.

The United States submitted applications to the OIE requesting recognition as a country historically free of Contagious Bovine Pleuropneumonia (CBPP) and for bovine spongiform encephalopathy (BSE) classification risk status. The OIE recognized the United States as CBPP free and was classified as “controlled” risk for BSE.

Vice Chair Norman Willis then discussed several significant items from OIE’s 75th General Session. The topics he offered for the Committee’s awareness and consideration were the Animal Health and Welfare Fund, use of epidemiological models, the concept of zoning and compartmentalization, and the full membership of the People’s Republic of China. The Animal Health and Welfare Fund is a fund to improve veterinary sanitary governance and to strengthen competencies. The OIE
Performance Vision and Strategy (PVS) Tool is used to evaluate veterinary services. The 10.5 million Euro global fund is comprised of voluntary contributions. OIE’s use of epidemiological models enables them to study what if scenarios. Their use is limited during outbreaks or as a predictive tool and is just one of a number of tools used for scientific advice. He indicated that a definition of epidemiological model doesn’t exist in the veterinary field. The concept of zoning and compartmentalization is about separating subpopulations of animals with distinct animal health status. Compartmentalization is where animal populations are separated by management and husbandry practices related to biosecurity. For zoning, animal populations are separated on a geographical basis and includes surveillance, and identification and traceability of live animals.

Alex Thiermann, International Services (IS), APHIS, USDA and President of OIE’s Terrestrial Animal Health Standards (Code) Commission, gave a report on current activities of the Code Commission and discussed their work plan. The Commission met in September 2007 and the results of that meeting will be available on OIE’s website.

Thiermann gave examples of subject areas of discussion from the September meeting of the Commission which included:

• General definitions concerning veterinary services and veterinary authorities as well as surveillance and monitoring;
• The use of the Performance Vision and Strategy (PVS) tool for evaluation of veterinary services which had already been applied in 37 countries; the tool is available to countries for periodic self-assessment;
• Translating the concept of compartmentalization to implementation for avian influenza;
• Discussing the presence of lyssa viruses versus rabies free status as well as considering a product or population safe versus country freedom;
• The public health implications of bovine tuberculosis;
• Trying to loosen restrictions for BSE, in particular bones for making gelatin; and
• Dealing with compartments and the presence of pathogens in wildlife, as well as the different approach between classical swine fever and avian influenza.
Thiermann also discussed horizontal topics included the use of a commodity based approach for the Code. Traditionally the Code has been written by disease whereas trade occurs by commodity. Other horizontal issues mentioned were official OIE disease categorization, country status in relation to the situation in wildlife (e.g. avian influenza (AI) and classical swine fever (CSF), the incorporation of the concept of “containment zone” in the Code (using the example of a CSF outbreak near Miami International Airport where the area around the airport could be considered a containment zone and the remainder of the state considered free; active surveillance would have to establish the disease did not escape the containment zone), how to implement compartmentalization, commodity specific recommendations and use of the PVS tool to evaluate veterinary services. Thiermann also mentioned to move to having reference documents on non-listed diseases that are outside the Code (e.g. Listeria) so that trade disruptions did not occur when a country identified the presence of that disease.

Consideration is also being given to publishing the Code in two volumes because of the size. One volume would deal with Horizontal Issues and Animal Welfare, while the second volume would deal with diseases. Thiermann indicated topics in the future work program including official OIE disease categorization but offered that member countries would also offer topics.

Donald V. Lightner, Director of the OIE Reference Laboratory for Shrimp Diseases and Professor at the University of Arizona, College of Agriculture, Department of Veterinary Science and Microbiology, and Permanent Observer of OIE’s Aquatic Animal Health Standards Commission gave a status report on OIE’s efforts to harmonize the Aquatic Animal Health Code with the Terrestrial Animal Health Code.

The Aquatic Animal Health Standards Commission (AAHSC) was given a mandate several years ago by OIE Director General Bernard Vallat to take steps to harmonize the Aquatic Animal Health Code with the Terrestrial Animal Code. In his meeting with the AAHSC earlier this month in Paris, France, Vallat listed harmonization of the two Codes as number one in his list of priorities for the AAHSC. Also included as priorities for the AAHSC were aquatic animal welfare issues; adapting the OIE Performance Vision and Strategy (PVS) Tool for evaluation of veterinary services as they apply to aquatic
REPORT OF THE COMMITTEE

animals; to follow issues relating to food safety and the inspection of aquatic animal products; and to identify critically important antimicrobial compounds needed for disease control in cultured aquatic animals. Amphibian diseases were formally added to the responsibilities of the AAHSC during the OIE General Session in May 2007. David Wilson, former Deputy Director General of OIE and now serving OIE as a consultant, is working with the Code Commissions to harmonize the Codes where it makes biological sense to do so.

Progress to date includes the harmonization of most of the horizontal chapters of the two Codes. The disease specific chapters in the Aquatic Code have been rewritten to more closely approximate the format and organization of the Terrestrial Code chapters, including articles on safe commodities that do not require a health certificate and articles relating to the disease status of a country, zone or compartment.

In preparation by members of the AAHSC, or by ad hoc groups reporting to the AAHSC, are other Aquatic Code chapters and appendices on surveillance, animal welfare, disinfection of aquaculture establishments and development of new model aquatic animal health certificates. These Aquatic Code chapters and appendices are being prepared to be follow the same structure as equivalent Terrestrial Code chapters, as much as is possible within the constraints posed by biological differences and culture in a water environment.

Beverly Schmitt, Director of the Diagnostic Virology Laboratory, National Veterinary Services Laboratory (NVSL), USDA-APHIS-VS and Vice-president of OIE’s Biological Standards (Laboratory) Commission, gave a report on how that Commission works and how their work plan is set. The Laboratory Commission, Presided by Steve Edwards, establishes or approves methods for diagnosing diseases of mammals, birds and bees, and the testing of biological products, such as vaccines, used for control purposes, as well as oversees production of the Manual of Diagnostic Tests and Vaccines for Terrestrial Animals.

Schmitt briefly reviewed the criteria for inclusion in the OIE list that replaced the previous List A and List B diseases. The criteria for inclusion in the list include the potential for international spread, the potential for significant spread within naive population, the zoonotic potential, and emerging diseases.

Schmitt indicated that the OIE develops and publishes
the biological standards for diagnostic tests and vaccines every 4 years with a chapter for every disease listed in the Terrestrial Animal Health Code plus additional significant diseases. It is adopted by OIE Member Countries during General Session each May by consensus; there is no other pathway for adoption.

Schmitt then reviewed the process for updating the Manual. Jim Pearson serves as a Consultant Technical Editor of the Manual and the Scientific Editor is Sara Linnane. There are 117 chapters to review and edit. The chapters are first routed to Michael David, NCIE-VS-APHIS-USDA for United States review. The planning for a new edition of Manual starts same year it is published. New chapters and those for updating are identified as well as authors and reviewers. The author submits the revised or new chapter which are then reviewed by the Consultant Technical Editor, corrected if necessary, then sent to member countries and reviewers during the second year. The Consultant Technical Editor reviews the comments and includes those that are appropriate. Policy questions and questionable scientific comments are referred to the Biological Standard Commission (BSC) for review and direction. Revised Chapters are then sent to the author for final review and, in some cases, the author is also asked to advise on the validity of some comments. The author can question the changes but can not delete or change the chapter without approval. Editors and/or the BSC review the author’s changes. OIE takes precedent over the author; after all, it is an “OIE Manual”. The Scientific Editor coordinates the entire review and puts it into final format for approval by the country Delegates at the General Session. She emphasized that there is an opportunity for all OIE member countries to be involved in Manual revisions.

Regarding the 2008 edition of the Manual, the BSC has reviewed the comments received at all of its meetings in 2006 and 2007, approved it in January 2007 and sent it to International Committee for approval. The Manual was approved by the International Committee in May 2007. Schmitt anticipates its publication in the Spring of 2008.

A Time Specific Presentation entitled, Integrated Agricultural Intelligence – Why It is Essential Today, was given by Fonda Munroe, National Manager of Animal Health Risk Analysis in the Science Branch of the Canadian Food Inspection Agency. The full text of her presentation is included in these proceedings at the end of this Committee Report.
REPORT OF THE COMMITTEE

Victoria Bridges, Veterinary Epidemiologist and Head of the Emerging Disease Tracking, Analysis and Forecasting Team, Center for Emerging Issues, Centers for Epidemiology and Animal Health (CEAH), VS-APHIS-USDA, gave a report on the World View of Highly Pathogenic Avian Influenza (HPAI) in poultry. Bridges had just completed a one-year assignment to the United Nation’s Food and Agriculture Organization (FAO) Avian Influenza Crisis Management Center (AI-CMC).

Looking at H5N1 HPAI outbreaks in birds in 2007, one can categorize countries into four groupings based on incidence of disease. Countries in which H5N1 HPAI is endemic in an entrenched manner include Egypt, Viet Nam, and Indonesia. Joining this group in 2007 was Bangladesh, which had their first reported case of HPAI in February. Upon identification of the first case in Bangladesh, the disease was soon identified throughout much of the country.

Nigeria and China are both countries in which H5N1 HPAI outbreaks occurred in 2007 in an ongoing sporadic manner at a greater incidence. In China, surveillance is showing a greater distribution of virus in addition to the outbreaks identified via clinical signs. Countries that reported levels of HPAI at an ongoing sporadic level but at a lower incidence level in 2007 include Pakistan, Russia, Myanmar, Thailand, and Germany. Russia had two foci of outbreaks in 2007: in February in the vicinity of Moscow and in January and September in the area around Krasnodar. Myanmar has had outbreaks approximately once a month since February.

The fourth grouping of countries reporting H5N1 HPAI in 2007 are those that reported only a few outbreaks during the year, include Afghanistan, Azerbaijan, Cambodia, the Czech Republic, France, Ghana, Hong Kong, Hungary, India, Japan, Kuwait, Laos, Malaysia, the Republic of Korea, Saudi Arabia, Togo, Turkey, and the United Kingdom.

Based on geographic distribution of outbreaks of H5N1 HPAI in 2007, in addition to Southeast Asia and Egypt, two foci of viral activity can be identified. One area of focus was in Europe, consisting of two separate outbreaks. HPAI was found in farmed geese in Hungary and in a commercial turkey facility in the United Kingdom. Based on genetic analysis of the virus and epidemiology of the outbreaks, it is most probable the virus was moved from Hungary to the United Kingdom via importation of turkey meat. In June 2007, a commercial turkey operation in
the Czech Republic was found to be affected with H5N1 HPAI, followed by identification of disease in a commercial chicken operation under the same ownership. A number of dead wild birds and a few domestic poultry in southern Germany and northeastern France were found to have been infected with H5N1 HPAI in June and July, and continuing into September. Based on genetic analysis, virus isolates from Germany and France are greater than 99 percent similar to virus isolated in the Czech Republic. Additionally, these viral isolates from the Czech Republic, Germany, and France are highly similar to the viral isolates from Kuwait and significantly different from those from Hungary and the United Kingdom.

Another focus of H5N1 HPAI in 2007 was in Western Africa, involving Nigeria, Togo, and Ghana. Nigeria was the first country in Africa affected with H5N1 HPAI in February 2006. Since then, disease has been ongoing in Nigeria with 25 states having been affected by the end of July 2007. Approximately a half-dozen cases were reported in Ghana during April through June 2007 and several cases were reported in Togo during June and July. While no cases were reported during 2007, both Cote D'Ivoire and Burkina Faso had outbreaks in 2006.

Risk factors involved in the spread of HPAI include wild bird migrations, wild bird bridge species, live domestic poultry, domestic poultry products, and fomites/human movement. While these risk factors may play varying roles in the epidemiology of HAPI outbreaks, they must all be kept in mind and addressed.

When providing assistance to countries experiencing outbreaks of HPAI or conducting preparedness activities prior to identification of disease outbreaks, the FAO focuses on the following areas of expertise: market chains, compensation, vaccination, laboratory capacity and diagnostics, surveillance, communications, and preparedness planning. FAO communication activities often focus on development of messages to the general public, but also include efforts to improve communications between relevant governmental agencies and between governments and nongovernmental organizations. Identification of donor countries and organizations to meet the needs for HPAI preparedness and response within developing countries is also a major focus for FAO activities.

Luis Rodriguez, Research Leader of the USDA-ARS, Foreign Animal Disease Research Unit at the Plum Island Animal
REPORT OF THE COMMITTEE

Disease Center, Greenport, New York, gave an update on the FMD Global Research Alliance (GFRA). Cyril Gay had first reported on GFRA at the 2006 meeting of the Committee. GFRA is an international consortium to facilitate strategic research collaboration between five institutions: the Institute for Animal Health, (United Kingdom), the Plum Island Animal Disease Center (PIADC), (United States), the National Centre for Foreign Animal Disease (Canada), the Australian Animal Health Laboratory, and the International Livestock Research Institute (ILRI).

The GFRA research focuses on: 1.) fast acting biotherapeutics and vaccines that can stop and prevent shedding and transmission, provide greater cross-protection, enable the implementation of a differentiating infected from vaccinated animals (DIVA) strategy, and prevent the carrier state, and the development of delivery systems that allow mass vaccination; 2.) rapid detection methods; 3.) pen-side screening tests; and 4.) models for disease control and eradication.

The current research program is on track to deliver vaccines but is resource starved - vaccines are being improved in incremental steps (e.g. ARS-Department of Homeland Security Adenovirus Vaccine Development). Development of diagnostics is being conducted in-line with development of the vaccines. There is much to do in terms of test validation and international standardization with good progress being made between APHIS and Canada. Regarding progress on biotherapeutics, there are limited resources available. To address gaps in epidemiology and model use, there is a collaborative effort between ARS-INTA (Argentina) and the University of California, Davis. Further progress will require significant investment in supporting science in areas of immunology and pathogenesis, epidemiology and countermeasures discovery.

The GFRA approach requires significant investment but is based on the premise that more can be done by working together and eliminating duplication of effort. The effort does, however, need to accelerate and to focus on deliverables of diagnostics, vaccines and biotherapeutics, and decision support tools. Increased funding will accelerate delivery of products to manage an FMD outbreak in the FMD-free countries and there are different needs of FMD-free countries versus endemic countries.

GFRA includes two programs, Program One focuses on the needs for FMD free countries and will seek additional funding from governments for accelerated deliverables of differentiating
infection from vaccinated animals (DIVA) diagnostics, vaccines, and detection. It includes collaboration with the Institute for Animal Health at Pirbright on FMD vaccine immunity and collaboration with National Centre for Foreign Animal Disease on FMD diagnostics. While the United Kingdom, Canada and Australia have been successful in obtaining funding, the United States has not and has asked for funding for its component of Program One in both the FY2007 and FY2008 budgets. Program Two focuses on the needs for endemic areas such as determining the duration of immunity, adaptation of existing vaccines, use of critical control point epidemiological analysis, and improving vaccine efficiency, and through progressive control lead to eradication. Additional funding from outside sources is being sought in support of countries endemically infected with a focus on poverty alleviation and trade development. A November 2006 meeting in Agra-India led to the development of a Global Roadmap for Improved Control of FMD in Endemic Settings. One outside source for funding of Program Two was the Wellcome Trust. At this point, Rodriguez introduced Andres Perez from the University of California – Davis to brief the committee on a $22 million Wellcome Trust Proposal for the Development of Tools for the Progressive Control of FMD in Endemic Settings. The proposal includes components on critical control point analysis and improving vaccine efficiency. Perez is serving as the Coordinator for the portion of the proposal on epidemiology design and modelling of critical control points in endemic FMD control.

Rodriguez then reported on a recent meeting he attended in Buenos Aires focused on strategies and common actions for the prevention, control and eradication of FMD and other trans-boundary animal diseases in South America. The meeting was held under the auspices of the FAO Global Forum for the progressive control of trans-boundary diseases (GF-TAD) and was jointly organized with OIE.

The objectives of the meeting were to discuss a common strategy, plan and proposal for specific activities at national and regional level by governments, regional and international organizations, to define a work plan in the medium and long term, to detect overlapping of the different strategies in place in the region and in particular activities of prevention, training, early detection and response, vaccination campaigns and surveillance and to coordinate actions between regional organizations,
REPORT OF THE COMMITTEE

international organizations, donors and countries in the region.

The meeting was attended by over 60 representatives from the American hemisphere, including Chief Veterinary Officers and Presidents of cattle producer associations throughout the Americas. In addition there were representatives from OIE, FAO, the World Health Organization, the Pan American Health Organization, the Common Market of South America (MERCOSUR), and other international and regional organizations.

Rodriguez presented a 30 minute overview entitled, Novel Tools for Foot-and-Mouth Disease Control and Eradication. The basic idea was to create awareness that the currently available tools (e.g. vaccines and diagnostics) to control FMD might not be adequate to achieve final eradication. Furthermore, these tools are not adequate for the necessary surveillance to maintain the disease-free status after eradication is achieved. This was the first time this specific subject was discussed in this forum. Several participants were very interested in including the need for development and adaptation of appropriate technologies in any future discussions about FMD eradication from South America.

At the meeting, a Resolution was drafted and approved in support of the regional efforts for FMD eradication in South America. The Resolution included the creation of a matrix document summarizing all ongoing national and region eradication efforts so that all countries are aware of what efforts are being pursued and duplication of efforts are identified.

While in Buenos Aires, Rodriguez was also able to participate as an observer in a meeting of the Inter-Hemispheric Group for the Eradication of FMD (GIEFA). The meeting presided by Phil Bradshaw of the American Soybean Association further discussed regional strategies for FMD control in target high-risk areas identified including the Amazonas region (Brazil), the Tripartite border region (Argentina/Paraguay/Bolivia), and the Binational border region between Brazil and Paraguay Chaco region.

The GIEFA group has identified critical gaps in the eradication programs and is providing strategic funding to solve these gaps. Rodriguez suggested that technological gaps be identified and specific requests to develop the technologies to address the gaps be submitted to appropriate international and regional organizations, including the GFRA to which the PIADC is affiliated.
INTERNATIONAL STANDARDS

Eric Hoffman, Associate Deputy Administrator, IS-APHIS-USDA discussed a new IS initiative called International Technical Regulatory Capacity Building (ITRCB). The ITRCB supports U.S. trade policy objectives by enhancing developing countries’ ability to trade. It directly supports the President’s National Security Strategy by promoting free trade and open markets; all while fostering economic growth and building future markets. The ITRCB encompasses training, meetings, foreign visits, workshops and other areas. This is considered to be a growth area, and IS will adapt as the needs change.

Hoffman began his presentation with a definition of capacity building as, any consultation, orientation, teaching, training, workshop, or similar activity with foreign nationals done in the United States or in another country where the objective is to enhance the ability of foreign nationals to address animal and plant health issues within their countries or organizations. The mission of international services is to provide internationally-based animal and plant health expertise and service that enhance USDA-APHIS capacity to safeguard American agricultural health, to strengthen emergency response preparedness, and to facilitate safe agricultural trade.

ITRCB activities include providing scientific, technical, and regulatory training in:

• Foreign animal disease surveillance, epidemiology, emergency preparedness and response (e.g. foot and mouth disease, avian flu, other transboundary emerging and zoonotic animal diseases);
• Foreign plant pest monitoring, detection, tracking, eradication (exotic fruit flies, other quarantine and non-quarantine pests);
• Export and import regulations, health certification, and pest and disease risk and pathway analyses (animal, plant, fisheries);
• Biotechnology regulatory procedures and processes;
• Pest and disease mitigation techniques;
• National animal and plant health infrastructures and delivery of services;
• Sanitary and phytosanitary regulations development;
• Wildlife control techniques and diagnostics;
• Regulation of veterinary vaccines, diagnostic test kits, laboratory procedures; and
• Livestock identification techniques and procedures.
The goals of the ITRCB Initiative include:

- Develop and implement a standardized approach for receiving and responding to international technical and regulatory capacity building requests and develop additional formal international training courses to reduce the number of ad hoc requests;
- Develop and implement standardized criteria for prioritization and tracking of all APHIS ITRCB requests;
- Hire and train ITRCB personnel who will work closely with Points of Contact from each of the APHIS units and USDA agencies, to receive, prioritize, plan, deliver, and evaluate APHIS international technical and regulatory capacity building activities;
- Develop and implement an electronic process that captures and integrates all phases of APHIS ITRCB: requests, prioritization, tracking, delivery, evaluation, reporting;
- Carry out retrospective study of the last three years of ITRCB done by APHIS to determine what APHIS courses are needed to replace ad hoc requests and how many/year are needed;
- Research, develop, and implement a cost recovery process for delivery of APHIS technical and regulatory expertise to include salary and expense reimbursement and overhead charges;
- Identify and access specific funding sources to carry out additional ITRCB in support of APHIS Mission priorities;
- Look closely at how often and for how much time certain APHIS experts get called upon to provide international training; determine need for “backup experts” and more broadly assign “subject matter expert” requests;
- Investigate, develop and include into the 2010 budget, a new line item request for ITRCB course design and delivery, and the additional APHIS staff to carry it out; and
- Provide world class service, hospitality, and technical exchange to those visiting APHIS from abroad through the APHIS International Visitor’s Center.

As an update on APHIS’ screwworm program, the following information was provided by Hoffman:
INTERNATIONAL STANDARDS

Background: APHIS’ Screwworm Program prevents the infestation of screwworm flies in the United States by working with Mexico and countries in Central America. Working together, the pest has been eradicated from all of Central America to the Darién Gap, between Colombia and Panama. In collaboration with that region, the plan is to maintain that barrier to prevent northward movement of screwworm populations.

Status: APHIS produced 110 million sterile screwworm flies per week during FY 2006 to maintain the barrier at the Darién Gap. Agency officials detected no cases of screwworm in Central America in FY 2006. Also, Panama received screwworm-free status on July 12, 2006.

In addition to the sterile production facility in Tuxtla Gutierrez, Mexico, in FY 2006, APHIS completed construction of a new screwworm rearing facility in Panama to maintain the barrier there. This new plant would address political concerns as well as inefficiencies of transporting the flies from the current facility in Mexico. The first x-ray sterilizing unit arrived in Panama by mid 2007 and is fully operational. The second and last x-ray machine should be functional by November 2007. Required staff is being hired and trained. Sustainable production levels of sterile flies have already started. By December 2008, APHIS should have this facility with 100% sustainable production levels of sterile flies.

Both the Tuxtla Gutierrez and the Panama sterile insect production facilities will remain in operation for the immediate future. Having redundant rearing capacity at Tuxtla Gutierrez provides some degree of insurance in case production interruptions occurs at the Panama rearing facility.

The last presentation was an update on the North American Animal Health Laboratory Network Collaborative Effort. At the beginning of the Committee meeting, the Chair had passed out several copies of two reference notebooks prepared for meetings on this topic - Collaborative Effort to Enhance Animal Health Laboratory Networks in North America/Esfuerzo de Colaboración Para Mejorar Las Redes de Laboratorios de Salud Animal en Norte América prepared for a meeting with Animal Health Officials and federal laboratory directors from Mexico held during the 14th Annual Meeting/14ª Reunión Annual of the Consejo Nacional de Salud Animal (CONASA – roughly the Mexico equivalent to USAHA) which was held in Mexico City, Mexico in November 2006; and North American Animal Health Laboratory
REPORT OF THE COMMITTEE

Network Collaboration prepared for a meeting planned and hosted by the Canadian Food Inspection Agency held at the National Centre for Foreign Animal Disease (NCFAD) in Winnipeg, Canada in February 2007. The Chair indicated that he had received requests for copies of the notebooks. The Committee agreed that the notebooks be made available by placing on the USAHA website for easy access.

The Chair then referenced two items distributed to the Committee relative to the tri-national collaborative effort on animal health laboratory networks. One was a brief history of the collaborative effort and the other was the text of a presentation made by the Chair, Rick Willer, at the Laboratory Committee meeting of the Consejo Nacional de Salud Animal (CONASA – roughly the Mexico equivalent to USAHA) during their 14th Annual Meeting. Both items are included in their entirety at the end of the Committee Report.

The Chair also indicated that USAHA President Lee Myers had asked him or someone from the Committee to represent the Association at the 15th Annual Meeting of CONASA held September 17-19, 2007 in Mexico City. Because the Chair was unable to attend, he asked Committee member Bob Frost to attend. Both the Chair and Frost had also been invited to attend by the President of CONASA. While in Mexico City, Frost met with key laboratory people and participated in the CONASA Laboratory Committee meeting. After the morning session, Mexico Secretary of Agriculture Alberto Cardenas Jimenez, Enrique Sanchez Cruz, Director of Servicio Nacional de Sanidad, Inocuidad y Calidad de Agroalimentaria (SENASICA-Mexico’s equivalent to USDA-APHIS) and Frost talked about the merits of the recent laboratory partnership and collaborative effort between the North American countries. On Monday evening, Frost met with Sanchez Cruz, Francisco Velarде, Director General of the Dirección General de Salud Animal (DGSA-Mexico’s equivalent to USDA, APHIS, VS), Igor Romero, Director of the Comisión México-Estados Unidos para la Prevención de la Fiebre Aftosa y Otras Enfermedades Exóticas de los Animales (CPA-Mexico’s equivalent to USDA’s Foreign Animal Disease Diagnostic Laboratory), Hugo Fragoso, Director of the Centro Nacional de Servicios de Constatación en Salud Animal (CENAPA) and Montserrat Arroyo, Director of Field Operations for CPA, at their office in Mexico City. The hour long
meeting covered the progress and Mexico’s contribution to the North American Animal Health Laboratory Network and their vision for Mexico’s laboratory network. All agreed that over the last few years trust, friendship a scientific partnership has evolved. All were excited about the future possibilities for the trilateral effort and the added safeguards for animal and human health the three countries will provide for the North American continent. Arroyo gave a thorough presentation to CONASA’s Laboratory Committee on the evolution and current status of the North American Animal Health Laboratory Network.

Paul Kitching, Director of the Canadian Food Inspection Agency’s, NCFAD in Winnipeg, Manitoba, Canada, then provided an update on the North American Animal Health Laboratory Network Collaborative Effort activities. The concept of a North American Laboratory Network was first reported on by Hugo Fragoso at the 2006 USAHA Committee on International Standards meeting. Kitching indicated that in October 2004, the USAHA Committee on Diagnostic Laboratory and Veterinary Workforce Development expressed consensus to support working towards a North American Animal Health Laboratory Network and a commitment to increase collaboration among diagnostic laboratories.

In March of 2005, the Prime Minister of Canada and the Presidents of Mexico and the United States launched the Security and Prosperity Partnership of North America (SPP) as a commitment by the three countries to work together to build a safer and more economically dynamic North America. The SPP constituted a trilateral effort to increase security and to enhance prosperity among the three countries, through greater cooperation and information sharing.

As part of the Prosperity Agenda of the SPP, to enhance the quality of life, a commitment was made to create a safer and more reliable food supply, while facilitating agricultural trade. Within this framework the three countries agreed to enhance laboratory coordination and information-sharing by conducting targeted bilateral and/or trilateral activities to establish a mechanism to exchange information on laboratory methods and to build confidence regarding each other’s testing procedures and results. It is in this context that the initiative to harmonize the diagnostic tests in the North American Animal Health Laboratory Network was established.
In November 2006, Richard Willer and Robert Frost, USAHA Past Presidents, presented the idea for collaboration between the three countries on animal health laboratory networks at the CONASA meeting in Mexico City. This had been preceded by a meeting of laboratory representatives from the three countries at USAHA’s 110th Annual Meeting in October 2006, to discuss the merits of establishing a North American Animal Health Laboratory Network and how the network would operate.

The CFIA coordinated a meeting of high level representatives from the three nations in February 2007, at the NCFAD in Winnipeg, Canada, to discuss details of the collaboration between the nations’ animal health laboratory networks and developed the terms of cooperation and road map towards the harmonization of tests used in North America for the diagnosis of animal diseases. It was decided that initial efforts for harmonization of diagnostic tests should be concentrated in 3 areas: Avian influenza, tuberculosis and vesicular diseases. Working groups, with representatives from Mexico, Canada and the U.S., were established to address these 3 disease areas while maintaining the respective mandates of their country’s animal health agency.

Workshops were held in Mexico City in May 2007, for the Vesicular Diseases and the Avian Influenza Working Groups. A functional definition of harmonization of diagnostic tests was adopted. It was agreed that the term refers to ensuring an equivalency of diagnostic test results between the laboratories, regardless of protocols practiced by each country. Both of these working groups have been involved in a comprehensive set of activities, including the training of laboratory staff, sharing of diagnostic test protocols and inter-laboratory tests of harmonization panels. Progress of the activities of both of these working groups has been monitored by conference calls and adjustments made to the road map. Progress is, for the most part, on schedule.

The Tuberculosis Working Group will meet on November 1 and 2, 2007, in Ames, IA, to establish its road map and activities. A meeting of the three working groups will take place in February 2008, to review the overall results of the activities and to determine future actions.

In addition to harmonizing diagnostic tests, this initiative provides for interchange of diagnostic panels, enhancement of
diagnostic capability, training opportunities, sample movement across the borders, compliance with International Standards (ISO 17025), sharing of information, diagnostic protocols, reference material and reagents. Collaboration between the laboratory networks of our three countries helps to improve our ability to safeguard our animal industries, enhance real time disease surveillance to shorten the time to response, provide for surge capacity during outbreaks, enhance the sharing of technology and enable us to standardize training.

Kitching mentioned that his government was so pleased with the progress on the North American collaborative effort, the CFIA received $600,000 funding to begin a similar collaborative effort in South America.

During the business session, the Committee discussed a number of items including how better to review and comment on proposed new and amended OIE Code Chapters and reference documents. As agreed to by the Committee previously, the OIE documents available for comment in December 2006 were forwarded to the Chair by Michael David. The Chair in turn forwarded them to all of the USAHA Committee Chairs as well as the National Assembly of State Animal Health Officials (State Veterinarians). The previous year (2005), the Chair had filtered the documents available for review and sent only the items that pertained to each Committee to the Chair of that Committee. This past year (2006), the Chair used a different approach – sending out all of the documents available for comment to all of the Committee Chairs highlighting the names of those documents thought to be of interest to that particular committee. As has happened in the past, few substantive comments were received.

Vice Chair Willis suggested that during the coming comment cycle (documents are out for comment in December with a January deadline), the draft chapters could be screened by the Chair and Vice Chair for possible controversial topics, and then supported by the opinions and input of a few other members of the Committee in order to lessen the volume of material forwarded to the appropriate Chair. The Committee agreed. In addition, the Chair agreed to work more closely with David in order to identify items needing close scrutiny and to reduce any duplication of contact with USAHA Chairs.

The Committee discussed the layout of the Committee meeting and agenda. It was suggested that business discussions
REPORT OF THE COMMITTEE

should occur during the meeting after a subject is presented, rather than at the end of the meeting. If possible, Resolutions should be developed in advance of the meeting for discussion, modification and approval at the meeting. The Chair and Vice Chair would attempt to identify ahead of time any item that might be the subject of a formal resolution.

It was also suggested that the Committee members would like to have regular contact between the Annual Meetings, either electronically or by teleconference. The Chair agreed to explore doing this with financial support from APHIS or ARS.

Finally, the Committee members expressed a desire to go back to a rectangular layout for the Committee meeting in order to promote better discussion. The Chair agreed to ensure this change at the 2008 Annual Meeting.

The last discussion item related to establishing a relationship with the Committee on Aquaculture. Because of the overlapping areas of the Aquatic Animal and Terrestrial Animal Health Codes and Manuals, it was felt that a cooperative link between the two Committees should be established. This year’s agenda included an update on the efforts to harmonize the two Codes and was included with the full support of the Chair of the Committee on Aquaculture. International aquatic animal health issues would be included as a subject item on future Committee agendas in collaboration with the Committee on Aquaculture.
EXECUTIVE SUMMARY

Uruguay officially requested that APHIS allow the importation of fresh (chilled or frozen), deboned, and matured prime beef cuts from Uruguay, into the United States. Uruguay vaccinates its cattle population against foot-and-mouth disease (FMD) and plans to continue vaccination at least until 2003. Given the history of the disease in Uruguay and the fact that Uruguay requested authorization to export a commodity rather than recognition of FMD freedom, APHIS conducted a quantitative risk assessment to evaluate the likelihood of FMD introduction through importation of beef from Uruguay.

Consistent with the approach taken by APHIS in the past for evaluating the risk of FMD in beef imports from Argentina, the mitigations considered in this assessment include:

1. Beef imported from Uruguay will be deboned prime beef cuts from carcasses that are maturated for 36 hours at a temperature between 2 to 10 degrees Celsius;
2. Beef will originate from animals in herds certified by governmental veterinary officials to have been vaccinated with oil-adjuvant vaccine;
3. All animals must pass both ante- and post-mortem inspections; and
4. All carcasses must be pH tested in the loin muscle and the pH must be less or equal to 5.8.

BACKGROUND

In April of 2001 an FMD outbreak occurred in Uruguay along the border with Argentina. The first case was identified on April 24, 2001 in the western state of Soriano. A total of 2,057 foci were reported by the end of the outbreak. The last focus reported was on August 21, 2001. Due to the magnitude of the outbreak, Uruguay determined that a stamping-out policy was inadequate and initiated a massive vaccination program. As a result of the outbreak the U.S. removed Uruguay from the list of FMD free...
countries and prohibited beef imports from the country.

APHIS conducted a site visit in July 2002 to gather data and relevant information to assess the risk of importing FMD in beef from Uruguay. APHIS had thorough knowledge of animal health infrastructure in Uruguay as a result of a previous assessment conducted in December 2000 and a history of trade with Uruguay. The scope of the 2002 site visit included verification of FMD outbreak controls, an overview of the surveillance program and laboratory capabilities, vaccination practices and eradication activities, and movement and border controls. Particular focus was placed on the regional FMD situation in Uruguay and South America and on the risk of reintroducing FMD into Uruguay from neighboring countries. The site visit report notes that FMD in South America is a regional problem, as was clearly evident in the outbreaks of 2001 in Argentina, Uruguay, and Brazil. It also notes that Uruguay is maintaining its strategy of vaccinating all cattle until the regional situation is rectified. The July 2002 site visit report is extensively referred to in this risk assessment, and is attached. A summary of the site visit findings is contained in the introduction section of this risk assessment. APHIS used the data obtained during the site visit as well as information provided by Uruguay to conduct this quantitative risk assessment.

SCIENTIFIC SUMMARY

The objective of this risk assessment is to quantify the annual risk of introducing FMD virus into the U.S. through importation of fresh (chilled or frozen), matured and deboned prime beef cuts from a vaccinated herd population in Uruguay. The analysis estimates the annual likelihood of importing beef from at least one FMD infected and viremic carcass from Uruguay. A scenario was developed to estimate this probability. The initiating event is the selection of herds in Uruguay from which to extract animals for slaughter.

The assessment is based on the premise that FMD infected beef from Uruguay can enter the U.S. if:

- There is an undetected/unreported FMD outbreak in Uruguay, and
- There is at least one FMD infected undetected herd selected to provide animals for export slaughter, and
INTERNATIONAL STANDARDS

- At least 1 animal from the infected, undetected, selected herds
  - is viremic, and
  - is selected for slaughter, and
  - is not detected during ante-mortem and postmortem inspections, and
  - provides meat containing FMD virus that survives maturation and deboning.

SUMMARY OF RESULTS

Hazard Identification

FMD virus can survive in frozen and contaminated meat in non-acid environments for up to 80 days. Therefore, APHIS considered presence of FMD virus in meat as a potential hazard.

Release Assessment

APHIS used a quantitative model to estimate the annual probability of importing infected beef into the U.S. from Uruguay. Monte Carlo simulations were carried out on an Intl Business Mach (IBM) PC, with the @RISK modeling software. The annual quantity of beef imported into the U.S. (in the simulations), ranged between 12,000 to 24,000 metric tons with a most likely value of 19,000 metric tons. This is based on historical annual exports of beef from Uruguay to the United States during 1996 to 2001.

Because vaccination is being carried out in Uruguay and because of the assumption that disease can go undetected for extended periods of time in vaccinated populations, there could be several undetected infected herds in Uruguay from which animals are picked and slaughtered, during a year with FMD. However, there is uncertainty about the potential number of undetected infected herds in Uruguay during a year with FMD. In order to better understand and characterize the uncertainty in this parameter, and how it affects the overall risk, the following two scenarios were evaluated:

- **SCENARIO 1:** In the first scenario, the number of undetected infected herds (N), varied uniformly between a minimum of 1 and a maximum of 35
- **SCENARIO 2:** In the second scenario, the number of undetected infected herds (N), varied from a minimum of 1 to a maximum of 62, with a most likely value of 35

These results are summarized in the Table 1.
<table>
<thead>
<tr>
<th>Scenario</th>
<th>Outputs</th>
<th>Mean</th>
<th>Most Likely</th>
<th>5%tile value</th>
<th>50%tile value</th>
<th>95%tile value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scenario1</td>
<td>Annual Probability of importing infected beef from Uruguay</td>
<td>3.51 X 10^-5</td>
<td>7.06 X 10^-6</td>
<td>3.05 X 10^-6</td>
<td>2.47 X 10^-5</td>
<td>1.03 X 10^-4</td>
</tr>
<tr>
<td>Scenario2</td>
<td>Annual Probability of importing infected beef from Uruguay</td>
<td>6.67 X 10^-5</td>
<td>5.57 X 10^-5</td>
<td>1.06 X 10^-5</td>
<td>5.12 X 10^-5</td>
<td>1.76 X 10^-4</td>
</tr>
<tr>
<td>Scenario1</td>
<td>Number of years until 98,200 the first importation of FMD infected beef from Uruguay</td>
<td>9,100</td>
<td>1,500</td>
<td>27,400</td>
<td>359,000</td>
<td></td>
</tr>
<tr>
<td>Scenario2</td>
<td>Number of years until 32,500 the first importation of FMD infected beef from Uruguay</td>
<td>700</td>
<td>800</td>
<td>13,200</td>
<td>118,800</td>
<td></td>
</tr>
</tbody>
</table>
Exposure assessment

Exposure assessment is the evaluation of the biological pathways leading to exposure of susceptible species to FMD virus. In the past, APHIS conducted an assessment of the potential pathways of exposure to FMD-infected beef (Centers for Epidemiology and Animal Health (CEAH) 1995 and 2001). APHIS considers that the most likely pathway of exposure of susceptible species to potentially FMD-infected beef would be through feeding food waste to swine (USDA, APHIS, VS, CEAH 001). Waste-feeder operations are licensed and inspected regularly by USDA inspectors. The licensing process requires that producers cook the waste fed to swine, reducing the probability of survival of foreign animal disease agents in the waste. In addition, the number of waste-feeding operations declined dramatically since 1994 and several states have prohibited feeding food wastes to swine. In a 1995 study by APHIS, the quantity of plate and manufacturing waste not adequately processed prior to feeding to swine was estimated at 0.00023 or less, with a 95 percent confidence (CEAH 1995). Based on this fraction, less than 1 part in 4,300 of imported beef is likely to be fed inadequately cooked to swine.

Consequence assessment

The consequences of FMD introduction into the U.S. would be extremely high. Available data do not allow quantification of the number of herds/farms that would be infected if FMD were introduced. Nevertheless, the cost of control, eradication and compensation, if disease were introduced, is likely to be significant. In addition to the direct costs of FMD introduction domestic and international trade losses would be very significant.

Using the difference in the Consumer Price Index (CPI) in 2001, APHIS updated the results of a 1976 study by McCauley et al. that estimated the direct costs (control and eradication program costs) and consumer impacts of FMD introduction over a 15-year period (1976-1990). The result is that the sum of the consumer impacts and direct costs in March 2001 dollars would be:

- 35.8 Billion dollars for endemic FMD with voluntary control
- 34.4 Billion dollars for eradication by strict slaughter and quarantine
- 38 Billion dollars for eradication by area vaccination
- 40.5 Billion dollars for compulsory vaccination program with endemic FMD

In addition to the direct costs of FMD introduction, domestic and international trade losses need to be considered.
REPORT OF THE COMMITTEE

The value of U.S. exports of beef products alone, which would be immediately lost, was over US$3 billion in 2001 (WTA 2001). The sum of the consumer impacts, direct costs and trade losses, would be between US$ 37 billion to US$ 44 billion, in 2001 dollars. This is an extremely high consequence.

RISK ESTIMATION

Risk estimation consists of integrating the results from the release assessment, exposure assessment, and consequence assessment to produce overall measures of risk associated with the hazards identified at the outset. Thus, risk estimation takes into account the whole risk pathway from hazard identified to the unwanted event (World Organization for Animal Health (OIE) 2002c).

The release assessment found:

The likelihood of exposure of FMD-susceptible species to FMD infected beef was not evaluated quantitatively in this risk assessment. However, in a 1995 study (CEAH 1995), APHIS determined that 0.023 percent of plate and manufacturing waste is not adequately processed prior to feeding to swine. This is a three orders of magnitude reduction in the risk at the release level.

The consequences of an FMD outbreak in the U.S. would be extremely high. The sum of the consumer impacts, direct costs and trade losses, would be between US$ 37 billion to US$ 44 billion, in 2001 dollars. Although the consequences of an FMD outbreak in the United States would be very high, given the findings of the release and exposure assessments, APHIS believes the likelihood of Uruguay beef introducing and establishing FMD is low.
INTERNATIONAL STANDARDS

BRIEF CHRONOLOGY OF EVENTS IN THE UNITED STATES ANIMAL HEALTH ASSOCIATION (USAHA) DEVELOPMENT OF A TRI-NATIONAL COLLABORATIVE EFFORT ON ANIMAL HEALTH LABORATORY NETWORKS IN NORTH AMERICA - 1999 THROUGH OCTOBER 2007

Richard D. Willer
Arizona Department of Agriculture

Robert E. Frost
Lincoln, CA

• 1999: The first discussion of the concept of connecting state/provincial and federal animal health laboratories and the vision of an American continental laboratory network occurred between Bob Frost (then USAHA Third Vice-President) and Canada’s Norman G. Willis, the President of the World Organization for Animal Health (OIE), during the USAHA’s Annual Meeting in 1999. This discussion occurred prior to the establishment of the Ames Master Plan and prior to the November 2001 birth of what now is known as the National Animal Health Laboratory Network (NAHLN).

• 2000 – 2002: Events, actions and discussions during this time frame were focused on the Ames Master Plan, establishing the NAHLN, and the needs of the Plum Island federal reference laboratories. The vision of a continental animal health laboratory effort was openly discussed at high international leadership levels in and out of the halls of USAHA and with world leaders at the 2002 OIE meeting in Paris, France.

• 2003: The 2003 USAHA Annual Meeting was the start-up meeting for the Committee on International Standards. At the invitation of Frost (then USAHA President), OIE’s Director General Bernard Vallat was present at the meeting along with North American government leaders where the vision of an American continental animal health laboratory network was discussed.

• 2004: In May of 2004, Frost (then USAHA Immediate Past President) and Bennie Osburn, Dean of the School of Veterinary Medicine, University of California, Davis, and
immediate Past President of the Association of American Veterinary Medical Colleges, Co-chairs of the Committee on Diagnostic Laboratory and Veterinary Workforce Development (CDLVWD), facilitated a USAHA stakeholder meeting at the National Centre for Foreign Animal Disease in Winnipeg, Canada, hosted by Centre Director Paul Kitching. This meeting led to a bilateral laboratory agreement between Canada and the United States.

- 2004: At the October 2004 Annual Meeting of the CDLVWD, there was agreement from the Chief Veterinary Officers from Canada (Brian Evans), Mexico (José Angel Del Valle) and the United States (John Clifford), along with the consensus of the Committee, to support the concept of an animal health laboratory network in North America. Rick Willer (then USAHA First Vice-President) discussed the concept further with Del Valle after the Committee meeting. Del Valle was so enthused that he returned to his country and lobbied his superiors for funding. He was successful in obtaining an unprecedented increase to Mexico’s federal laboratory budget (200 million pesos—a significant increase to a decades old flat line budget for his country’s federal laboratories). As a result of the additional money that enabled Mexico to modernize its laboratory facilities and because of the continued enthusiasm of Mexico’s animal health leadership, Mexico was now ready and willing to be a North American animal health laboratory partner.

- 2005: Willer (then USAHA President) continued his efforts with Mexico’s animal health and laboratory leadership on collaboration between the three nations on animal health laboratory networks.

- June 2005: In June of 2005, CDLVWD Co-chairs Frost and Osburn met in Ottawa with Canadian officials to further establish roadmaps and goals for an animal health laboratory network in North America and a short term/long term veterinary workforce development plan.

- 2006: Frost continued to work with animal health leadership in Canada.

- June 2006: In June of 2006, Willer (then USAHA Immediate Past President) met with Mexico’s federal laboratory directors
and Animal and Plant Health Inspection Service – International Services in Mexico City. At that meeting, Mexico pointed out that this continental animal health laboratory network effort was supported at the Presidential/Prime Ministerial level in the Security and Prosperity Partnership (SPP) agreement of 2005. This historic agreement between the countries of North America provided for, among other things, collaboration on laboratory networks. [In March of 2005 the Presidents of Mexico and the United States, and the Prime Minister of Canada agreed to work together to enhance the security and prosperity of the three nations.]

- **October 2006:** At the USAHA’s Annual Meeting in 2006, Hugo Fragoso, director of one of the three federal laboratories in Mexico, made a presentation at the Committee on International Standards on the collaborative effort on animal health laboratory networks in Mexico, the United States, and Canada. Fragoso emphasized the importance of the SPP in providing the framework for animal health laboratory network collaboration (see 2006 CIS committee report). Paul Kitching also pointed out the need for collaboration between North American animal health laboratory networks and emphasized the importance of the SPP during the meeting of the CDLVWD (see 2006 CDLVWD committee report).

- **October 2006:** During USAHA’s Annual Meeting in October 2006, Willer and Frost facilitated a meeting betweenAPHIS, and Mexico and Canadian laboratory leadership where follow-up action items were agreed upon. John Clifford, Chief Veterinary Officer for the United States, was present and supported those action items.

- **November 2006:** In November 2006, at Mexico’s request, Willer and Frost made a presentation at the Annual Meeting of Mexico’s Consejo Nacional de Salud Animal (CONASA-Mexico’s counterpart to USAHA) and met with Mexico laboratory directors and animal health leadership to discuss laboratory network collaboration.

- **December 2006 – January 2007:** As a follow-up to both USAHA’s Annual Meeting in October 2006 and CONASA’s Annual Meeting in November 2006, Frost and Willer worked with Canada on a February 2007 meeting in Winnipeg. Holding
this meeting was one of the follow-up action items from the tri-lateral laboratory meeting held at USAHA's Annual Meeting in October 2006.

- **February 2007**: In February 2007, Canada hosted a meeting of high level animal health laboratory representatives from Canada, U.S. and Mexico to discuss details of the collaboration between the nations’ animal health laboratory networks and develop the terms of cooperation and road map towards the harmonization of tests used in North America for the diagnosis of animal diseases. It was decided that initial efforts for harmonization of diagnostic tests should be concentrated in 3 areas: Avian influenza, tuberculosis and vesicular diseases. Working groups with representatives from Mexico, Canada and the United States were established to address these 3 disease areas while maintaining the respective mandates of their country’s animal health agency.

- **May 2007**: Workshops were held in Mexico City in May 2007, for the Vesicular Diseases and the Avian Influenza Working Groups. A functional definition of harmonization of diagnostic tests was adopted. It was agreed that the term refers to ensuring an equivalency of diagnostic test results between the laboratories, regardless of protocols practiced by each country. Both of these working groups have been involved in a comprehensive set of activities, including the training of laboratory staff, sharing of diagnostic test protocols and inter-laboratory tests of harmonization panels. Progress of the activities of both of these working groups has been monitored by conference calls and adjustments made to the road map.

- **Programmed for November 2007**: The Tuberculosis Working Group plans to meet on November 1st and 2nd, 2007, in Ames, IA, to establish its road map and activities.

- **Programmed for February 2008**: A meeting of the three working groups is planned for February 2008, to review the overall results of the activities and to determine future actions.
Collaboration between the animal health laboratory networks of the North American countries – Canada, México, and the United States – is essential to the economic welfare of the continent and the health of their domestic, wild animal and human populations. This presentation describes the animal disease diagnostic laboratory system in the United States, reviews the structure of an animal health laboratory network in the United States and the reasons for its formation, and suggests a plan for future collaboration between the three countries on animal health laboratory networks.

There are a number of important reasons to support future collaboration of the laboratory systems in our three North American countries. The first and perhaps most important is that we live in a global environment, diseases know no boundaries. Transboundary diseases, as the World Organisation for Animal Health (OIE) calls foreign animal diseases, are not excluded as a result of political boundaries. The legal trade in animals and animal products has expanded tremendously and zero disease risk is not attainable nor supported by free trade agreements. In addition to the controlled risk of legal animal disease movement, intentional or unintentional illegal movement of animals and animal products magnifies the risk of movement of animal diseases across borders and between countries.

Our world order has changed and the threat of intentional harm to free and developed countries through the use of animal disease agents is very real. The livestock industries are critically important to North America for a source of safe, reliable, reasonably priced meat food products as well as important non-food by-products. The economic importance is underscored
when you consider the significance of livestock production in North America as related to world production for those livestock commodities. North American countries produce 35% of the world’s poultry meat, 25 percent of the world’s beef, one-sixth of the world’s milk and 10 percent of the world’s pork.

Today, wildlife and wildlife diseases are an integral component of North American disease prevention and control activities for domestic animals. Currently, United States and Canadian efforts to eliminate bovine tuberculosis and brucellosis have been challenged by these diseases in wildlife populations. In addition, zoonotic diseases, those transmissible between people and both domestic and wild animals are of increasing importance to public health. United States records show that 50 million people have acquired zoonotic diseases during the last five years.

Livestock markets of the North American countries are significantly integrated. The United States imports over a million live cattle from Mexico each year and in turn, livestock products and purebred seed stock are exported to Mexico. There is similar market integration between the U.S. and Canada. Unfortunately, there have been recent setbacks in market integration due to bovine spongiform encephalopathy (BSE). It is anticipated that this hurdle will be overcome and markets will continue to be further integrated, amplifying the need for improved surveillance for animal diseases and real time diagnostics for that surveillance.

The front-line defense that protects our domestic and wild animal populations as well as human health and economic welfare is the animal disease diagnostic laboratories and practicing veterinarians. The early identification at the animal disease diagnostic laboratory of transboundary (foreign) diseases and emerging and re-emerging diseases will enable us to mount a rapid response. Early containment and elimination are keys to restoring our livestock industries and the critically important export markets.

Collaboration of the North American countries on animal health diagnostic networks and connection of those systems will improve our ability to safeguard our important animal industries. Enhancement of real-time disease surveillance will shorten our time to respond. Enhanced and interconnected laboratory networks will also provide surge capacity during outbreaks of disease that overwhelm our individual resources. Collaboration will enhance the sharing of technology between the three countries and enable us to standardize our laboratory techniques
and training. In short, collaboration will lead to a hemispheric protection net for our domestic and wild animal resources.

The foreign animal disease laboratories operated by the United States Department of Agriculture (USDA) in Ames, Iowa and Plum Island, New York are responsible for testing samples for foreign animal disease. However, almost all of the day-to-day animal disease diagnostic work is performed in an animal disease laboratories operated by either state governments or state universities. These laboratories, distributed throughout the country with nearly one in each state, may be the first to see a suspected foreign animal disease or a newly emerging disease. The concept of connection of these front-line laboratories into a network that can enhance our nation’s animal disease surveillance system and provide surge capacity in the event of a disease outbreak gave birth to the United States’ National Animal Health Laboratory Network (NAHLN).

The establishment of the NAHLN provided for the standardization of testing techniques, improved the infrastructure of network laboratories including the procurement of equipment, enhanced training and increased the sample capacity. The network was formed to enhance national surveillance for animal diseases and leverage the nation’s laboratory resources.

Twelve of the nation’s animal disease laboratories received initial funding to participate in the network focusing on a number of high-consequence foreign animal diseases. Since that time, a number of other laboratories have been incorporated into the system at various levels of participation. The diagnostic platform chosen to enhance surveillance in the network laboratories and conduct this testing in real-time was the polymerase chain reaction. Efforts have begun to connect the NAHLN to the food testing and human laboratory system.

Canada recently has implemented a similar animal disease laboratory network that is connected to their human health laboratory system. Their animal disease surveillance system is similarly based in laboratories operated by a province or a university, with the federal foreign animal disease reference laboratory located in Winnipeg, Alberta. Canada’s laboratory system is being connected to the NAHLN through the Winnipeg laboratory.

México has an extensive animal disease laboratory system supported by the federal foreign animal disease laboratory (CPA), national animal disease laboratory (CENASA), and the
REPORT OF THE COMMITTEE

national parasite and toxic residue laboratory (CENAPA). These laboratories can and should be integrated with the U.S. and Canadian laboratory networks.

There are a number of areas where we can collaborate on our nation’s animal disease laboratory networks. They include:

• standardization of diagnostic tests;
• mutual recognition and application of international standards;
• development of technical capacity of our personnel through meetings of experts;
• exchange of experiences in laboratory network oversight;
• use of common protocols, reference materials and reagents; and
• improvement of knowledge on the epidemiology of transboundary diseases, including those that are zoonotic.

Collaboration between and interconnection of the national animal health laboratory networks of México, Canada, and the United States are critical to enhancing our ability to safeguard the domestic animal and wildlife resources of North America, as well as to protect human health and the food supply. Laboratory integration will also contribute to our regional economic stability and growth through ensuring safe trade in animals and animal products. The Consejo Nacional de Sanidad Animal, the United States Animal Health Association and the Canadian laboratory support group must work together with our respective federal governments and stakeholders to accomplish this important effort.

Author’s Note: Dr. Richard Willer has served as 2005 USAHA President and Arizona State Veterinarian 1992 to Present. Mr. Bob Frost has served as 2003 USAHA President and Livestock Producer, Lincoln, CA.
Background

In March of 2006, the CFIA hosted an interdepartmental meeting on intelligence sharing. Ten federal Departments and Agencies attended. The overarching objectives of the meeting were to discuss the information needs of these organizations related to agriculture specifically; and to determine if there was a consensus concerning the formation of a network to share, not only data, but the analysis of the data that were identified. From this meeting the concept of “integrated intelligence for agriculture” emerged.

The proposal, which was crafted by the members, for the establishment of an Integrated Agri-Intelligence Network was: “That a Government of Canada collaborative Integrated Agri-Intelligence Network be formed and that the work of the Network will rest on three major pillars. These are:

• Exchange of relevant information and analyses in a proactive and timely manner;
• Training in intelligence techniques and processes (including scenarios / exercises); and
• Participation in regular exchanges of information for strategic planning purposes”

The concept of “network” is integral to integrated agri-intelligence. This paper will define integrated agri-intelligence; discuss why it is essential today; and outline some of the benefits to the collaborators.

What is Integrated Agri-Intelligence?

Agriculture has a significant impact on a nation’s security because of its links to public health, food safety and security, environmental health and economic stability. Thus, threats and risks associated with agriculture can have an impact on these sectors. This is one of the main driving forces for the development of integrated agricultural intelligence or integrated agri-intelligence (IAI). Figure 1 illustrates the relationship between agriculture, in
Integrated agri-intelligence (IAI) is the product of analysis of information, data, events and issues related to a broadly defined agriculture sector. The inputs to IAI come from many different organizations and multiple units within each organization. The organizations that contribute to IAI form a network to which each provides information related to their field. The information and data thus provided by contributors are analyzed to produce intelligence which is in turn used by the contributors.

Any organization with a link to agriculture may contribute to IAI. These organizations include those involved in:

- public health
- agriculture, animal health, plant health and plant production
- environment organizations related to some aspect of the food chain such as processors, transportation and providers
- public safety and emergency management
- intelligence and security
- criminal (organized crime, etc.) investigation and enforcement
- border security and customs
- national defense
- central government agencies.
INTERNATIONAL STANDARDS

Each organization provides inputs related to its mandate and work. There are many specific units within each of these organizations that can contribute to IAI. Several specialized units may exist in a single organization. These units include the following fields:

- medical sciences
- biological sciences
- physical sciences
- social sciences
- intelligence
- counter-intelligence
- surveillance
- risk analysis
- criminal investigations
- emergency planning and operations.

The range of contributors in the network is one of the unique features of IAI. An important aspect is the merging of science-based sectors and the traditional intelligence field. This ‘lab coat meets trench coat’ approach means that the two diverse fields will begin to use and understand a common language and vocabulary. This creates synergies and opportunities to build on and reinforce complementary skills, knowledge and expertise. The members exchange and analyze information, which produces superior intelligence to that which would have been produced in isolation.

The benefits to all are that there can be a comprehensive analysis of all of the diverse and broad information which is supplied to the network and which produces integrated agri-intelligence. The relationship between IAI and contributing organizations and between the kinds of inputs from these organizations into IAI is illustrated in Table I.
Table I

The impact on different government departments of an outbreak of the Asian strain of avian influenza H5N1

<table>
<thead>
<tr>
<th>Department or agency</th>
<th>Areas of potential impact associated with the event</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public health</td>
<td>Human health</td>
</tr>
<tr>
<td>Agriculture and Food</td>
<td>Food security, Food safety, Animal health and production, and Economic Trade restriction</td>
</tr>
<tr>
<td>Inspection Agencies</td>
<td>Migratory birds and other susceptible wild species, Endangered species</td>
</tr>
<tr>
<td>Environment and natural resources</td>
<td></td>
</tr>
<tr>
<td>Public security and emergency management</td>
<td>Overall management of associated emergencies</td>
</tr>
<tr>
<td>Intelligence and security</td>
<td>Possible terrorist links/activities</td>
</tr>
<tr>
<td>Criminal investigations and enforcement</td>
<td>Possible links to organized crime</td>
</tr>
<tr>
<td>Border security</td>
<td>Smuggling of contraband (animals or products) across borders</td>
</tr>
<tr>
<td>National defense</td>
<td>Possible terrorist links/activity, which threatens national security</td>
</tr>
<tr>
<td>Central government agencies</td>
<td>Economic, Political, and International</td>
</tr>
<tr>
<td>Transportation</td>
<td>Movement of diagnostic specimens</td>
</tr>
</tbody>
</table>

Decision-makers are assisted by IAI in their work. The goals of decision-makers may be multiple and diverse and their respective core businesses may be very different. However, in one aspect or another, the core business of each has a link to agriculture.

Why is Integrated Agri-Intelligence Essential Today?

Integrated Agriculture Intelligence is an approach to information sharing and analysis which allows different stakeholders, linked through agriculture, to share information, learn to speak a common language and integrate their analyses of events and situations. The need for this kind of approach is increasing in importance for many reasons, of which the following three are very important.

1. The world is changing and we cannot afford a lag
period in our understanding of the overall environment. In addition, we must bring the scientists and the intelligence communities together. Table II compares factors between the late 1970’s – early 1980’s to the same factors today. The changes are driving the need for integrated agri-intelligence.

2. The complexities, commonalities and interconnectedness of many sectors require an integrated approach. The concepts of convergence, commonality and interconnectedness may be a major global theme in the next fifty years. These terms can be applied across science and technology fields such as nanotechnology, biotechnology and medicine and within fields such as public health or agriculture. However, these concepts will also have to be integrated across sectors which traditionally may not have seen the need to interact. Bioterrorism, for example, has confirmed the realization that national defense and biological science sectors must work together more closely than ever.

3. Agri-food is vulnerable. Agriculture is vulnerable on many fronts. Not only is it vulnerable to natural events and the activities of humans who may intentionally or unintentionally threaten it but also because of the manner in which it is organized and the infrastructure on which it depends. Threats to agriculture have consequences for many sectors. Some of these consequences may be so detrimental to society that they may result in a backlash against agriculture should any of them occur.

The Benefits of Integrated Agri-Intelligence

There are many significant benefits of integrated agri-intelligence. It will help to keep us “ahead of the wave” and to anticipate possible events – thus giving us a greater opportunity to prevent or prepare for these events. It will open channels of communication, not just in times of disaster or threat, but also in “peace time”, by enhancing our individual and collective understanding of threats. Our prevention and preparedness activities will be more focused and effective. Integrated agri-intelligence will help to integrate expertise and develop superior strategic plans, policy development and operational outcomes.
<table>
<thead>
<tr>
<th>Element</th>
<th>Mid-1980s</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Globalization</td>
<td>Driver of change</td>
<td>Status quo – may even be a push-back from some sectors</td>
</tr>
<tr>
<td>Terrorism</td>
<td>Low visibility, local</td>
<td>High visibility, global</td>
</tr>
<tr>
<td>Nature of threats</td>
<td>Traditional, nuclear</td>
<td>Non-traditional, new life forms</td>
</tr>
<tr>
<td></td>
<td>weapons at worst</td>
<td>Extremely easy and globally distributed</td>
</tr>
<tr>
<td>Access to information</td>
<td>Moderately easy but</td>
<td></td>
</tr>
<tr>
<td></td>
<td>greater in developed</td>
<td></td>
</tr>
<tr>
<td></td>
<td>countries</td>
<td></td>
</tr>
<tr>
<td>Speed of information transfer</td>
<td>Fast</td>
<td>Faster</td>
</tr>
<tr>
<td>Communications</td>
<td>Traditional – television,</td>
<td>Much more sophisticated -</td>
</tr>
<tr>
<td></td>
<td>telephone, newspaper.</td>
<td>cell phones with text messaging, cameras</td>
</tr>
<tr>
<td></td>
<td>Still in growth phase of</td>
<td>information age.</td>
</tr>
<tr>
<td></td>
<td>v the information age.</td>
<td></td>
</tr>
<tr>
<td>Access to advanced technology</td>
<td>Moderately easy</td>
<td>Extremely easy</td>
</tr>
<tr>
<td>Demand for information</td>
<td>High</td>
<td>Unbounded</td>
</tr>
<tr>
<td>Crime</td>
<td>‘Traditional’</td>
<td>‘Traditional’ but new forms enabled by science and technology</td>
</tr>
<tr>
<td>Public demand for safety and</td>
<td>Increasing after a period</td>
<td>Very high public fear of perceived</td>
</tr>
<tr>
<td>security</td>
<td>of relative calm in post-WW II</td>
<td>and real risks</td>
</tr>
</tbody>
</table>
INTERNATIONAL STANDARDS

Conclusion

All the forces that have an impact on agriculture have an impact on food safety, food security, food quality, public health, environmental health, public security and economic security. These forces are multiple and diverse and are the responsibility of many different organizations.

These organizations can work together to provide integrated agricultural intelligence. It is important that these organizations work together prior to an event. All the parties with a stake in agriculture, regardless of how diverse, are advised to contribute to integrated agricultural intelligence in order to optimize the delivery of their individual mandates and to enhance national security.
REPORT OF THE COMMITTEE ON JOHNE’S DISEASE

Chair: Scott J. Wells, St Paul, MN
Vice Chair: Andy Schwartz, Austin, TX

John B. Adams, VA; Marilyn F. Balmer, MD; Richard E. Breitmeyer, CA; Charles E. Brown, II, WI; Todd M. Byrem, MI; Yung Fu Chang, NY; Michael T. Collins, WI; Thomas F. Conner, OH; Robert A. Cook, NY; Ed Corrigan, WI; Stephen K. Crawford, NH; Anita J. Edmondson, CA; Robert G. Ehlenfeldt, WI; John I. Enck, Jr., PA; William H. Fales, MO; Keith R. Forbes, NV; Bob Frost, CA; L. Wayne Godwin, FL; Jeffrey J. Hamer, NJ; Beth Harris, IA; William L. Hartmann, MN; Steven G. Hennager, IA; Donald E. Hoenig, ME; Sam D. Holland, SD; John P. Honstead, CO; David L. Hunter, MT; Jamie S. Jonker, VA; Karen R. Jordan, NC; Susan J. Keller, ND; John C.. Lawrence, Me; Donald H. Lein, NY; Mary J. Lis, CT; Laurent O’Gene Lollis, FL; Vader M. Loomis, PA; Gordon ‘Cobbie’ Magness, SD; Beth E. Mamer, ID; Chuck E. Massengill, MO; George L. Merrill, NY; Chris W. Murdock, MO; Edwin M. Odor, DE; Kenneth E. Olson, IL; Elizabeth J. Parker, DC; Boyd Parr, SC; Elisabeth Patton, WI; Janet B. Payeur, IA; Kristine R. Petrini, MN; Jewell G. Plumley, WV; Michael R. Pruitt, OK; Sebastian Reist, NJ; Suelee Robbe-Austerman, SD; Paul E. Rodgers, CO; Allen J. Roussel, Jr., TX; Sarah B. S. Shapiro Hurley, WI; William P. Shulaw, OH; Shri N. Singh, KY; Ben Smith, WA; Judith R. Stabel, IA; Susan M. Stehman, NY; Les C. Stutzman, NY; Cleve Tedford, TN; Deepanker Tewari, PA; Charles O. Thoen, IA; John “Brad” Thurston, IN; James A. Watson, MS; Gary M. Weber, MD; Diana L. Whipple, IA; Robert H. Whitlock, PA; Ronald B. Wilson, TN; Ching-Ching Wu, IN; Ria de Grassi, CA.

The Committee met from 12:30 to 5:30 p.m. on Sunday, October 21, 2007 at John Ascuaga’s Nugget Hotel, Reno, Nevada. There were 78 attendees. The Committee recognized Robert Whitlock and John Adams for their years of service to the Committee, including leadership and for serving as Co-Chairs of the National Johne’s Working Group (NJWG) since its inception.
RESOLUTION 11: INDEMNIFICATION TO ELIMINATE CATTLE CONFIRMED POSITIVE FOR MYCOBACTERIUM AVIUM PARATUBERCULOSIS (MAP)

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) request necessary funding to provide limited indemnification of cattle for producers who participate in the National Johne’s Control Program, meet all Program Standards and cull to slaughter any animal confirmed positive for Mycobacterium avium paratuberculosis (MAP) by an officially recognized test provided further that the indemnification will apply only to animals determined to be clinically normal and a high or moderate MAP shedder.

The USAHA further requests that Congress recognize the importance of funding a Johne’s disease indemnification program to augment, and not subtract from, current minimal funding for the National Johne’s Control Program. USAHA recommends that this program remain voluntary.

RESPONSE: The United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) appreciates this recommendation and remains committed to improving our Johne’s control program. However, we have several concerns regarding the request to provide indemnity for cattle confirmed positive for Mycobacterium avium paratuberculosis (MAP). These include:

- No authorization for indemnity in the statute which establishes the Johne’s program (7 USC Sec. 7626). This statute limits USDA to funding requests for conducting research, testing, and evaluation of programs for the control and management of Johne’s disease in livestock. In addition, authorizations of appropriations for the Johne’s program only extend through 2007. USDA can not consider acting on this request until the new farm bill updates this restriction.
- Indemnity can only be applied to eradication programs (regardless of whether they are voluntary or mandatory). The Johne’s program is a control program. Removal
REPORT OF THE COMMITTEE

of some infected animals, while leaving others within the herd, will not produce a reduction in the national herd prevalence and can not be considered eradication. Currently, the economic models published show that test and cull programs can not remove the infection from the herds and would not be cost-effective methods to eradicating Johne’s disease.

• Any herd owner that would participate in the indemnity program would have to make eradication of the disease the goal of their herd plan which requires the removal of all infected animals. Removal of some infected animals, while leaving others, will not produce a rapid reduction within a producer’s herd prevalence levels, thereby prolonging the cleanup efforts.

• Enzyme-linked immunosorbent assay (ELISA) testing is the most cost-effective method of managing the infection on the farm after the presence of MAP has been confirmed in moderate to heavily infected herds. Confirming ELISA positive animals to establish their eligibility for indemnity delays removal of the animal from the herd, in addition to accumulating further costs to the program.

• Producers that are only willing to remove heavily shedding animals after applying for indemnity would not be considered committed to Johne’s eradication in their herd. Industry has not provided any information supporting how the inclusion of indemnity would increase participation in the voluntary program, or increase the commitment of producers already enrolled.

As a result of these concerns, VS will not pursue indemnity funds for the Voluntary Bovine Johne’s Disease Control Program at this time.

RESOLUTION 12: QUANTITATIVE BULK TANK MILK TESTS FOR DETECTING JOHNE’S DISEASE

The United States Animal Health Association (USAHA) recommends that the United States Department of Agriculture (USDA), Agricultural Research Services (ARS) and the research
JOHNE’S DISEASE

Community have a greater focus on development of quantitative based tests for detecting Mycobacterium avium paratuberculosis (MAP) in bulk tank milk.

RESPONSE: United States Department of Agriculture (USDA), Agricultural Research Services (ARS) proactively initiated the development of a quantitative-based test for detecting MAP in bulk tank milk in 2006; this is a quantitative real-time PCR test for Johne’s disease in milk and other tissues that uses the unique target sequences, ISMap02, identified by ARS through the Johne’s genome sequence project. ARS has developed a test format that includes a probe enabling the quantification of the amount of MAP DNA present in a test sample. ARS is collaborating with Sandra Godden at University of Minnesota in using this test on colostrums samples obtained from noninfected and infected dairy herds, and to date has evaluated this experimental test on over 350 samples. When completed, the results will be submitted to the University of Minnesota, which will then conduct validation studies by comparing the results to fecal shedding of the bacterium. ARS plans further research on this approach to enabling the quantification of MAP in bulk tank milk.

RECOMMENDATIONS FROM 2006:

1. That USDA continue support of the National Demonstration Herd Project (NDHP) by facilitating meetings with VS providing travel expenses for the NJWG Demonstration Herd Subcommittee to work with Charles Fossler and Jason Lombard and staff at CEAH to analyze the resultant data and prepare manuscripts in a timely manner. Additionally, for CEAH to allocate more funds to assist the Johne’s Disease epidemiologists to enhance the efforts of CEAH staff working with the National Johne’s Program. Furthermore, that Jason Lombard continues as an active participant in this process and continues to participate as coordinator of the NDHP with the newly hired John’s Epidemiologist Charles Fossler. Response: Results from analysis of data from the National Demonstration Herd Project was the focus of a half-day session of the National Johne’s Working Group on October 18, 2007. Preliminary analysis (abstract attached below) shows results are consistent with effectiveness of the control program in
REPORT OF THE COMMITTEE

reducing incidence of Johne’s disease on cattle operations. An outline of analyses and potential publications was presented.

2. Laboratories that passed the Johne’s organism detection check test outside the normal time sequence (typically February through May each year) should be given “preliminary approval” as an approved laboratory for that specific methodology i.e. solid media, liquid media or PCR testing. Preliminary approval would be given when laboratory results are submitted after NVSL report at the annual USAHA meeting. Additionally, requests for check test kits would be honored from laboratories that are implementing a new test method outside the time when test kits are routinely shipped to participating laboratories. Preliminary approval would be provided following submission of check test results that meet or exceed the test criteria established that year. However, that preliminary approval would not include listing of that laboratory in the approved laboratory list as published in the USAHA proceedings nor would that laboratory be listed on the USDA-APHIS web site of approved laboratories that year. Laboratories that pass the annual organism based proficiency test are officially approved January 1 following the annual USAHA meeting. Response: Procedure has been put in place.

3. Laboratories that fail organism detection test and desire a retest should complete the following protocol through NVSL.

a. Each laboratory would be required to provide a written self-assessment report outlining possible deficiencies or situations as to what factors lead to an inadequate check test. Included would be a plan to enhance the laboratories proficiency to detect MAP in fecal samples. A template for this report is being developed. If a commercial test kit or test system is being used for organism detection, the company should be contacted to help determine the source of the problem and their findings should be included in the self assessment.
b. Each laboratory would be encouraged to seek additional training either from another local laboratory considered proficient in organism detection or at NVSL.

c. Letters from NVSL notifying each laboratory about test results will also be sent to the Designated Johne's Coordinator (DJC) for that state and to the National Johne's Coordinator (NJC) for their information. Laboratories that do not pass the check test must contact the NJC and their DJC regarding continuation of their opportunity to perform organism detection tests for the Voluntary Bovine Johne's Disease Control Program.

d. Laboratories that fail the organism based check test are encouraged to re-take the check test following submission of their written self-assessment and approval of the National Johne's Coordinator, if adequate check test kits are available at NVSL.

Response: Procedure has been put in place.

4. Laboratories that fail two sequential organism detection test and desire a retest should complete the following protocol through NVSL.

a. Each laboratory would be required to provide a written self-assessment report outlining possible deficiencies or situations as to what factors lead to an inadequate check test. Included would be a plan to enhance the laboratories proficiency to detect MAP in fecal samples. If a commercial test kit or test system is being used for organism detection, the company must be contacted to help determine the source of the problem and their findings should be included in the self assessment.

b. Laboratories in this category will be required to send the person responsible for the organism detection testing to NVSL or to another laboratory with the necessary experience and expertise approved by NJC for further training in mycobacterial detection methods.

c. Laboratory would be required to purchase and submit results from a second check test following mandatory training at NVSL or another laboratory.
d. Letters from NVSL notifying each laboratory about test results will also be sent to the DJC for that state and to the NJC for their information.
Response: Procedure has been put in place.

5. USDA-APHIS-VS signed a cooperative agreement (05-9100-0996-GR) with a team of scientists to develop a consensus recommendation on diagnostic testing for bovine paratuberculosis in the U.S. These recommendations have been developed and were reviewed and approved by the NJWG. The Committee accepts and recommends that USDA adopt the Diagnostic Testing for Bovine Paratuberculosis in the U.S. as developed under cooperative agreement 05-99100-0996-GR. This recommended test regimen for the detection of paratuberculosis in cattle is included in these proceedings following the Committee Report. Response: Accomplished.

6. The Committee recommends that USDA-APHIS-VS provide funding to identify target herd sensitivities and the most cost-efficient testing alternatives for detection of M. paratuberculosis in dairy and beef cattle herds at different levels of the Johne’s Disease Test Negative Program.
Response: Funding was provided to the University of Minnesota for this project and a preliminary concept paper report was presented to the National Johne’s Working Group on Friday, October 19.

7. The Committee recommends that USDA-APHIS-VS- NVSL continue to develop a systematic protocol for the production and characterization of a uniform, quality Johnin purified protein derivative (PPD) and manufacture Johnin PPD. The Johnin PPDs must be of equivalent sensitivity and specificity from batch to batch. These products must be available for distribution to researchers upon request.
Response: Efforts are underway by NVSL.

8. The Committee recommends that NVSL provide a pilot test panel of ten test samples, consisting of three or more different mycobacterial species, to interested diagnostic
laboratories performing confirmatory PCR tests on all acid-fast suspect positive cultures for M. paratuberculosis. The laboratories will provide PCR methodologies and results, reported as positive or negative, back to NVSL. Response: Accomplished.

9. The Committee acknowledges and appreciates the improvement and speed in which the Center for Veterinary Biologics (CVB) has licensed products important to the NJCP. We recommend that CVB review milk Enzyme-linked immunosorbent assay (ELISA) in an expedient manner. In order for laboratories to qualify to perform the milk ELISA as a ‘program’ test, a proficiency test panel must be developed for laboratory approval. The Committee recommends that NVSL acquire milk samples from an outside source and not purchase lactating cows for the sole purpose of providing milk for the proficiency panel. Response: One ELISA test kit has been approved by CVB for marketing as a milk ELISA test kit and efforts are underway by NVSL to develop an ELISA test kit.

10. The Committee approved a recommendation that NVSL provide and distribute a fecal sample from a low / moderate shedding cow to be used in a pilot study involving approximately 5 – 10 laboratories for each of the three culture methods (HEY, Trek and MGIT) and quantitative direct PCR to evaluate sources of variation in fecal culture shedding levels. Data will be reported to CEAH. Response: This effort was not completed last year, but plans are underway for implementation in 2008.

11. The Committee recommends that USDA and livestock producers expedite the implementation of a national animal identification system (NAIS). NAIS would greatly enhance the ability to identify and control movement of infected animals. We also recommend development of an indemnification program, supported in part by producers, to increase the confidence that these animals will not spread disease to other herds. Furthermore we recommend producers consider the high risk of introducing Johne’s disease when purchasing cattle. Response: Efforts
REPORT OF THE COMMITTEE

continue towards implementation of a national animal identification system.

Ken Olson, National Institute for Animal Agriculture (NIAA), provided the Johne’s Education Update. The mission of the Education Initiative is to provide producers and those who work with them reliable, useful, easy to access information about Johne’s Disease that is based on the best current science. A primary tool for this effort is the website www.johnesdisease.org. In addition at least 12 Johne’s related articles have appeared in producer press since the first of the year. A current effort that is underway with the Johne’s Disease Integration Program (JDIP) is a national dairy producer survey that seeks to identify barriers to and useful incentives for participation in the Johne’s program. It will also provide insights on information and education needs for the future.

Michael Carter, National Johne’s Program Coordinator, presented the Fiscal Year (FY) 2007 Johne’s Disease Program Updates.

In 1997, USAHA’s National Johne’s Working Group (NJWG) appointed a Sub Committee to design an affordable and flexible program based on sound scientific knowledge. The result was the 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 M. paratuberculosis 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-VS in April of 2002. The latest revision to the program standards occurred in June 2006 with inclusion of pooled fecal samples for level three test negative testing and updating the laboratory approval section of the standards.

For FY 2007 through October 10, 2007, 49 States had adopted VBJDCP or had programs that were considered in compliance with these standards. In fiscal year (FY) 2007, the reported activities includes 599,393 cattle tested by enzyme linked immunsorbent assay (ELISA), 120,170 cattle tested by fecal culture, 11,859 cattle tested by polymerase chain reaction (PCR), 8,483 enrolled herds (6,472 dairy and 2,011 beef) of which 1,709 are test negative herds (1,009 dairy and 700 beef). Herds
enrolled as test-negative are progressing through to level four. There are 689 Johne’s program level one (390 dairy and 306 beef), 595 Johne’s program level two (352 dairy and 243 beef), 127 Johne’s program level three (70 dairy and 57 beef), and 289 Johne’s program level four herds (197 dairy and 92 beef).

In FY 2007 United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Service (VS) received $12.0 million. Of this, $5 million was distributed through cooperative agreements with the States for use with the National Johne’s Demonstration Project ($1.8 million to 17 States), and $3.2 million through State Cooperative Agreements. This is also the third year for funding the Johne’s Education Initiative (JEI) coordinator through a cooperative agreement with NIAA. Accomplishments include maintaining the JEI website with the inclusion of a section linking producers to State websites, identifying VBJDCP herds and the coordination of contacts with industry groups for Johne’s Disease Integrated Project’s Johne’s Economics White Paper.

The purpose of the Johne’s Economics White Paper, supported by APHIS, was to produce a white paper discussing consumer perception and likely impact to the dairy industry if Mycobacterium avium paratuberculosis (MAP) was determined to have a causal role in Crohn’s disease. The final draft has been written and the authors would like to publish it in the winter or spring of 2008.

Along a similar vein, APHIS-VS also supported a colloquium organized by the American Academy of Microbiology on the subject of Mycobacterium avium paratuberculosis: Incidental Human Pathogen or Public Health Threat. APHIS-VS did this to ensure animal agriculture was represented during the discussions and that VS is aware of the direction that the colloquium was moving in. A final report is expected in the spring of 2008.

Two new initiatives were started in FY07: (1) a project in conjunction with University of Minnesota to evaluate the current test negative component of the VBJDCP to assess if the testing strategies accomplish the desired level of confidences and a second part of the project is to explore options for a more cost efficient herd classification program; and (2) a proposal as a three-year project to validate Johne’s vaccines developed through JDIP.

Bob Whitlock, University of Pennsylvania, provided the
REPORT OF THE COMMITTEE

NJWG report. The full report is included in these proceedings.


Preliminary results from the NAHMS Dairy 2007 study suggest that the program is educating producers. About 90 percent of dairy producers knew basic information about the disease and more than 55 percent were knowledgeable about the disease. More than 30 percent of dairy producers had implemented some form of a Johne's disease (JD) control program. Review of important management practices confirms that producers are changing calf management practices to better control the disease. More than 30 percent of producers reported confirming JD on the operation within the past year. The majority of producers used the serum ELISA test to confirm JD. Preliminary culture results from six environmental samples collected per operations suggests that more than half of dairy operations are infected, with increased prevalence as herd size increases. In conclusion, the voluntary control program appears to be providing producers with the tools they need to start controlling JD. With the majority of dairy operations infected, the control of JD becomes even more critical.

Scott Wells, University of Minnesota, and Mike Carter, National Johne's Disease Program Coordinator, presented the Future of the National Johne’s Disease Control Program—Strategic Planning Process.

The National Johne's Disease Control Program to date has been developed as a voluntary program supported by USDA-APHIS-VS. Due to recent erosion in federal support, concerns regarding the future of the program were expressed. Central to the discussions was the importance of considerations of program changes to meet the needs of the cattle industry and individual producers. As a result of discussions, consensus was reached for the development of a new national strategic plan for control of Johne’s disease.

The Committee approved a recommendation that a Subcommittee be established to initiate and spearhead the formulation of a new, comprehensive strategic plan to guide the future of Johne's disease control and management efforts in the United States. This Subcommittee will present an initial draft of
the strategic plan at the Johne’s Working Group meeting at the National Institute of Animal Agriculture meeting in 2008, with a final draft to be presented to the Committee for approval at the 2008 USAHA Annual Meeting.

This Subcommittee should include representatives from all pertinent JD groups. Including, but not limited to, the cattle industry, private veterinary practitioners, academia, government and allied industries.

Randy Capsel, National Veterinary Service Laboratories (NVSL) presented the 2007 Johne’s Fecal Proficiency Test Summary and Serology Proficiency Test Summary.

The 2007 Johne’s fecal organism-based proficiency test had 71 laboratories participating. These laboratories consisted of 65 United States laboratories, five Canadian laboratories, and one laboratory from Sweden. In total 127 kits were shipped, with results submitted for 119 kits. After sample validation, five low shedder samples were removed from Lot 1 kits, four low shedder samples were removed from Lot 2 kits, and no samples were removed for scoring from Lot 3 kits. This indicated a possible issue with testing sensitivity due to the low isolation from low shedder samples. Fecal culture techniques resulted in 68 of 83 kits meeting the passing criteria. Direct fecal PCR techniques resulted in 30 of 36 kits meeting the passing criteria.

The fecal pooling proficiency test had 33 laboratories participating, with 43 kits being shipped. Of these 43 kits, 33 kits received passing scores, seven kits did not pass, and three kits did not have results returned.

Results were mailed in early October for all laboratories. Retesting is available by contacting the National Veterinary Services Laboratory (NVSL) after receipt of results. A listing of the approved laboratories for both standard proficiency kits and pooling kits is included in these proceedings.

A confirmatory PCR testing panel was made available in 2007. The first set of kits resulted in mixed results, thus resulting in a second lot being shipped to requesting laboratories. All laboratories received satisfactory scores for the second lot of kits.

The 2007 serologic proficiency test had 80 United States (U.S.) laboratories and 10 international laboratories participating. Overall, six individuals utilizing the IDEXX Herd Check® test kit and seven individuals utilizing the BIOCOR Parachek™ test kit did not receive passing scores. This is prior to retest performances
REPORT OF THE COMMITTEE

being submitted. Reports were mailed in mid-September 2007 and retest panels were shipped at the same time final reports were distributed. A brief overview of progress at the NVSL on the Johnin PPD work and milk ELISA implementation was presented.

Judy Stabel, USDA, Agriculture Research Service (ARS) provided the Scientific Advisory Subcommittee on Johne’s Disease. The Subcommittee Report was approved by the Committee. The report is included in these proceedings at the end of this report.

Committee Business and Resolutions

Four Resolutions were taken under consideration, amended, and approved and forwarded to the Committee on Nominations and Resolutions.
JOHNE’S DISEASE

NATIONAL JOHNE’S WORKING GROUP (NJWG) REPORT

Bob Whitlock
Co-Chair

The NJWG met on Thursday afternoon October 18 and all day Friday October 19, 2007 during the United States Animal Health Association (USAHA) Annual Meeting, Reno, Nevada. The meeting was opened with self-introduction of all NJWG members and guests in attendance at 1:00 p.m. The meeting was Chaired by Bob Whitlock, Co-Chair NJWG and Scott Wells, Chair of the USAHA Committee on Johne’s Disease. More than 100 persons attended the day-and-a-half meeting.

Scott Wells provided an update on Resolutions passed by the Committee last year. Veterinary Services (VS) responses to Resolution 11- Indemnity for animals that are clinically normal but Johne’s disease (JD) positive as moderate or high shedders. USDA-APHIS-VS expressed the following concerns: 1) there is no current authorization in the program standards for paying indemnity. this would have to wait until passage of the new farm bill to make the necessary changes; 2) indemnity is only available for eradication programs and Johne’s disease is a control program. An owner would need to commit to eradication of all positive animals not just moderate and high shedders; 3) data indicates that test and cull methods are not the most feasible strategies; 4) enzyme linked immunosorbent assay (ELISA) is the most cost effective testing method but confirmation on ELISA positives would delay moving the highest infected animals out of the herd; 5) producers who require indemnity to remove moderate or high shedders lack commitment to the program. APHIS-VS will not pursue funding for indemnity at this time.

Resolution 12 – Testing bulk tank milk for Mycobacterium avium paratuberculosis (MAP): Recommends that United States Department of Agriculture (USDA), Agriculture Research Service (ARS) develop a method for quantitative testing of bulk tank milk. Response: USDA-ARS is working with the University of Minnesota. ARS has developed a polymerase chain-reaction (PCR) probe and is evaluating 350 samples comparing fecal shedding to MAP in milk. A USDA, Cooperative State Research, Education and Extension Service (CSREES) National Research Initiative (NRI) grant has supported this initial work. The investigators will need to continue the research and validate the
REPORT OF THE COMMITTEE

probe on non-infected herds. For exact wording of the resolutions see: www.usaha.org/meetings/proceedings.shtml; Page 490, 2006 USAHA Proceedings; and www.usaha.org/committees/jd/jd.shtml. This last site is for Committee on Johne’s Resolutions for 2006.

Several recommendations were approved by the Committee on Johne’s in 2006:
For more details, consult pages 403 to 406, 2006 USAHA Proceedings.

1) Demo Herd Project – Continued support for the Demo Herd Project.
   APHIS-VS is committed to this project and it remains a priority for funding.
2) National Johne’s Check Test (NJCT): Organism Based Test- Preliminary approval will be given to laboratories taking and passing the check test at times other than the annual test date. They will be notified but they will not have their laboratory information added to the web site list until the following test cycle.
3) NJCT: Failing laboratories – When a laboratory fails the check test, the Designated Johne’s Coordinator (DJC) for that state’s laboratory will be notified so that arrangements can be made to test samples from program herds in an approved laboratory. Arrangements can be made to retest and return to approved status.
4) NJCT: Laboratories that fail twice- In the event that a laboratory fails twice then they will need to send personnel to National Veterinary Services Laboratory (NVSL) for training or bring an expert to their laboratory for training. This has not been required yet but things are in place if needed.
5) Best test strategy: The recommendation that USDA accept the Best Test Available Concept.
6) NVSL Provide a source of Johnin PPD – this is an ongoing and laborious task but new batches are in progress.
7) NVSL: Provide a Pilot Panel for PCR Confirmatory Tests. – This was done. 10 samples including three non-MAP mycobacterium was sent out. The first panel included blanks and several laboratories complained because they failed. The second panel was 100 percent pass so no one complained.
8) In anticipation that Center for Veterinary Biologics (CVB)
will license the milk ELISA request NVSL is to prepare a Check test. NVSL is working on a panel for Check Test and hope to have it in place by March 2008.

9) NVSL locates low-moderate shedder and sends test panels to various laboratories for repeatability study. This will be done in 2008.

NJWG Treasurer, Ken Olson reported that the NJWG had a balance of $25,941.42 and income of $3,456.81 for reimbursement from USDA mini-symposium on vaccination at the 2006 NJWG Meeting. Travel expenses of $830.40 for Ken Olson and Bob Whitlock to participate in a NJWG planning meeting in Washington, D.C. in June 2007 and checking account expenses of $53.28 leaving a balance of $28,514.55 as of September 28, 2007. The Johne’s CD project included income of $93,078.28 and expenses of $71,140.28. The income from three major sources: $30,318.28 was the initial balance, sponsors of the CD project, $27,000 and sales of Johne’s CD ROMs for $35,760.00. To date 895 individual copies of the JD-Disease CD have been sold through the USAHA office and by the agency that produced the CD.

The Strategic Plan for the NJWG and the Committee on Johne’s will be updated to meet current guidelines and program implementation standards in 2008. Scott Wells and Mike Carter reminded those present this will be a high priority for 2008 and asked that all present provide input as to the most important factors, goals and objectives that need to be updated. The NJWG and the Committee on Johne’s recognized the need for updating of the current Johne’s Strategic Plan that was adopted in 2004 and updated in 2005. Resolutions went forward and were adopted by USAHA supporting this activity. They called for strong producer input in development of the plans with support from USDA.

Vivek Kapur provided an update of Johne’s Disease Integrated (JDIP) activities with a focus on Phase II. JDIP’s mission is to promote, animal bio-security through development and support of projects that enhance knowledge, promote education, develop real world solutions and mitigate losses from Johne’s disease. JDIP is a broad-based consortium of more than 140 investigators from academia, industry and government agencies. It has established world-wide collaborations including
REPORT OF THE COMMITTEE

with a similar program established in 2006 in Europe by the European Union. Strategic objectives include: 1) to support and facilitate investigator-directed research of Johne’s disease, 2) to create and maintain comprehensive scientific core facilities to support JD research and training activities, 3) to establish translational research capacity for developing and validating diagnostic tests, vaccines and disease management concepts for Johne’s disease, and 4) to provide scientific information and support for the development of JD education, prevention, and control programs.

Primary funding is provided by USDA, Cooperative State Research Education and Extension Service (CSREES), National Research Initiative’s (NRI), Coordinated Agriculture Project (CAP) program grants. The initial award was $4.4 million for 3 years, and then recently JDIP was awarded a continuation grant of $4.8 million to start in April, 2008. In addition a $500 thousand grant from APHIS-VS will fund work related to the development and evaluation of vaccines in Phase II. A more comprehensive outline of the program is available at www.jdip.org.

Lanny Pace, Liaison with American Veterinary Medical Association (AVMA) Council on Public Health and Regulatory Veterinary Medicine (CPHRVM) reported on changes recommended by the AVMA's CPHRVM for consideration by the AVMA Executive Board. The Executive Board approved the revision to the policy titled Johne's Disease. on November 7, 2007.

Johne's disease is a disease of significant economic importance to cattle and small ruminants. The AVMA will disseminate information and encourage veterinary practitioners to become familiar with ongoing efforts to control and eradicate Johne's disease. The National Academies of Science (NAS) report, Diagnosis and Control of Johne's Disease, indicates that currently available tests and diagnosis management practices are sufficient to control the disease. The AVMA encourages the USDA to review the implementation of the U.S. Voluntary Johne's Disease Herd Status Program for Cattle and to evaluate state programs for their equivalency to the Recommended Standards. In addition, the AVMA supports research in the development of improved diagnostic tests, management practices, vaccines, and their roles in control efforts in herds and flocks. To that end the AVMA supports active pursuit of maximum and sustained funding to effectively
JOHNE’S DISEASE

support the USDA Johne’s National Control Program.

(Proposed by CPHRVM – Mar 2003)
Cost: None

Background: In 1996, the National Animal Health Monitoring System study of U.S. dairy production showed an estimated prevalence of Mycobacterium paratuberculosis of 21.6 percent across U.S. dairy herds. Economic analyses at that time also showed that the cost of Johne’s disease to individual affected herds can be large and that the national average cost to producers across all herds was $220 per cow. Premature culling, reduced milk production, and body weight losses in slaughtered cattle are means through which the dairy industry has lost productivity due to Johne’s disease.

USDA-APHIS-VS published its Uniform Program Standards for the Voluntary Bovine Johne’s Disease Control Program in April of 2002. These national standards include education for producers and veterinarians regarding herd management plans and testing programs for Johne’s.

Historically, the USDA-APHIS-VS has provided funding to support this program, in addition to some support provided by states. The highest level of federal funding to support the program was gained in 2005, but since that time, funding levels have diminished.

At its October 10-12, 2007 meeting, the CPHRVM approved a motion to revise the policy titled Johne’s Disease. It asserts that the AVMA should actively pursue maximal and sustained federal appropriations for the USDA’s Johne’s National Control Program, to fully support veterinary and producer education, research, laboratory capabilities, diagnostics, and risk analyses for Johne’s disease.

Ernest Hovingh reported that a national survey of dairy producers will assess producer’s perception of the importance of Johne’s disease from a business perspective compared to other issues facing dairymen today. The program they are being asked to evaluate is the current National Johne’s Disease Control Program, as implemented by USDA-APHIS-VS and developed by the National Johne’s Working Group, a Sub-committee of the Committee on Johne’s. Are producers aware of the program and its potential value? Are producers participating in the program, if so why, if not, why not? What is the knowledge level
of producers about Johne’s disease? Does the current program meet producer’s needs? Are veterinarians providing the services needed as it pertains to the Johne’s program to assist herd owners to implement the desired management outcomes? The survey will assess what motivates, engages, deters and frustrates producers about the current Johne’s Disease Certification Program.

The survey instrument was developed by a group of 12 experts through an iterative process and made possible by funding by JDIP and is being coordinated through the Pennsylvania State University Survey Center. The final draft is now being beta-tested by dairy producers and when final will be sent to about 6,300 (about 12.5 percent) randomly selected dairy producers across the United States. Distribution to producers is expected to be done during early January, 2008, assuming funding has been provided. The survey center anticipates a 50-60 percent response rate.

Mark Kinsel, Designated Johne’s Disease Coordinator (DJC), Washington State Department of Agriculture presented information on a summary of more than 400 Risk Assessments and Herd Management Plans (RA/HMP): What can a closer evaluation of 400 RA/HMP tell us? Two major questions seemed to be paramount from producers; a) how much impact does Johne’s disease impact my herd and if Johne’s disease has a significant impact, what can I do about it?

Study design: A total of 407 Johne’s disease risk assessments from Washington (199) and Oregon (208) completed since 2003 were included. They represented 312 herds (160 Washington, 152 Oregon) with 95 follow-ups. There were two Johne’s disease status variables: 1) Johne’s positive herd defined as at least one clinical cow or one positive test in last year – Results: one clinical cow or one positive test in last year = 52.2 percent of all herds (53.1 percent Washington, 51.3 percent Oregon), 2) Johne’s positive cow reported in their herd history-Results: Johne’s positive cow reported in the herd history = 72.3 percent of all herds (72.1 percent Washington, 72.7 percent Oregon). Data was entered into RAMP software and imported into database for analysis with Statistix statistical software.

Significant risk factors for being a Johne’s positive herd included: herd size (herds > 500 cows had 1.95 times higher risk), adding animals in last year (“open” herds had 1.88 times higher risk), crowding of calving area (crowded areas had 1.23 times more risk), presence of Johne’s suspects and/ or clinical cases in
JOHNE’S DISEASE

calving area (presence of Johne’s suspect had 1.22 times more risk), manure soiled udder or legs in calving area (soiled cows had 1.12 times higher risk), and manure contamination of cow feed (contaminated feed had 1.38 times higher risk). Of concern was that only 3 of the 121 herds that purchased animals in the previous year had biosecurity measures in place to prevent the introduction of Johne’s disease. Most herds had no changes in herd scores over time, a source of concern.

Scott Wells presented an overview of the National Johne’s Disease Demonstration Herd Project (NJDDHP). This is the fourth year of the project with 17 states participating including 66 dairy herds from 16 different states and 22 beef herds in 10 states. It is an APHIS priority, funded at approximately $1.5 million per year. It is a long-term project destined to last over five years. Implementation of intervention strategies are to be evaluated, with an emphasis on risk from fecal contamination. Core outcome variables are to be measured, with data shared across states. Objectives are to:

1. Evaluate the long-term effectiveness and feasibility of management-related disease control on development of Johne’s disease and infection on dairy and beef cattle operations.
2. Provide information and materials for education and training of public and private practice veterinarians and cattle producers.
3. Develop and evaluate management, testing, and monitoring strategies for use in control of Johne’s disease in cattle herds.
4. Create the opportunity for add-on projects within states to address important research objectives.

Chuck Fossler reported on the current status of the NJDDHP, including preliminary results and publication plans. The primary objective of the project is to evaluate the long-term effectiveness and feasibility of management-related control measures for Johne’s disease on dairy and beef operations. Secondary objectives include: providing materials for education and training; evaluation of management, testing, and monitoring strategies; and creating opportunities for additional research. The primary hypothesis is that control of Johne’s disease can be achieved through implementation of on-farm management.
REPORT OF THE COMMITTEE

practices to reduce transmission of infection to susceptible cattle. The project, currently in its fourth year, includes 66 dairy herds from 16 states and 22 beef herds from 10 states.

Seven of the beef herds are using whole herd ELISA with fecal culture follow-up as their testing strategy and 15 herds are doing whole herd fecal culture and ELISA. Forty-one of the dairy herds use whole herd fecal and ELISA. Nine herds use whole herd fecal and ELISA some years and whole herd ELISA with subset fecal culture other years. Six herds do whole herd ELISA with a fecal culture follow up on ELISA positive animals. Six herds, all with over 500 cows, do a whole herd or subset or herd ELISA with a fecal culture subset. Four herds do whole herd fecal culture with no ELISA. BioCor ELISA is used by 28 herds use doing 25,197 tests while 58 herds are tested by IDEXX for 85,641 tests and six herds using kinetics ELISA (KELA) for 10,587 tests. Two herds are being tested by a unique ELISA for 1,759 tests. Fecal samples are tested using TREK ESP in 41 herds with 41,873 samples; BACTEC in 19 herds on 15,945 samples; MGIT in seven herds on 4,050 samples; HEY in 49 herds on 28,663; liquid culture in two herds on 349 samples; culture in 31 herds on 5,651 samples and PCR in 14 herds on 4,164 samples. Use of environmental cultures has increased to where it was used by 31 dairy herds and 13 beef herds in 2006. Critical questions being asked include:

1. Has the incidence of clinical cases decreased over the 3 years?
2. What effect does culling high shedders versus keeping high shedders have on herd status?

To determine if the difference is significant they are looking at cohorts the year before versus cohorts the year after. Some changes are not as noticeable because many of the herds were dealing with JD prior to enrollment and some management was already in place. There has been a decrease in environmental positive samples. A quantitative look could suggest a decrease in the bio- burden instead of just negative/positive. Preliminary results of the project indicate that, for those herds with three full years of participation and data submission, there have been reductions in ELISA test prevalence in beef herds and dairy herds from year 1 to year 3 of participation. In addition, for cows tested between 24-48 months of age, there have also been some reductions in incidence as measured by fecal test results in cows born during the first year of study participation compared to cows born two years prior to the beginning of participation. These
results suggest that management changes implemented since the beginning of the project have been effective in reducing the incidence of infection. However, these results are preliminary, as not all herds have been followed for a sufficient period to assess changes in incidence in cattle born after the farm’s beginning of participation. Two to three more years of following these herds would provide much better evidence of effects of NJDDHP participation because additional cohorts could be included (i.e., born 1-2 years after project began) and could also include those herds that began project in 2004 and 2005.

The consensus of those in attendance was that the demonstration herd project is a high priority and that the project should be continued. It was suggested that criteria for continued participation in the project be discussed among the principal investigators and then documented to serve as a guide for investigators. Investigators involved in the project have submitted 38 abstracts/papers and given 68 presentations at scientific meetings, presented the material at 28 workshops and developed an additional 9 add-on projects. More information is available at http://nahaphis.usda.gov/jddh/index.html. A series of publications detailing results from the project herds is planned with the first to be submitted shortly. They include:

- Overview of NJDDHP and of herds at program outset
- Change in prevalence of M. paratuberculosis infection after 3 years
- Economic cost of Johne’s Disease and Johne’s Disease Control Programs
- Changes in incidence of clinical disease in culled cattle and incidence of infection in young adults
- Association between changes in management and prevalence of infection after 3 years
- Associations between environmental and cattle test results
- Effects of vaccination

Bill Shulaw presented data from three demonstration herds in Ohio. One heavily infected dairy herd with 140-159 cows enrolled in July 2004 and were tested two times yearly first with BioCor ELISA and then Trek culture and PCR. They did 1:5 pools in 2006. Udder swabs were done on 20 cows each year through 2006, 62 percent of the swabs were positive. They sold youngstock and bought springing heifers from a dealer.
three times. In January 2005 calves were moved 12 miles away for rearing. They had one heifer positive at 14 months and no environmental positives. They went from 62 percent to 14 percent and two clinical cases.

The second herd was a small pure bred beef herd. The herd was closed and had 10 percent incident by Herrold’s egg yolk medium (HEYM) in 2003. The third herd was a seed stock beef herd with 120 cows. The herd was open and also had a 10 percent incidence on HEYM in 2003. The second herd had three culture positives and went from 10 percent to 5 percent positive. They changed management because heifers were at risk. They do not save heifer replacements but purchased heifers from a negative herd.

The third herd is a show herd. They test at sale time selling only test negative cattle. They went from 20 percent to 0 percent JD. In 2005 they had one positive and 2006 one positive and 2007 no positives. Cull any positive right away. Fecal samples from 1,417 cows were combined to make 286 pools. There were 43 false negative pools and four false positive pools (no positive cows). Positive pools had TTP four to five days longer than that of the highest cow in the pool.

Mario Villarino and E.R. Jordan, presented evaluation of disease-control strategies for Johne’s disease in a Texas dairy. The Texas Demonstration Project for the control of Johne’s disease is currently implementing and evaluating a Johne’s disease control strategy based on testing milking cows at the time of dry-off using ELISA, implementation of bio-security measures against the disease (colostrum management and calf management strategies) in two commercial herds. Comparative studies between ELISA positive and negative cows indicate a significant milk production reduction in ELISA positive animals (-8,927 lb) and reduction of days in lactation (-130 days). The direct cost of the disease, evaluated as cost of cow replacement due to premature culling was estimated at $205 per cow. After six years of implementation of the program, a significant reduction of sero-positive prevalence was found, with a project benefit/cost analysis of $254,071 during the project evaluation (2001-2006) (one dairy). Our results demonstrate that using ELISA test results to implement colostrum management protocols, when accompanied with removal of heifer calves to a segregated facility, decreases the sero-prevalence of JD over time as the implementation of the
control program progresses.

Beth Patton presented a summary of the Wisconsin Department of Agriculture, Trade and Consumer Protection demonstration herd project. Three herds are participating in a vaccine study in which every other calf was vaccinated until age matched cohorts of 50 calves or 10 percent of the adult herd were established for each farm. The herds have been participating in the project since September, 2003. Although all herds have experienced significant reductions in fecal culture prevalence, when the infection prevalence was compared between the cohorts, the vaccinated animals had 68 percent lower infection prevalence than unvaccinated controls. In these groups, there was a trend toward higher fecal shedding and increased clinical disease in the non-vaccinated controls (not statistically significant at this stage of the project). Vaccinations are done with a 22 gauge needle and this change in addition to good restraint of the calves while vaccinating has seemed to result in smaller subcutaneous granulomas at the vaccination site.

Bob Whitlock presented information about a Pennsylvania demonstration herd that did ELISA, individual fecal cultures and environmental sampling. Although a risk assessment/herd management plan (RA/HMP) was in place, it appeared the herd owner retained culture positive cattle until they showed clinical signs. Additionally one cow with clinical signs of Johne’s disease was located in a pen next to the maternity pen and easily contaminating newborn calves. Additionally water samples for the waterers for adult cows was so contaminated with MAP, that a ten gallons of water was equivalent to a heavy shedder in terms of MAP contamination (an estimated 200,000 colony forming units of MAP). A dairy herd in Ohio used for DJC training had annual fecal and ELISA testing done and made many of the changes recommended by the RA/HMP but still did not cull heavy shedders until they started to show evidence of weight loss and diarrhea, the typical clinical signs of Johne’s disease. Retention of heavy shedders for prolonged periods of time only prolongs the reduction in new infections and lessens the impact of funds spent for herd testing.

A plea was made for veterinarians working on JD infected herds when the herd uses individual fecal cultures that culture positive cows need to be culled prior to the onset of clinical disease.
REPORT OF THE COMMITTEE

NJWG Reorganization – Retirements are generating a change of leadership for the NJWG. John Adams and Bob Whitlock will be stepping down as Co-Chairs of the NJWG. Scott Wells, University of Minnesota, Jamie Jonker, National Milk Producers Federation (NMPF), and Elizabeth Parker, National Cattlemen’s Beef Association (NCBA), will become Co-Chairs of the NJWG beginning January 1, 2008.

Jamie Jonker has been appointed Co-Chair of the National Johne’s Working Group by Scott Wells, Chair Committee to replace John Adams who retired from NMPF effective July 1, 2007. Jamie is a Cornell graduate with a PhD in cattle nutrition from the University of Maryland. The report was given by Jamie Jonker:

NMPF is a farm commodity organization representing most of the dairy marketing cooperatives serving this nation. NMPF members market the majority of the milk produced in the U.S., making the NMPF the principal voice on national issues for dairy cooperatives and their dairy farmer members.

NMPF, Animal Disease Prevention and Eradication Policy Statement: Animal diseases continue to reduce profitability for dairy producers and may impede exports and international market development. Diseases such as tuberculosis, brucellosis, Johne’s disease and others can significantly increase costs to dairy producers in terms of decreased milk production, loss of animals, and replacement of animals. Preventing any animal disease outbreak in the U.S. remains a primary focus of dairy producers. Any occurrence of an animal disease outbreak or introduction of diseased animals into the U.S. from foreign sources must be addressed promptly to prevent further spreading.

Specifically concerning Johne’s disease, NMPF will continue their efforts to secure funding for Johne’s disease and it remains a priority.

Specifically, members of NMPF want to prioritize:

1. Rapid & accurate testing
2. Vaccine development
3. Vaccine strategic plan and best management practices
4. Education and participation
The NMPF supports:

- adopting programs and securing adequate funding to prevent and/or eradicate animal diseases, including proactive programs that encourage the responsible use of animal drugs by dairy producers;
- expanded indemnity programs for herds infected with brucellosis, tuberculosis, and other pertinent diseases;
- a ban on importing animals, semen, embryos, or other animal derived materials from regions of the world which are not free of animal diseases which may cause the transfer of agents that are pathogenic for animals or humans;
- maintaining effective import inspection and surveillance programs for animals and animal by-products; and,
- developing and implementing appropriate response programs and mechanisms for government and industry in the event of an animal disease outbreak; the development of improved methods for detecting animal diseases; and
- close coordination among federal and state animal disease prevention and eradication programs.

Elizabeth Parker has been appointed Co-chair of the NJWG to replace Gary Weber who is no longer with National Cattelmen's Beef Association (NCBA). Elizabeth began working with NCBA in January 2007. She hails from Abilene, Texas and is a graduate of Texas A and M, College of Veterinary Medicine. She worked approximately seven years in mixed and small animal practices in Texas then went to Washington, DC as an AVMA Science Congressional Fellow, serving on the House Agriculture Committee (HAC) for Ranking Member Congressman Charlie Stenholm. Following the fellowship she remained on the HAC, working for Chairman Larry Combest and Chairman Bob Goodlatte. Prior to joining NCBA as Chief Veterinarian, she was an international consultant for the Food and Agriculture Organization (FAO) of the United Nations in Rome, Italy, working on highly
REPORT OF THE COMMITTEE

pathogenic avian influenza.

Elizabeth’s main responsibilities at NCBA are animal health, animal welfare and homeland security regulatory issues. NCBA has two policies on Johne’s disease - one as part of Integrated Disease Research and another on Johne’s Disease Program Quality. Elizabeth’s talk on Johne’s can be summed up with focus on four areas: disease management by producers (including utilizing testing procedures to help in herd management decisions), research, education and outreach to help producers, and realistic expectations of federal funding. For example, lessons learned from the Johne’s disease demonstration projects can be utilized to improve programs and herd management. NCBA wants to collaborate with USAHA-APHIS and NMPF, among others, and strongly supports a multidisciplinary, integrated Johne’s Disease Program that provides quality to the producer. NCBA urges the Secretary of Agriculture to continue to place Johne’s disease as a high priority for significant levels of intramural and extramural research funding and will also continue to work with coalitions to maintain Congressional awareness and support to adequately fund Johne’s disease control and research programs. Congressional awareness is a challenge as there is an even greater continual need to educate new staff and new Members who are not aware of Johne’s disease nor are they aware of agriculture in general.

Scott Wells gave a report on his evaluation of progress made by dairy and beef cattle herds in the Minnesota Johne’s Disease Control Program. The objective of this study was to evaluate progress made by Minnesota cattle herds in the control of Johne’s disease through participation in the Minnesota Johne’s Disease Control Program. Data showed a reduction in the risk of within-herd Johne’s disease transmission and seroprevalence through time in dairy and beef cattle herds in the Minnesota JD Management Program, consistent with a positive effect of the program on control of Johne’s disease.

Mike Carter presented an overview of International Johne’s Control Programs. The review included the basic programs for Australia, Denmark, Japan, and the United Kingdom. Australia’s program has been primarily developed and funded by the involved industry for each species. Their program includes a test negative classification component. This test negative component is included
JOHNE’S DISEASE

into a dairy score used to provide producers with information useful to assess the risk of introduction of MAP when purchasing animals. The beef industry has a similar classification that includes a beef only classification that acknowledges the low prevalence of MAP in the beef industry.

Denmark is also developing an industry driven program based on multiple testing, using milk ELISA. Cows are classified as green, yellow, or red based on the number of positive tests and response of the test. Management decisions and handling of the animals are based on the classification of the animals. Denmark also includes a heavy education component that ties the program to Salmonella control as well.

Japan’s emphasis is on eradication of Johne’s disease through active surveillance and removal of test positive animals. The basic program includes surveillance test every five years. Positive herds enter a monitoring program where animals are repeatedly test until the herd is tested negative at least twice. Partial indemnity is available for test positive animals.

The United Kingdom was included briefly as an example of a country that is relying completely on industry for the control of Johne’s disease and the animal health officials support the industry through guidelines and education.

Scott Wells presented a draft report from an APHIS-VS funded group project with additional information expected at the next NJWG meeting. The concept paper was entitled Herd Testing Strategies to Achieve Classification Levels for U.S. Voluntary Bovine Johne’s Disease Control Program. The concept paper essentially places both the status program and the management program in a single herd classification program ranked by presumed herd prevalence of Johne’s disease. A second draft of the proposal was presented, discussed and then tabled until further refinements. A new version will be presented at a future meeting.

Jeanette McDonald provided an update and evaluation of Online Johne’s Education. The online Johne’s education effort consists of modules and certificate programs for both veterinarians and producers. For veterinarians, the Online Johne’s Disease Veterinary Certificate Program, was developed consisting of seven modules covering the basics of Johne’s disease pathobiology and epidemiology, diagnostics and test interpretations, risk
REPORT OF THE COMMITTEE

assessment, and management and control in dairy and beef operations. The seventh module is an update module that covers new and emerging topics, management strategies, and diagnostic technology. This module also is used for recertification of Johne’s certified veterinarians. For practical application four virtual farm visits (dairy and beef) are created so that veterinarians can practice assessing the risk of Johne’s disease occurrence and developing management plans for different types and sizes of operations with varying levels of disease prevalence. We also have modules that address Johne’s disease in goats, sheep, cervidae, camelids, and bison.

For producers, the modules have been revised for the certificate program to specifically provide relevant information. These modules are organized by type of operation (dairy or beef) and species (goats, sheep, cervidae, camelids and bison.) In addition, we are developing a series of four modules where producers talk to producers about the economic impact of Johne’s disease and control efforts on their businesses.

Currently evaluation studies are underway of both the certificate program and the dairy producer module. The purpose of the studies is to gain further insights into the impact of the respective education programs on veterinarians’ and producers’ knowledge and practice. In addition, veterinarians’ and producers’ individual learning preferences, strategies, and activities are being assessed during and after their participation in the online education programs. Veterinarians and producers are being recruited as subjects for these studies and appeal to DJC’s and others to help identify eligible candidates. Eligible candidates are those who have not yet started any of the Johne’s education courses. They will be given a pre-test and a post-test, asked to fill out a pre-course questionnaire, and post-course questionnaire, and a subset will be asked to participate in a post-course phone interview. They will be compensated for their efforts ($200 - $300 depending on the extent of their involvement.) Please contact Jeannette McDonald at mcdonal7@wisc.edu or 608-263-5170 for possible recruits or further questions.

Ken Olson provided the Johne’s education update. The mission of the education initiative is to provide producers and those who work with them reliable, useful, and easy to access information about Johne’s disease that is based on the best current science. A primary tool for this effort is the website
www.johnesdisease.org. In addition at least 12 Johne’s related articles have appeared in producer press since the first of the year and several radio/podcast interviews have been given. Six industry groups assisted in distribution of Johne’s information to the 60,000+ World Dairy Expo attendees in Madison, Wisconsin. A current effort that is underway with JDIP is a national dairy producer survey that seeks to identify barriers to and useful incentives for participation in the Johne’s program. It will also provide insights on information and education needs for the future.

Yung-Fu Chang previously reported on the in-vitro cellular immune responses to recombinant antigens (rAgs) of Mycobacterium avium paratuberculosis (MAP). He reported on the differential immune responses and protective efficacy of four rAgs of MAP (85A, 85B, 85C, and Superoxide dismutase [SOD]) used with adjuvants, monophosphoryl lipid A containing synthetic trehalose dicorynomycolate and cell wall skeleton (MPLA) and bovine IL-12, against MAP challenge in calves. Group I was administered the four rAgs along with MPLA and IL-12. Group II was administered with four rAgs and MPLA. Group III received MPLA and IL-12. Group IV was given MPLA alone. rAgs induced significant lymphoproliferative responses in vaccinated animals (Groups I and II). All the four rAgs induced significant IFN-γ production from 11-23 weeks after primary vaccination (APV), except for SOD. Significant increase was noticed in CD3+, CD4+, CD8+, CD21+, CD25+, and gd+ cells against all four rAgs in the vaccinated animals. rAg-specific expression of IL-2, IFN-γ and TNF-α was significantly higher in the two vaccinated groups. 4/8 animals in Group I, 3/8 animals in Group II, and 3/4 animals in Groups III and IV were found positive for MAP in one or more tissues. Among the seven positive animals in groups I and II, except for one animal, the others had < 10 CFU. Isolation was confined to one tissue in these animals, except in one, wherein MAP was isolated from two tissues. In the control Groups (III and IV), majority of the positive animals had five tissues positive for MAP, with >300 CFU. Preliminary data from this study indicated that all four rAgs induced a good Th1 response and conferred protection against MAP infection in calves.

Judy Stabel with S. Robbe-Austerman and Bill Davis presented infection models useful for studying host responses to infection to aid in the development of diagnostic tools and
vaccines. The majority of experimental models for ruminants have utilized an oral inoculation of live MAP in order to establish infection, mimicking the fecal-oral route of transmission generally observed in the field. The current study was designed to compare the effectiveness of oral and intraperitoneal inoculation on the host immune response to MAP infection. Twenty neonatal holstein calves were obtained from status level 4 herds and randomly assigned to 5 treatment groups: 1) control noninfected (C), 2) oral, 3) oral with dexamethasone pretreatment (oral/DXM), 4) intraperitoneal (IP), and 5) oral/mucosal (oral/M). The oral group was fed milk replacer containing $10^{10}$ cfu of live MAP, strain K-10, 2x per day for 14 consecutive days. The oral/DXM group was inoculated in the same manner as the oral group but the calves were administered 0.25 mg/kg BW dexamethasone IV for 3 consecutive days prior to bacterial challenge, and again on days 28 and 56 post-challenge. Intraperitoneal inoculation of calves with $10^{10}$ cfu MAP, strain K-10, was performed on days 0, 7, 14, and 21 of the study. The oral/M calves were inoculated by feeding milk replacer containing live MAP obtained by scraping the ileal mucosa from a clinically infected cow on days 0, 7, and 14. All calves were housed in Association for Assessment and Accreditation of Laboratory Animal Care (AAALAC)-accredited BSL-2 facilities during the study. Throughout the study, blood and fecal samples were obtained from calves on days -5 and -4 prior to the first inoculation of MAP, and then on days 7, 14, 21, 28, and monthly thereafter for the 12 month term of the study. Blood samples were processed for isolation of peripheral blood mononuclear cells (PBMC) followed by incubation with medium only (nonstimulated), concanavalin A (ConA), a whole cell sonicate of MAP (MpS), and johnin purified protein derivative (JPPD) for 24 and 48 hr for determination of cytokine secretion, lymphocyte proliferation, and flow cytometric analyses. Results demonstrated that oral inoculation of calves significantly increased lymphocyte proliferative responses to K-10 MpS at 1 months. Secretion of antigen-stimulated iNOS by Princeton BioMedtech Corporation (PBMC) was higher for oral infection groups at both 6 and 12 months post-infection compared to control calves. IP calves had the earliest antigen-specific IFN-g responses at 7 d post-infection, preceding responses noted for other infection groups that followed between 90 and 120 d. Average IL-10 responses to ConA and MPS were higher at 1 and 6 months and declined significantly by
JOHNE’S DISEASE

12 months post-infection. At 1 month, oral and oral/M calves had higher MPS-stimulated IL-10 than other treatment groups. By 12 months only the oral/M calves had higher IL-10 secretion than control calves. Intracellular IFN-γ and IL-10 levels were measured for CD4+, CD8+, and gd T cell subpopulations. At 3 months post-infection, there was significantly higher IFN-γ in CD4+ cells stimulated with MPS in the oral treatment. Intracellular IL-10 was higher in CD4+ and CD8+ T cells in oral and IP calves compared to the other treatments. These results demonstrate that exposure and infection to MAP will invoke early immunologic responses characterized by IFN-g, IL-10, and iNOS secretion.

Todd Byrem, Antel BioSystems, presented an overview of activities by Dairy Herd Improvement (DHI) organizations in providing Johne’s testing by milk ELISA to their membership. There are currently eight DHI milk testing laboratories, with direct access to over 2 million cows in the US, that offer the Johne’s milk ELISA on samples routinely collected by DHI technicians and submitted for traditional component analysis. Convenience and lower cost to practitioners and producers underlie continued growth in testing volume anticipated to exceed 150,000 units in 2008. Guidelines and procedures for ELISA testing have been drafted by a task force appointed by National DHI to provide quality assurance standards for participating laboratories. Standards have been developed for both the Field Service (sample collection and submission) and Laboratory (testing) components of DHI and compliance will be audited annually. Participating DHI organizations are encouraged to implement these guidelines and procedures, and to coordinate their activities with state designated Johne’s coordinators and herd veterinarians as they provide testing services to dairy producers.

Ken Olson presented an introduction to the Johne’s Roundup, a producer/industry-driven initiative to develop a strong, on-going grassroots base to support continuation of the National Johne’s Disease Control Program. The concept is still in the developmental stages, but is seen as an important effort to help maintain federal funding for the program that has declined from the original $21 million authorized in the 2002 Farm Bill to approximately $12 million received currently. The effort would work to help identify program components that are critical to program success, document “cost share” components that currently or could
exist and communicate producer/industry activity and funding needs to Congress. Interested parties were invited to a special session following the Friday afternoon to discuss the concept in greater detail and plan next steps forward.
The Scientific Advisory Subcommittee on Johne’s Disease met on October 17, 2007 from 9:00 a.m. to 12:00 p.m. The major discussion point during the meeting was the consideration of incorporation of the milk ELISA test into the Program Standards as a herd screening tool for paratuberculosis. The Subcommittee discussed the merits of the test with presentations by Scott Wells, Todd Byrem, and Jason Lombard. A comprehensive assessment of the test suggest that the sensitivity and specificity of the milk ELISA test is comparable to levels attained with serum ELISA test, a key test in the herd certification program. The milk ELISA assay has been offered as a service by AntelBio (Michigan) on Dairy Herd Improvement Association (DHIA) samples submitted to their laboratory. Other DHIA laboratories are acquiring training to engender the ability to run the milk ELISA test. The internal quality control of these laboratories will be overseen by Quality Certification Services and include both the field and laboratory components of this testing. The ParaChek test (Prionics) is the only test currently licensed in the US for the detection of Mycobacterium avium paratuberculosis antibodies in milk. The cost of the test ($5-$6), combined with the rapid availability of results, is attractive to the producer. Further reduction in cost projections may be available if the milk ELISA test is used on bulk tank milk samples rather than individual cow samples. However, a comparative analysis of herd level detection using a subsample of individual cows with bulk tank milk should be undertaken before this is recommended. The Subcommittee recommended that the milk ELISA test be incorporated into the voluntary control program as an official screening test for Johne’s disease. The Subcommittee also suggests that DHIA field technicians should be certified for collection of samples and that laboratories running these samples should run a milk proficiency test annually that is administered by NVSL.
The National Johne’s Demonstration Herd Project (NJDDHP) in the United States was initiated to evaluate the long-term feasibility and effectiveness of management-related practices designed to control Johne’s disease on dairy and beef cattle operations. The NJDDHP was started in 2003, but final herd enrollment numbers were not reached until 2005. The NJDDHP includes 66 dairy herds and 22 beef herds in 17 states. In the subset of herds with three years of participation, preliminary estimates indicate a significant reduction in MAP prevalence in the third year of participation compared to the first year by ELISA testing in beef herds and in dairy herds by ELISA testing and fecal culture testing for cattle shedding at moderate to high levels. These results suggest that herd prevalence has decreased since the beginning of the project. For the subset of herds with four years of participation, Cox proportional hazards methods were used to examine incidence of MAP in cattle born after beginning participation in the project compared to cattle born prior to participation. Cows were divided into 3 cohorts: -2 = cows born 13-24 months prior to program participation, -1 = cows born 1-12 months prior to program participation, and 0 = cows born 0-11 months after beginning the program. Preliminary estimates indicate that dairy cattle born since the beginning of the project had a significantly decreased risk of being fecal culture positive and of fecal shedding at moderate to high levels compared to cattle born 2 years prior to the start of the project (Fecal-culture positive: Cohort -1: HR 0.64, p=0.03; Cohort 0: HR 0.53, p=0.02; Fecal shedding at moderate-to-high levels: Cohort -1: HR 0.68, p=0.07; Cohort 0: HR 0.54, p=0.04). These results suggest that management efforts initiated since the beginning of the project were effective in reducing incidence of MAP. However, further analysis is needed to identify those efforts that have the greatest effect on incidence. In addition, a longer follow-up period would provide much better evidence of effects of NJDDHP participation because additional cohorts could be included (i.e., born 1-2 years after the project began) and could also include those herds that began the project in 2004 and 2005.
JOHNE’S DISEASE

NVSL Approved Laboratories for Johne’s Disease
Centrifugation Methods
October 21, 2007

Bishop, Sparks, Thompson
Veterinary
Diagnostic Laboratory
890 Simms Road
Auburn University
Auburn, Alabama 36832
rowesar@vetmed.auburn.edu

California Animal Health and Food
Safety
Laboratory System - Tulare Branch
University of California
Tulare, California 93274
jmadaska@ucdavis.edu

Rocky Mountain Regional Animal
Health Laboratory
CO Dept. of Agriculture,
Division of Animal Industry
Denver, Colorado 80211
tiffany.brigner@ag.state.co.us

Veterinary Diagnostic Laboratory
Colorado State University
Fort Collins, Colorado 80523
dhyatt@colostate.edu

University of Florida FARMSRL
Gainesville, Florida
neumannL@mail.vetmed.ufl.edu

Veterinary Diagnostic Laboratory
College of Veterinary Medicine
Iowa State University
Ames, Iowa 50011
curtt@iastate.edu

United States Department of
Agriculture
Animal and Plant Health Inspection
Service
Veterinary Services
National Veterinary Services
Laboratories
Diagnostic Bacteriology Laboratory
Ames, Iowa 50010
Randy.T.Capsel@aphis.usda.gov

Idaho Bureau of Animal Health
Laboratories
Idaho State Dept. of Agriculture
Boise, Idaho 83712
bmccuskey@idahoag.u

Caine Veterinary Teaching Center
University of Idaho
Caldwell, Idaho 83607
mamerb@uidaho.edu

Galesburg Animal Disease
Laboratory
Illinois Dept. of Agriculture
Galesburg, Illinois 61401
svinson@agri.state.il.us

Animal Disease Diagnostic
Laboratory
Purdue University
West Lafayette, Indiana 47907-7440
wuc@purdue.edu

Livestock Disease Diagnostic
Center
University of Kentucky
Lexington, Kentucky 40511
jdonahue@uky.edu
REPORT OF THE COMMITTEE

Animal Health Diagnostic Laboratory  
Maryland Dept of Agriculture  
Frederick, Maryland 21702  
ahfrederick@mda.state.md.us

Diagnostic Center for Population & Animal Health  
Veterinary Diagnostic Laboratory  
Michigan State University  
Lansing, Michigan 48910  
hattey@dcpah.msu.edu

Michigan Dept of Agriculture  
East Lansing, Michigan 48823  
Benkos9@michigan.gov

Antel Biosystems, Inc  
Lansing, Michigan 48910  
foshaugw@antelbio.com  
donohueh@antelbio.com

Allied Monitor, Inc  
Fayette, Missouri 65248  
cmurdock@coin.org

Veterinary Diagnostic Laboratory  
North Dakota State University  
Fargo, North Dakota 58105  
Neil.dyer@ndsu.edu

New Jersey Department of Agriculture  
State Diagnostic Laboratory  
Trenton, New Jersey 08625  
aghdica@ag.state.nj.us

Animal Disease and Food Safety Laboratory  
Reno, Nevada 88502  
keith.forbes@agri.state.nv.us

New York State College of Veterinary Medicine Diagnostic Laboratory  
Cornell University  
Ithaca, New York 14853  
plm2@cornell.edu

Oregon Department of Agriculture  
Animal Health Laboratory  
Salem, Oregon 97301  
leffinge@oda.state.or.us

Pennsylvania Veterinary Laboratory  
Harrisburg, Pennsylvania 17110  
ehue@state.pa.us

New Bolton Center  
University of Pennsylvania  
Kennett Square, Pennsylvania 19348  
rhw@vet.upenn.edu  
tfyock@vet.upenn.edu

Animal Disease Research and Diagnostic Laboratory  
South Dakota State University  
Brookings, South Dakota 57007  
holly.kroschel@sdstate.edu

Texas Veterinary Medical Diagnostic Laboratory  
Amarillo, Texas 79106  
r-raleigh@tvmdl.tamu.edu

Texas Veterinary Medical Diagnostic Laboratory  
Texas A and M University  
College Station, Texas 77843  
aswinford@tamu.edu

Virginia Department of Agriculture  
Lynchburg, Virginia 24504  
lisa.ramsey@vdacs.virginia.gov
JOHNE’S DISEASE

Washington State Department of Agriculture Laboratory Services
Olympia, Washington 98501
ssorg@agr.wa.gov

Washington Animal Disease Diagnostic Laboratory
Pullman, Washington 99164
loaks@vetmed.wsu.edu
teitzelc@vetmed.wsu.edu
tezelc@vetmed.wsu.edu
Marshfield Laboratory
Food Safety Services
Marshfield, Wisconsin 54449
koziczkowski.jeff@marshfieldclinic.org

Alberta Agriculture and Food Safety Division
Edmonton, Alberta, Canada T6H 4P2
rashed.cassis.gov.ab.ca

National Veterinary Institute
Swedish National Veterinary Institute (SVA) Paratuberculosis Laboratory
Uppsala, Sweden SE-75189
goran.bloske.sva.se
REPORT OF THE COMMITTEE

NVSL Approved Laboratories for Johne’s Disease
TREK ESP
October 21, 2007

California Animal Health and Food Safety Laboratories
University of California
Davis, California 95616
rwalker@ucdavis.edu

Connecticut Veterinary Medical Diagnostics Laboratory
University of Connecticut
Storrs, Connecticut 06269
sandra.bushmich@uconn.edu

Veterinary Diagnostic and Investigational Laboratory
University of Georgia
Tifton, Georgia 31793
srajeev@uga.edu
cbaldwin@uga.edu

United States Department of Agriculture, Animal and Plant Health Inspection Service,
Veterinary Services, National Veterinary Services Laboratories
Diagnostic Bacteriology Laboratory
Ames, Iowa 50010
randy.t.capsel@aphis.usda.gov

Animal Disease Diagnostic Laboratory
Purdue University
West Lafayette, Indiana 47907-7440
wuc@purdue.edu

Department of Diagnostic Medicine/Pathobiology
Kansas State University
Manhattan, Kansas 66506
tpurvis@vet.k-state.edu

Veterinary Medical Diagnostic Laboratory
University of Missouri
Columbia, Missouri 65211
falesw@missouri.edu

Cooperative State and Federal Diagnostic Laboratory
Missouri Department of Agriculture
Jefferson City, Missouri 65109
quintin.muenks@mda.mo.gov

New Jersey Department of Agriculture
State Diagnostic Laboratory
Trenton, New Jersey 08625
aghdica@ag.state.nj.us

New York State College of Veterinary Medicine Diagnostic Laboratory
Cornell University
Ithaca, New York 14853
plm2@cornell.edu

Animal Disease Diagnostic Laboratory
Ohio Department of Agriculture
Reynoldsburg, Ohio 43068
jcui@mail.agri.state.oh.us

Oklahoma Animal Disease Diagnostic Laboratory
Oklahoma State University
Stillwater, Oklahoma 74078
laura.b.dye@okstate.edu

Pennsylvania Veterinary Laboratory
Harrisburg, Pennsylvania 17110
ehue@state.pa.us
JOHNE’S DISEASE

Clemson Veterinary Diagnostic Center
Columbia, South Carolina 29224
aleapha@clemson.edu

Virginia Department of Agriculture
Lynchburg, Virginia 24504
lisa.ramsey@vdacs.virginia.gov

NVSL Approved Laboratories for Johne's Disease
MGIT 960
October 21, 2007

Rocky Mountain Regional Animal Health Laboratory
Colorado Department of Agriculture, Division of Animal Industry
Denver, Colorado 80211
tiffany.brigner@ag.state.co.us

Live Oak Animal Disease Diagnostic Laboratory
Live Oak, Florida 32064
cook@doacs.state.fl.us

United States Department of Agriculture, Animal and Plant Health Inspection Services, Veterinary Services, National Veterinary Services Laboratories
Diagnostic Bacteriology Laboratory
Ames, Iowa 50010
randy.t.capsel@aphis.usda.gov

International Swaps and Derivatives Association Animal Health Laboratory
Boise, Idaho 83712
bmccuskey@idahoag.us

Caine Veterinary Teaching Center
University of Idaho
Caldwell, Idaho 83607
mamerb@uidaho.edu

C.E. Kord Animal Disease Laboratory
Nashville, Tennessee 37220
alice.smith@state.tn.us

Texas Veterinary Medical Diagnostic Laboratory
Texas A and M University
College Station, Texas 77843
aswinford@tamu.edu

International Swaps and Derivatives Association Animal Health Laboratory
Boise, Idaho 83712
bmccuskey@idahoag.us

Becton Dickinson Systems
Sparks, Maryland 21152
rpfeltz@bd.com

International Swaps and Derivatives Association Animal Health Laboratory
Boise, Idaho 83712
bmccuskey@idahoag.us

Johne’s Testing Center
School of Veterinary Medicine
Madison, Wisconsin 53706
bbunkel@svm.vetmed.wisc.edu

TREK Diagnostic Systems
Sun Prairie, Wisconsin 53590
sallen@trekds.com
REPORT OF THE COMMITTEE

NVSL Approved Laboratories for
Johne’s Disease
Sedimentation Methods
October 21, 2007

Minnesota Veterinary Diagnostic Laboratory
College of Veterinary Medicine
University of Minnesota
St. Paul, Minnesota 55108
olsen015@umn.edu

Wisconsin Veterinary Diagnostic Laboratory
Madison, Wisconsin 53705
suzanne.burgener@wvdl.wisc.edu

NVSL Approved Laboratories for
Johne’s Disease
BACTEC 460
October 21, 2007

Animal Health Monitoring Laboratory
Abbotsford, British Columbia, Canada
letitia.curley@gems8.gov.bc.ca

Animal Health Laboratory
University of Guelph
Guelph, Ontario, Canada
N1G2W1
jeidt@lsd.uoguelph.ca

United States Department of Agriculture,
Animal and Plant Health Inspection Service
Veterinary Services
National Veterinary Services Laboratories
Diagnostic Bacteriology Laboratory
Ames, Iowa 50010
Randy.T.Capsel@aphis.usda.gov
JOHNE’S DISEASE

NVSL Approved Laboratories
Johnne’s Disease
PCR
October 21, 2007

Arizona Veterinary Diagnostic Laboratory
Tucson, Arizona 85705
creggiar@ag.arizona.edu

California Animal Health & Food Safety Laboratory
University of California Davis, California 95616
rlwalker@ucdavis.edu

Rocky Mountain Regional Animal Health Laboratory
Colorado Department of Agriculture,
Division of Animal Industry
Denver, Colorado 80211
tiffany.brigner@ag.state.co.us

Infectious Diseases & Pathology Laboratory
University of Florida Gainesville, Florida 32669
williamse@mail.vetmed.ufl.edu

United States Department of Agriculture
Animal and Plant Health Inspection Services
Veterinary Services
National Veterinary Services Laboratories
Diagnostic Bacteriology Laboratory
Ames, Iowa 50010
Randy.T.Capsel@aphis.usda.gov

Galesburg Animal Disease Laboratory
Illinois Department of Agriculture
Galesburg, Illinois 61401
Greg.fritz@illinois.gov

Animal Disease Diagnostic Laboratory
Purdue University
West Lafayette, Indiana 47907-7440
wuc@purdue.edu

Breathitt Veterinary Center
Murray State University
Hopkinsville, Kentucky 42240
shri.singh@murraystate.edu

Tetracore, Inc
Gaithersburg, Maryland 20878
bmangold@tetracore.com

Animal Health Laboratory
Maryland Department of Agriculture
College Park, Maryland 20740
chiminhuang@hotmail.com

Animal Health Diagnostic Laboratory
Maryland Department of Agriculture
Frederick, Maryland 21702
ahfrederick@mda.state.md.us

Antel Biosystems, Inc
Lansing, Michigan 48910
donohueh@antelbio.com

Diagnostic Center for Population & Animal Health
Veterinary Diagnostic Laboratory
Michigan State University
Lansing, Michigan 48910
hattey@dcpah.msu.edu
REPORT OF THE COMMITTEE

Marshfield Laboratory – Veterinary Diagnostic Services
Bloomfield, Michigan 48302
mortier.paul@marshfieldclinic.org

Minnesota Veterinary Diagnostic Laboratory
University of Minnesota
St. Paul, Minnesota 55108
sedax00@umn.edu

Mississippi Veterinary Research and Diagnostic Laboratory
Mississippi State University
Jackson, Mississippi 39216
mzhang@cvm.msstate.edu

Nebraska Venture Development Corporation
University of Nebraska
Lincoln, Nebraska 68583-0907
droyal2@unlnotes.unl.edu

Molecular Diagnostic Laboratory
Cornell University
Ithaca, New York 14853
sgki@cornell.edu

Animal Disease Diagnostic Laboratory
Ohio Department of Agriculture
Reynoldsburg, Ohio 43068
jcui@mail.agri.state.oh.us

Pennsylvania Veterinary Laboratory
Pennsylvania Department of Agriculture
Harrisburg, Pennsylvania 17110
wferia@state.pa.us

Animal Disease Research Diagnostic Laboratory
South Dakota State University
Brookings, South Dakota 57007
Jane.christopher-hennings@sdstate.edu

Ambion, Inc
Austin, Texas 78744
mangkey.bounpheng@appliedbiosyste.com

Texas Veterinary Medical Diagnostic Laboratory
Texas A and M University
College Station, Texas 77843
l-sneed@tvmdl.tamu.edu

Utah Veterinary Diagnostic Laboratory
Utah State University
Logan, Utah 84322
jtrujillo@cc.usu.edu

Virginia Department of Agriculture
Lynchburg, Virginia 24504
lisa.ramsey@vdacs.virginia.gov

Marshfield Laboratory
Food Safety Services
Marshfield, Wisconsin 54449
kozickowski.jeff@marshfieldclinic.org

Food Safety Division
Agri-food Laboratories Branch
Alberta Agriculture
Edmonton, Alberta, Canada
T6H4P2
Robin.k.king@gov.ab.ca

Animal Health Laboratory
University of Guelph
Guelph, Ontario, Canada
N1G2W1
jeidt@lsd.uoguelph.ca
JOHNE’S DISEASE

Biovet Inc.
St. Hyacinthe, Quebec, Canada
J25 8W2
maryseb@biovet-inc.com

Sarrogate Variable Analysis,
Paratuberculosis Laboratory
Uppsala, Sweden, 76189
goran.bolske.sva.se
United States Department of Agriculture
Animal and Plant Health Inspection Service
Veterinary Services, National Veterinary Services Laboratories
Diagnostic Bacteriology Laboratory
Ames, Iowa 50010
randy.t.capel@aphis.usda.gov

Galesburg Animal Disease Laboratory
Illinois Department of Agriculture
Galesburg, Illinois 61401
svinson@agri.state.il.us

Animal Health Diagnostic Laboratory
Maryland Department of Agriculture
Frederick, Maryland 21702
ahfrederick@mda.state.md.us
Antel Biosystems, Inc
Lansing, Michigan 48910
donohueh@antelbio.com

Diagnostic Center for Population & Animal Health
Veterinary Diagnostic Laboratory
Michigan State University
Lansing, Michigan 48910
hattey@dcpah.msu.edu

Allied Monitor, Inc
Fayette, Missouri 65248
Veterinary Diagnostic Laboratory
cmurdock@alliedmonitor.com

Pennsylvania Veterinary Laboratory
Harrisburg, Pennsylvania 17110
ehue@state.pa.us

Sedimentation Methods using HEY Media
Minnesota Veterinary Diagnostic Laboratory
College of Veterinary Medicine
University of Minnesota
St. Paul, Minnesota 55108
olsen015@umn.edu

Direct PCR
Arizona Veterinary Diagnostic Laboratory
Tucson, Arizona 85705
creggiar@ag.arizona.edu

Infectious Diseases and Pathology Laboratory
University of Florida
Gainesville, Florida 32669
willamse@mail.vetmed.ufl.edu

United States Department of Agriculture
Animal and Plant Health Inspection Service
Veterinary Services
National Veterinary Services Laboratories
Diagnostic Bacteriology Laboratory
Ames, Iowa 50010
randy.t.capel@aphis.usda.gov
JOHNE’S DISEASE

Animal Health Diagnostic Laboratory
Maryland Department of Agriculture
Frederick, Maryland 21702
ahdred@mda.state.md.us

Tetracore, Inc
Rockville, Maryland 20850
bmangold@tetracore.com

Antel Biosystems, Inc
Lansing, Michigan 488230
donohueh@antelbio.com

Diagnostic Center for Population & Animal Health
Veterinary Diagnostic Laboratory
Michigan State University
Lansing, Michigan 48910
hattey@dcpah.msu.edu

Nebraska Venture Development Corporation
University of Nebraska
Lincoln, Nebraska 68583-0907
droyal2@uninotes.unl.edu

Molecular Diagnostic Laboratory
Cornell University
Ithaca, New York 14853
sgki@cornell.edu

Utah Veterinary Diagnostic Laboratory
Utah State University
Logan, Utah 84322
jtrujillo@cc.usa.edu

Marshfield Laboratory
Food Safety Services
Marshfield, Wisconsin 54449
koziczkowski.jeff@marshfieldclinic.org

MGIT 960

Rocky Mountain Regional Animal Health Laboratory
Colorado Department of Agriculture, Division of Animal Industry
Denver, Colorado 80211
tiffany.brigner@ag.state.co.us

United States Department of Agriculture Animal and Plant Health Inspection Service
Veterinary Services, National Veterinary Services Laboratories
Diagnostic Bacteriology Laboratory
Ames, Iowa 50010
randy.t.capel@aphis.usda.gov

Becton, Dickinson and Company (BD) Microbiology Systems
Sparks, Maryland 21152
fppfelter@bd.com

C.E. Kord Animal Disease Laboratory
Nashville, Tennessee 37220
alice.smith.state.tn.us

Johne’s Testing Center
School of Veterinary Medicine
Madison, Wisconsin 53706
bbkunkel@svm.vetmed.wisc.edu

TREK ESP

Veterinary Diagnostic Laboratory
University of Georgia
Tifton, Georgia 31793
srajeev@uga.edu
cbaldwin@uga.edu
REPORT OF THE COMMITTEE

Veterinary Diagnostic Laboratory
College of Veterinary Medicine
Iowa State University
Ames, Iowa 50011
curtt@iastate.edu

Kansas State University
Manhattan, Kansas 66506
tpurvis@vet.k-state.edu

Cooperative State & Federal Diagnostic Laboratory
Missouri Department of Agriculture
Jefferson City, Missouri 65109
quintin.muenks@mda.mo.gov

Veterinary Diagnostic Laboratory
North Dakota State University
Fargo, North Dakota 58105
neil.dyer@ndsu.edu

New York State College of Veterinary Medicine Diagnostic Laboratory
Cornell University
Ithaca, New York 14853
plm2@cornell.edu

Animal Disease Diagnostic Laboratory
Ohio Department of Agriculture
Reynoldsburg, Ohio 43068
jcui@mail.agri.state.oh.us

Clemson Veterinary Diagnostic Center
Columbia, South Carolina 29229
aleapha@clemson.edu

Bactec 460

United States Department of Agriculture
Animal and Plant Health Inspection Service, Veterinary Services, National Veterinary Services Laboratories
Diagnostic Bacteriology Laboratory
Ames, Iowa 50010
randy.t.capel@aphis.usda.gov
REPORT OF THE COMMITTEE ON LIVESTOCK IDENTIFICATION

Chair: Bob R. Hillman, Austin, TX  
Vice Chair: Kevin D. Maher, Ames, IA

The Committee met in Rose A Ballroom of John Ascuaga’s Nugget Hotel, Reno, Nevada, on October 23, 2007 from 8:00 a.m. to 4:00 p.m. There were one hundred twenty four committee members and guests in attendance. Bob Hillman, Chair, presided, assisted by Kevin Maher, Vice-Chair. Committee Chair Hillman welcomed committee members and guests to the meeting, discussed the committee meeting expectations and addressed
REPORT OF THE COMMITTEE

United States Animal Health Association Committee policies and procedures.

Dr. John Clifford, Deputy Administrator for United States Department of Agriculture (USDA), Animal and Plant Health Inspection Services (APHIS), Veterinary Services (VS) and Neil Hammerschmidt, National Animal Identification System Director, presented a report on the National Animal Identification System’s (NAIS) Business Plan to Advance Animal Disease Traceability. Their report is as follows:

Animal disease traceability is one of the most critical issues at hand for the USDA because it is a vital component of disease control efforts, and there exists a need for improved animal disease control infrastructure in the United States today. Federal-state cooperative disease programs have historically administered national animal identification and have achieved significant success in reducing animal disease in the United States. Paradoxically, this progress has resulted in drastically reduced levels of officially identified animals; since most States are free of bovine tuberculosis, brucellosis, pseudorabies, etc., they do not test or vaccinate for those diseases, so there is no mechanism to identify the animals or officially record these activities.

The NAIS is an integral part of the solution and provides: (1) standardization for information systems and (2) opportunity for producers to be part of U.S. animal health safeguarding efforts before an animal disease event or “outside of” participating in a disease program.

USDA’s “Business Plan to Advance Animal Disease Traceability” outlines strategies to enhance and further develop the U.S. traceability infrastructure. These strategies provide a complex solution that will take significant time and resources. Although 100 percent participation in the infrastructure would be ideal, USDA plans to focus immediate efforts where we can accomplish the most and achieve a “critical mass” of participation. Critical mass is defined as the minimum percentage of officially identified animals within each species/sector required to achieve traceability. For the purposes of the business plan strategies, USDA estimates that 70 percent of the animals in a specific species/sector need to be identified and traceable to their premises of origin. This estimate will serve as a benchmark for advancing animal disease traceability.
Working together with States/Tribes and industry partners, USDA has made significant progress with the three components of NAIS to date and will continue to build on those accomplishments to advance animal disease traceability. Over 40,000 premises have been registered nationwide, and premises registration continues to be our immediate priority. The animal identification component is also progressing well. USDA has approved the eighth animal identification device, bringing the total to seven visual tags and one injectable transponder. The third component of the NAIS, animal tracing, is now in the implementation phase. USDA is establishing formal cooperative agreements with the administrators of the animal tracking databases who participated in the interim phase and with any other organizations or states whose systems meet the technical specifications for integration with USDA’s Animal Trace Processing System.

To ensure ongoing, timely, and efficient progress, USDA is identifying strategies and actions that will enable us to advance towards our 48-hour traceability goal. We have established a very elaborate outreach and communication effort and will continue to expand on opportunities that allow us to work with industry. Our business plan targets actions in areas where the advancement in traceability offers the greatest return on the invested resources.

**Strategy 1: Prioritize Species/Sectors**

The establishment of priorities among species and sectors within species industries will ensure resources are applied where improvement in traceability is needed the most. The business plan first categorizes species based on existing tracing capabilities and the need for improvement. Tier 1 species include the primary commercial food animal industries – cattle, poultry (chickens and turkeys), swine, sheep, and goats. The competition horse industry is included as Tier 1 due, in part, to frequent animal movement. All other livestock and poultry are Tier 2. Additionally, sectors within the Tier 1 species have been prioritized to direct additional emphasis; for example, the beef and dairy breeding herds are the highest priorities within the cattle sector.

**Strategy 2: Harmonize Animal Identification Systems**

The need for standardized animal identification in government and industry programs is more evident now than ever before. Some disease control programs that are winding down, brucellosis for example, required a high level of identification and
traceability. In fact, there are numerous disease control programs that require and/or benefit from official animal identification. The standardization of animal identification and data collection in these existing systems presents a clear opportunity to enhance traceability. In the private sector, producers are seeking improved and flexible identification methods, and compatible processes and data standards that may be used for multiple purposes. Harmonizing animal identification systems will undoubtedly result in more cost-effective options benefiting producers while achieving increased animal disease traceability for the entire industry.

**Strategy 3: Converge NAIS Data Standards in Disease Programs and Regulations**

USDA will take steps to adopt and apply NAIS data standards in existing disease programs, including international/interstate commerce regulations. For example, establishing national data standards that identify premises importing and exporting livestock, locations participating in official disease control programs, and origin and destination premises listed on interstate certificates of veterinary inspection will greatly enhance animal disease tracing and emergency response capabilities.

**Strategy 4: Integrate Automated Data Capture Technologies with Disease Programs**

USDA will take steps to integrate electronic data capture and reporting technologies into existing disease programs. By using NAIS-compliant radio frequency identification (RFID) devices and integrating handheld computers/readers to replace paper-based forms, animal health officials will be able to electronically record and submit essential data to the USDA Animal Health and Surveillance Monitoring database and other appropriate animal health databases. The electronic collection of data will increase volume and quality, minimize data errors, and speed data entry into a searchable database.

**Strategy 5: Partner with States, Tribes, and Territories**

State animal health authorities play a critical role in advancing national animal disease traceability. Working in close partnership with state, tribal, and territorial officials, USDA will continue to support the advancement of each State’s disease traceability infrastructure. Each state animal health official will administer and manage localized plans reflecting the animal
health priorities in individual regions.

Strategy 6: Collaborate with Industry
Achieving traceability objectives requires a partnership between the production sector and animal health officials. Producer organizations, representing member interests, can accelerate the adoption of practices that advance traceability. USDA has entered into cooperative agreements with non-profit industry organizations to promote premises registration within various species groups. Collaboration with USDA accredited veterinarians will enable the delivery of accurate information to clients as well as enhance the adoption of NAIS data standards in everyday production management systems and disease program activities at the producer level. Additional partnership efforts with industry alliances, service providers, auction markets, feedlots, harvesting facilities, and other industry sectors are a priority for USDA.

Strategy 7: Advance Identification Technologies
Continued advancements in traceability require practical, affordable technology solutions that improve efficiency and accuracy of animal ID data collection. USDA will collaborate with stakeholders to establish performance standards for ID devices and evaluate emerging technologies with emphasis on systems that can operate at the “speed of commerce.”

Outcomes
The business plan will utilize “critical mass,” as explained earlier, to establish participation goals and objectives for individual species. The benefit/cost analysis now being conducted will provide more substantial information and input to these performance-based goals. Until that information is available, though, USDA will be recommending to the Species Working Groups a 70 percent critical mass participation level.

Opportunities to advance traceability will continue to evolve as the business plan strategies are successfully implemented. Additionally, industries will face new animal health demands as the animal agriculture industry changes. Therefore, the strategies will continue to be evaluated and adjusted to ensure that we continue to advance towards the optimum goal of a 48-hour traceback in as timely and efficient a manner as possible.
REPORT OF THE COMMITTEE

David Morris, USDA-APHIS-VS NAIS staff, provided a report on NAIS Cooperative Agreement and Animal Identification Projects.

He presented information regarding preliminary results associated with the NAIS Pilot Project involving packers and renderers. The goal of this project was to gather information from the beef, pork, and lamb processing facilities and rendering facilities regarding opportunities for participation in NAIS. Project leaders were Gary Smith and Dustin Pendell, Colorado State University and the Colorado Department of Agriculture.

Objectives included assessing specific animal identification technologies, the impact of speed of commerce on speed and accuracy; estimating costs of participation in acquiring identification information; and assessing the best way currently to collect, archive, and transfer identification information needed for traceability. Preliminary results indicate that harvest facilities and rendering facilities are concerned with costs to implement, necessity to use private database providers, speed of commerce, data security, functionality of devices, and multiple identification systems.

The FY2008 NAIS Implementation Cooperative Agreement was described. Significant for FY2008 is that work plans are to be aligned with the recently prepared NAIS Business Plan of 2007. Newer components will require training and outreach to accredited veterinarians regarding NAIS functionality by both state and federal animal health officials within the state. Increased flexibility was offered in preparing a work plan in accordance with identifying and reducing traceability risks within the State, Tribe, or Territory. All work plans submitted will need to address the first six of the seven strategies listed in the NAIS Business Plan of 2007.

John F Wiemers, USDA-APHIS-VS, NAIS reported on the cost benefit analysis of NAIS. Understanding benefits and costs of adopting the NAIS is essential for informed policy development, industry participation, and long range implementation. Through a cooperative agreement with USDA-APHIS, Kansas State University will lead a multi-institutional comprehensive analysis of the benefits and costs associated with adopting the components of NAIS: premises registration, animal identification, and animal movement recording. Emphasis will be placed on determining aspects of NAIS that are common and unique across species to obtain accurate estimates of benefits and costs of system.
adoption by livestock and meat firms. Benefits and costs will be estimated for different species, by different sub-sectors, and for different firm sizes with emphasis on those species identified in the NAIS business plan. Estimates of how benefits and costs will be shared vertically in the livestock and meat supply chain will be completed as well as estimates of costs to local and federal government of operating the systems.

A collaborative team of agricultural economists and animal scientists from four major Land Grant Universities will work with livestock and meat industry associations, collect past and on-going research, review NAIS pilot project and cooperative agreement reports, collaborate with APHIS, and collect information from local, state, and federal government agencies to generate a comprehensive benefit cost analysis of NAIS. Recognized economic principles and models will be employed. The project duration is one year with the final report expected by late fall of 2008.

Glenn Fischer, Chairman of the Identification and Information Systems Committee, National Institute for Animal Agriculture (NIAA) presented a report on the ID Info Expo 2007. He reported that the key goals for ID Info Expo 2007 were to:
• build on successful ID Info Expo Franchise
• expand Geographic Reach
• expand focus to include strong State and Commercial focal points along with Critical Federal program overview
• to be the meeting “Where Traceability Needs Intersect”

The meetings drew over 400 attendees, primarily from the United States and Canada. The British FMD Outbreak created enhanced sense of relevance, with excellent feature speakers from UK and University of California Davis, Disease Simulation Program. Feedback from the meetings showed strong positive feedback on expanded international and commercial application focus.

NAIS progress continued to be a key focal point of the meeting, with important updates from USDA, Undersecretary Knight, as well as USDA personnel that showed increased relevance for NAIS in disease traceability as the focal point for the program. USDA foreshadowed the release of the NAIS business plan, again stressing disease programs and the continued infrastructure development for the establishments of an effective traceability program.
REPORT OF THE COMMITTEE

NIAA continues to looks to provide government and industry with an important forum to discuss this issue and find consensus. In 2008, the direction will be to expand producer contribution to the program, provide stronger case study/application focus, and continue to grow international participation. Based on Regulatory and Market conditions, consider revised format, which may include an enhanced workshop format as part of the 2008 NIAA Annual Meeting.

Rich Baca, Director, Center for Animal Disease Information and Analysis, USDA-APHIS-VS; Centers for Epidemiology and Animal Health reported on NAIS Disease Program System Integration.

VS is using many of its information technology (IT) assets to improve traceability. This discussion covers information about how the NAIS, Animal Health Surveillance and Management (AHSM) and Mobile Information Management (MIM) solutions continue to evolve and are currently being used as part of the New Mexico Task Force supporting the tuberculosis control and eradication program to increase traceability capabilities and support accurate electronic record keeping for managing the herd testing. Standards and mobility are two key goals in building the needed IT tools. Standards provide common methods that provide consistency to business approaches. Mobile solutions offer the ability to place data management in the hands of the animal health officials in the field. Moving the first point of data management increases data integrity, offers real time usage of information and reduces redundant processes.

Patrick McFall, Program Manager USDA-APHIS-VS Process Streamlining (VSPS), provided a VSPS update. He reported that VSPS is part of a developing initiative by a program within USDA APHIS. This web-based system offers a single point of access to electronic forms, applications, and certification processes required for the interstate and international movement of animals and animal products. Designed for USDA accredited veterinarians and state and federal animal health officials, VSPS is part of an Agency-wide eGov initiative to move from paper to electronic forms. As a result, it meets the requirements of the Government Paperwork Elimination Act and also contributes to the 48-hour trace back goal of the NAIS.

With VSPS, accredited veterinarians can update their
accreditation status, access state regulations and foreign country import requirements, create electronic certificates of veterinary inspection for interstate movement, incorporate required diagnostic tests and vaccination records, and electronically submit documents to origin and destination State officials.

In order to access VSPS, which is a USDA mandated secure system, accredited veterinarians and state and federal animal health officials must first apply for USDA eAuthentication and then create a VSPS profile specific to their role. Roles are also available for veterinary assistants, lab technicians, importers, and others. For more information about accessing VSPS, see Getting Started below.

Once a user has been granted a role in VSPS, the user can access the two currently available modules:

- The Veterinary Accreditation Program (eVAP) module; and
- The Interstate movement module and related test records.

Additional modules such as import and export will soon be available through VSPS.

**eVAP Module:**

In October 2005, the National Veterinary Accreditation Program Staff transferred records of approximately 65,000 accredited veterinarians from its legacy national database to the new VSPS electronic Veterinary Accreditation Program module. This new module allows new veterinarians to apply for accreditation online and legacy accredited veterinarians to validate or update their contact information. Accredited veterinarians are encouraged to begin using the VSPS eVAP module to confirm that their accreditation and contact data is current and correct.

VS Area Veterinarians in Charge (AVIC) can use the module to approve roles in VSPS, verify accreditation status, process applications for accreditation, approve and print accreditation certificates, and create mailing labels, accreditation certificates and reports. State animal health officials can find accredited veterinarians and verify their accreditation status. The public can also find a listing of accredited veterinarians in their area.

**eInterstate Module:**

Accredited veterinarians with an active VSPS role can use the eInterstate Module to create electronic Certificates of Veterinary Inspection (eCVI) and related test records. This module
REPORT OF THE COMMITTEE

provides a standard method of data capture that automatically disseminates state of origin and destination data to the appropriate state animal health officials and various Veterinary Services databases. Accredited veterinarians can also access state import regulations and create test record templates.

The eInterstate module also has a laboratory component that provides online connectivity to participating Equine Infectious Anemia laboratories approved by VS-National Veterinary Services Laboratories (NVSL) leading to shorter turn around time for EIA test results. Using the e-Interstate laboratory component, veterinarians can submit EIA test records electronically. The laboratory component of the e-Interstate module currently provides official test charts for the VS Form 10-11, Equine Infectious Anemia (eEIA) Laboratory Test (digital photos may be included by the veterinarian). The VS Form 4-33, Brucellosis Test Record and VS Form 6-22, Tuberculosis Test Record are in development and will be added in the near future.

Report Tools:

VSPS also offers report tools for accredited veterinarians, diagnostic laboratories, and State and Federal animal health officials. Accredited veterinarians can store, print, and run reports on their own eCVIs and test records. State animal health officials can export their own state data to their State databases as well as batch print eCVI and related test and vaccinations records originating from or entering into their own state. Specific VSPS mail boxes have been established at VS; AVIC area offices to receive accreditation and role requests as well as animal and animal product import/export permit requests.


Francois Elvinger, Virginia-Maryland Regional College of Veterinary Medicine, Chairman and presenter for the National Animal Health Surveillance System Steering Committee provided a report on the system and urged support for full implementation of the National Animal Health Surveillance System. The 2001 National Animal Health Safeguarding Review recognized the central importance of comprehensive, coordinated and integrated surveillance for protection of US livestock and poultry health. VS,
in 2003, in response to the recommendations of the Safeguarding Review, appointed a national surveillance coordinator and created the National Surveillance Unit (NSU), which was tasked to coordinate all activities towards planning, evaluation, integration and enhancement of national animal health surveillance. By the spring of 2004, a Steering Committee composed of representatives from livestock, poultry and aquaculture industries, diagnostic laboratories, universities, State and Federal agencies was formed and charged with guiding and supporting design, planning and implementation of efficient and accurate surveillance for relevant animal diseases. The Steering Committee’s functions are to ensure consideration of all Safeguarding Review recommendations; guide strategic planning; interact with constituencies and obtain stakeholder input and support; request and review documents and plans (early and late); seek outside expertise and help (panels and working groups; teams); support quality control; and guide research. The Steering Committee set goals in the NAHSS Strategic Plan which included early detection and global risk surveillance for foreign animal diseases and emerging diseases; enhanced surveillance for current program diseases; monitoring and surveillance for diseases of major impact on production and marketing.

The NSU recognized early that planning and implementation of effective and efficient surveillance systems required a paradigm shift from the traditional fragmented surveillance activities for single diseases in disparate programs, into integrated systems, taking advantage of existing and new surveillance streams and analytical processes to generate the information needed to take action. The NSU, first prepared a Surveillance and Data Standards document as a foundation and guidance for all surveillance plans, and designed methods for existing and future surveillance program evaluations. The NSU also, within CEAH, took advantage of existing and new modeling, of threat, pathway and risk analyses, to set priorities. The NSU further produced the U.S. Animal Health and Productivity Surveillance Inventory, which is a database application that enables users to search for information about surveillance and monitoring programs, epidemiologic studies, and other activities related to animal health in the United States (can be accessed at www.aphis.usda.gov/vs/nahss/inventory.htm). Since its inception, VS, and in particular NSU work has led to significant accomplishments in the context of the NAHSS.
including design and implementation of surveillance for bovine spongiform encephalopathy, avian influenza, classical swine fever, viral hemorrhagic septicemia, pseudorabies virus, and scrapie; evaluation of scrapie and brucellosis surveillance; surveillance communication and reporting in the context of the National Animal Health Reporting Systems (NAHRS), World Organization for Animal Health (OIE) reports; and the U.S. Animal Health Report.

Despite those accomplishments, NAHSS faces challenges in the creation of integrated and comprehensive surveillance. Integration of surveillance streams for different diseases, eventually across species, requires careful evaluation of the epidemiology of diseases under consideration, their host and agent properties and dynamics in the environment. The potential for diagnostic systems (observations and/or tests) to be applied to animals or specimens for more than one agent or disease needs to be considered, and information technology systems to capture, analyze and transfer data and information need to be standardized. Integration needs to be logistically feasible under current or future funding streams. One of the main benefits of integration is the added value that can be obtained from efficient use of various surveillance streams for greater coverage of diseases and animal populations. Integration of surveillance streams will facilitate comprehensive surveillance which is surveillance for any manifestation (clinical, agent detection) of multiple diseases of interest across the U.S. and which facilitate national policy decisions and trade agreements.

Premises and animal identification will greatly benefit surveillance planning and execution. To appropriately plan surveillance it is of importance to have information on premises and animal location, and to have estimates of animal density and movement (direction and distance). For high impact diseases, the rapid determination of the location and expansion of a threat, i.e. of the animal disease agent, in particular from a shedding animal, helps determine which premises and animals are at risk, which allows for a faster response. Potential magnitude of exposure (for example related to the number of infectious animals that shed the agent) and time of exposure estimated from movement records will inform surveillance procedures, i.e. the design of sampling schemes (examination and/or specimen collection), which allows appropriate allocation of resources for surveillance (personnel and materials for specimen collection, laboratory capacities). Effective disease detection schemes are essential for rapid and efficient
response to introduction of disease into a population, as well as for determination of absence of disease.

The NAHSS Steering Committee has recognized the many challenges that VS faces in implementing integrated and comprehensive surveillance, in particular the restrictive funding mechanisms. Surveillance planning and funding for implementation have traditionally been tied to specific ‘program’ diseases, a mechanism of funding which prevents flexibility and which has resulted in a lack of harmonization of surveillance planning and implementation. Difficulties in resource allocation slow down the planning process and delay the implementation of integrated and comprehensive surveillance. This places animal agriculture at risk of undetected introduction and/or spread of animal diseases, including high impact foreign animal and emerging diseases. Given these restrictions, the Steering Committee decided to raise the awareness of stakeholders, as done with this report, and to look for support in identifying and leveraging resources to achieve maximum efficacy and efficiency of surveillance for diseases that are currently present in the United States, as well as for those that threaten US animal populations or may arise in the future.

Valerie Ragan, AgWorksSolutions, provided a report on the GlobalVetLink 50 State Regulatory Applications. She reported that GlobalVetLink, L.C. (GVL) is a private company, headquartered in Ames, Iowa, at the Iowa State University Research Park. GVL is the innovator of a secure, national web-based platform that replaces an outdated paper-based regulatory process. GVL established the ‘gold standard’ of electronic regulatory certification for animals – and is accepted by all 50 states.

GVL’s national multi-species web-based platform connects all state animal health and regulatory officials with its veterinarian subscribers and a growing national network of over 55 online animal diagnostic laboratories, which are also GVL subscribers. GVL’s regulatory system facilitates use of all forms of animal ID entered by accredited veterinarians, including: premises ID, digital photos, visual tags, and EID - with automated uploading of IDs.

Key Applications and Services:

- **Online Certificate of Veterinary Inspections System (OCVI)** - for animal movement certification by accredited veterinarians on behalf of their clients.
REPORT OF THE COMMITTEE

- State Animal Health Official Reporting – an automated real-time nationwide system that reports animal imports into a state, fulfilling the regulations for movements into the state, along with intra-state movement and lab tests result reporting.
- Equine Infectious Anemia system (eEIA) - Online system for completion of Equine Infectious Anemia (EIA) testing - including digital photos. The system connects diagnostic laboratories to private veterinarians & state animal health officials. Now approved by USDA-APHIS-VS for international movement of horses!
- Diagnostic Laboratory System- connecting labs to veterinarians with real-time reporting system.
- “Find An Aquaculture Diagnostic Lab” - developed in collaboration with American Veterinary Medical Association (AVMA), USDA’s Risk Management Agency, Federal Crop Insurance Corporation through Mississippi State University.
- Veterinary Feed Directive ‘eVFD’ – web based prescription and documentation system for feed grade antibiotic use-connected with the feedmills for prescription verification.
- Pet Lemon Law system - pet health certification prior to the sale of pets.
- Permitting – allows animal health officials to document state entry permits for animal movements.
- Pre-conditioning Calf Certification– certification system developed for bovine veterinarians and auction markets – in conjunction with the Iowa Veterinary Medical Association and Iowa State University.

GlobalVetLink provides a one-stop shop for veterinarians for multiple regulatory applications for a large variety of species - and has grown to 34 states with signed license agreements, with eight more in the legal review processes.

The company welcomes input from state animal health officials, laboratory personnel and veterinary practitioners as it continues to enhance its system and maintain its relevance to subscribers – especially subscribing veterinary practices.

Becky Brewer-Walker, Oklahoma Department of Agriculture, Food and Forestry, provided a report on a survey conducted to evaluate animal identification legislation at the state level. The report, entitled Animal Identification Legislation, Are We Heading in the Right Direction detailed the responses to a survey...
LIVESTOCK IDENTIFICATION

conducted by Brewer and her staff.


Of the responding States, 0 currently have no legislation pending.

Bills presented that DID NOT pass and contained POSITIVE language:
- Pennsylvania: SB 865, introduced October 2005. Would require mandatory premises registration and establish a database to facilitate that process.

Bills presented that DID NOT pass containing NEUTRAL language:
- South Dakota: HB 1199, introduced January 2007. Any and all ID program developed/implemented shall be voluntary.
- Washington: HB 1151, introduced February 2007. Create a livestock ID advisory committee to make recommendations on whether and how to implement a voluntary animal ID system.
- Texas: HB 637, introduced February 2007. Would require a voluntary animal ID program, to the extent required by federal law. Included an annual fee as determined by the Animal Health Commission. Participants may withdraw at any time having all personal information withdrawn from the program.
- Arkansas: HB 1761, introduced March 2007. Producers could voluntarily register their premises and ID animals. Would not require premise registration or use of eID.
REPORT OF THE COMMITTEE

mandatory participation in an animal ID system. Allows the development and implementation of a voluntary system consistent with NAIS. May include a registration fee.

Bills presented that DID NOT pass containing both POSTITIVE and NEGATIVE language:
- Oklahoma: HB 1842, introduced January 2007. Required mandatory premise registration, individual animal ID or group/lot ID and tracing animal movement. Operations with annual sales of $10,000 or less shall be exempt

Bills that DID NOT pass containing NEGATIVE language:
- Virginia: HB 1990, introduced January 2007. Ensured the state does not participate or provide any assistance to the establishment of the NAIS or similar program.
- Washington: HB 1151, introduced January 2007. Prohibited establishment of participation in NAIS. Any Cooperative Agreement with the federal government shall be terminated. Citizens must be notified that upon request their personal information will be expunged from the National Premises Information Repository.
- Missouri: HB 747, introduced February 2007. Shall not participate in NAIS. Will not establish a premise registration database or trace any animal movements. Any cooperative agreement with the federal government shall be terminated. Citizens shall be notified that upon their request their personal information will be expunged.
- Tennessee: SB 173, introduced February 2007. Shall not participate in NAIS. Will not establish a premise registration database or trace animal movement. Any Cooperative Agreement with the federal government shall be terminated. Citizens will be notified that upon their request their personal information will be expunged.

Bills with POSITIVE language that have become LAW:
- Wisconsin: ACT 229, effective April 13, '04. Created mandatory premise registration and established an electronic database related to livestock premises in the state.
- Indiana: TITLE 345, effective September 1, 2006. Created mandatory premise registration and the establishment of an electronic data base related to livestock premises in the
LIVESTOCK IDENTIFICATION

state. Also requires persons holding livestock exhibitions to register their premises and keep records of persons and livestock that attend their event. Stakeholders must contact the state veterinarian within 30 of changes in contact information.

- Michigan: ACT 466, effective March 1, 2007. Created mandatory premise registration, mandatory animal tagging and the establishment of an electronic data base related to livestock premises and animal movement in the state. All cattle, goats, sheep and privately owned cervidae shall bear official identification before leaving the premise.

- N. Dakota: ACT CHAPTER 36-01, effective July 1, 2007. State Board of Animal Health shall develop and maintain an animal tracking data base to assist with tracking animal movement for animal health purposes only. The information obtained is subject to open records laws. An appropriation of $90,836 from the State Treasury shall be used to develop and maintain the database.

Bills with LIMITING language that have become LAW:

- New Hampshire: RSA 436:6-A, effective September 1, 2007. Any program such as NAIS shall be voluntary.

- Arizona: TITLE 3 SECTION 3-114, effective September 19, 2007. Participation in NAIS shall remain voluntary. State shall not mandate or force participation in NAIS. The results of the survey strongly suggest that due diligence is necessary to address the myriad of concerns and misconceptions regarding implementation of NAIS.


He reported that premises registration became mandatory in Wisconsin on January 1, 2006 for all keepers of livestock. Currently there are over 55,000 registered premises. Prior to the mandatory premises registration, Wisconsin had no registration for swine, beef, horses or poultry except for NPIP enrolled flocks. Wisconsin was voluntarily registering premises for nearly three years prior to the mandatory program with less than 20,000 premises registering; most of these premises were licensed dairy farms. In April 2007, the state was notified of a positive pseudorabies herd for the first time since 1998.
REPORT OF THE COMMITTEE

This was the first time premises registration was utilized to respond to an animal disease emergency in Wisconsin. It is required by pseudorabies – eradication program standards to perform a five mile area survey and test. The premises registration information and the GIS mapping capabilities that are a result of premises registration expedited these surveys. Animal Health Officials were able to complete the area surveys and depopulations within the required timelines to maintain Stage V pseudorabies free status.

John Huntley, New York State Veterinarian, provided a report on Innovative Solutions in the New York State Cervid Program.

Background:
An animal identification system is an essential element of most animal health programs. It is the foundation upon which informed decisions can be made that support progress in population animal health. New York State animal health programs incorporate technology where appropriate to achieve efficiency in collection of necessary animal data, facilitate compliance, and ease producer requirements. The use of technology also limits the impact of the control elements on the animal population.

The New York State (NYS) Chronic Wasting Disease (CWD) Program:
The NYS CWD Control Program is an example of the use of information systems to support a herd certification program. The herd CWD certification program requires long term accountability for individual deer within a herd. The major tenets of the program involve the conduct of an annual inventory, the documentation of animal movements from the herd, and sampling natural deaths that occur. Those procedures require a viable animal identification system.

Special Considerations:
Deer are difficult to handle and the annual inventory has been a difficult event that hampered producer enthusiasm and participation. It required a roundup and individual handling of each deer. The inventory process often resulted in disruption to the operation and occasional injury to the captive deer.

In an effort to address these issues, the state in
LIVESTOCK IDENTIFICATION

cooperation with the federal government explored technological solutions that would ease producer concerns, maintain program integrity, and encourage participation and compliance with program elements.

Solutions considered:

The preferred solution to many of the handling, management, personnel, and other resource issues was to utilize a passive inventory system. This was designed to minimize the stress of roundup on the animals and produce a cost effective solution. The producer can also use this technology to manage other aspects of the herd including health monitoring, production data, and other business oriented support information. The producer also establishes a CWD herd status that can be used for intrastate and interstate movement of deer.

Primary requirements of such a system entailed the capture of individual animal identification data at distances beyond the capabilities of traditional radio frequency identification (RFID) technologies.

Two technologies were evaluated:

1. Ultra High Frequency (UHF) passive tags: These tags allowed for data capture at extended working distances of approximately 4 feet. Working distance can be extended by enhancement of the antennae element. The tags worked satisfactorily. Orientation of tag to antennae, body mass, and metal affected the effectiveness of the system.

2. Low Frequency ACTIVE RFID tags- This system allowed for data capture at an effective working distance of 10 feet or greater. The tags worked very well with 100% inventory outcome. The tags did not suffer issues with metal interference, body mass, or tag/reader orientation. Individual tag cost may be a future issue impacting producer adoption.

Data Collection:

Data was collected and downloaded in a similar manner for both systems. The primary requirement was the ability to use the data in the Department’s animal health information system. Data was uploaded into the Viaherd database for analysis and decision support regarding herd status and movement.
REPORT OF THE COMMITTEE

Summary Statement:
A viable animal identification system, either at the group or individual level has been an important component of the ability to improve animal health within animal populations. Utilization of technologies that minimize the impact of regulatory requirements at the producer level, work within the business rules inherent in the production system, and allow for the producer to use the information in non regulatory applications will encourage utilization of new technologies. Such technologies will permit animal health systems to keep pace with the speed of commerce and should result in improvements for surveillance, monitoring and control systems supporting animal health.

Greg Onstott, Missouri Department of Agriculture, reported on Missouri’s efforts to address animal identification and tracking issues at markets in the state. The following is his report, Streamlining Sale Barn Information Data.

The livestock markets in the State of Missouri currently collect thousands of blood samples on an annual basis. The current method requires the market veterinarian and or his/her assistant to manually enter and write out all data collected at chute side. The Missouri General Assembly approved a new decision item that will allow the Missouri Department of Agriculture, Animal Health Division to assist the market veterinarian in streamlining the test data from the livestock markets.

This streamlining project will convert the process of collecting disease surveillance information and data into an electronic format. The project will equip market veterinarians with new computers and software that will allow them to collect samples and send the information associated with that data electronically.

Once the software and hardware is installed the market veterinarian will collect the data and save it to the computer. The veterinarian will also utilize official USDA-RFID tags for the identification of replacement cows and bulls going “back to the farm”. Cull cows and bulls will still receive a metal test tag as in the past. All of this identification information, along with premises number of the market, date, species and age will be sent to the Division of Animal Health for disease trace back capabilities if needed. This electronic capture of data will also allow the test results and all associated data to be loaded instantly into the Generic Database (GDB) electronically, instead of manually. This
process will save time at for both the livestock market and animal health official.


The ongoing cooperative brucellosis control/eradication program has made great strides in elimination of this disease. Currently (September 2007) 49 states, Puerto Rico, and the Virgin Islands are classified as free. However an ongoing potential threat concerns both state animal health officials as well as cattle producers in the western United States. Private practitioners, producers and state animal health officials have all voiced support for development of a RFID Official Brucellosis Vaccination Tag that visually denotes the state where the animal was vaccinated. Such a tag, if made available for use on a voluntary basis now would offer the choice for the producer and his veterinarian to replace the metal clip tag in current use and over a period of time would allow for the identification of a large number of “momma cows” on producer operations. The use of an Official RFID Brucellosis Tag over the next four to five years would have a significant impact in acceptance of RFID to enhance this disease management program as well as identifying 60 to 70 percent of adult female cattle on producer operations where calfhood vaccination is practiced. The majority of livestock health officials, brand inspectors and livestock producers are familiar with the “state two digits codes” and routinely use this information to identify in which state cattle where vaccinated.

Encourage USDA-APHIS-VS to make available an “RFID Official Brucellosis Vaccination Tag” that is orange in color and carries the two digit state code, as an option, for use at the time of vaccination.

Further, USDA-APHIS-VS to subsidize these tags so that they are available through appropriate channels (state or federal offices depending on the state) to accredited veterinarians at a reasonable cost. ($0.25-0.50/tag)

Following the forgoing reports and discussion, the Committee conducted its business session.
Old Business:

The committee mission statement was reviewed with Committee members. Committee members determined that the current mission statement accurately reflects the mission of the Committee and therefore, the mission statement will be continued without modification.

Chairman Hillman reviewed with Committee members the three resolutions from the 2006 meeting of the Committee and noted that USDA had responded promptly to each resolution via the draft traceability business plan presented earlier during the meeting. Chairman Hillman reported that no further action appeared necessary relative to the resolutions.

New Business:

The Committee approved five resolutions that were forwarded to the Committee on Nominations and Resolutions.
REPORT OF THE COMMITTEE ON NOMINATIONS AND RESOLUTIONS

Chair: Bret D. Marsh, Indianapolis, IN

NOMINATIONS FOR ELECTED OFFICERS, 2007-2008

President: James W. Leafstedt, Alcester, SD
President Elect: Donald E. Hoenig, Augusta, ME
First Vice-President: Richard E. Breitmeyer, Sacramento, CA
Second Vice-President: Steven L. Halstead, Lansing, MI
Third Vice-President: David T. Marshall, Raleigh, NC

DISTRICT DELEGATES

NORTHEAST: E.W. Zirkle, New Jersey
J. I. Enck, Jr., Pennsylvania
SOUTH: L. O. Lollis, Florida
A. G. Rosales, Alabama
NORTH CENTRAL: V. Green, Michigan
J. Hawley, Indiana
WEST: W. Sauble, New Mexico
H. M. Richards, Ill, Hawaii

RESOLUTIONS

111th Annual Meeting

RESOLUTION NUMBER: 1, 13 and 75 Combined APPROVED

SOURCE: COMMITTEE ON CAPTIVE WILDLIFE AND ALTERNATIVE LIVESTOCK
COMMITTEE ON WILDLIFE DISEASES
COMMITTEE ON BRUCELLOSIS

SUBJECT MATTER: PUBLICATION OF THE PROPOSED CERVID BRUCELLOSIS RULE IN THE FEDERAL REGISTER

BACKGROUND INFORMATION:

To encourage whole herd brucellosis testing of cervids and to promote certified brucellosis-free herds, the committee recommends finalizing the Cervid Brucellosis Rule.
REPORT OF THE COMMITTEE

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) publish the proposed Cervid Brucellosis Regulations in the Federal Register for public comment.

RESOLUTION NUMBER:  2 and 11 Combined  APPROVED

SOURCE: COMMITTEE ON CAPTIVE WILDLIFE AND ALTERNATIVE LIVESTOCK COMMITTEE ON WILDLIFE DISEASES
SUBJECT MATTER: FINALIZE THE CHRONIC WASTING DISEASE HERD CERTIFICATION PROGRAM AND INTERSTATE MOVEMENT OF FARMED OR CAPTIVE DEER, ELK AND MOOSE RULE

BACKGROUND INFORMATION:

On August 3, 2006, the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS) received a petition from the Association of Fish and Wildlife Agencies. On August 4, 2006, USDA-APHIS received a petition from the National Assembly of State Animal Health Officials, and on August 8, 2006, USDA-APHIS received a petition from the United States Animal Health Association.

The primary issues addressed by all three petitions are the Federal preemption of State laws and regulations and the requirements established for the interstate movement of cervids in the Chronic Wasting Disease (CWD) rule.

A comment period has been held to address these concerns.

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) to act on the comments received in the petitions and finalize the Chronic Wasting Disease Herd Certification Program and Interstate Movement of Farmed or Captive Deer, Elk and Moose Rule.
RESOLUTION NUMBER: 3 and 10 Combined APPROVED

SOURCE: COMMITTEE ON CAPTIVE WILDLIFE AND ALTERNATIVE LIVESTOCK
COMMITTEE ON WILDLIFE DISEASES

SUBJECT MATTER: VACCINE FOR THE VARIOUS STRAINS OF EPIZOOTIC HEMORRHAGIC DISEASE IN CERVIDS.

BACKGROUND INFORMATION:
Epizootic Hemorrhagic Disease (EHD) is a detrimental threat to the farmed cervid populations, especially whitetail deer. The committee encourages the United States Department of Agriculture (USDA), Agricultural Research Service (ARS) to develop a vaccine that will protect against all known strains of this disease.

RESOLUTION:
The United States Animal Health Association (USAHA) requests the United States Department of Agriculture (USDA), Agricultural Research Service (ARS) initiate research in developing a vaccine that will adequately protect the farmed cervid population from all strains of epizootic hemorrhagic disease (orbiviral hemorrhagic disease).
REPORT OF THE COMMITTEE

RESOLUTION NUMBER: 5, 14, 16, 24, 41, 58, 61 and 67

Combined APPROVED

SOURCE: COMMITTEE ON CAPTIVE WILDLIFE AND ALTERNATIVE LIVESTOCK
COMMITTEE ON WILDLIFE DISEASES
COMMITTEE ON INFECTIOUS DISEASES OF CATTLE, BISON AND CAMELIDS
COMMITTEE ON ANIMAL HEALTH
INFORMATION SYSTEMS
COMMITTEE ON LIVESTOCK IDENTIFICATION
COMMITTEE ON FOREIGN AND EMERGING ANIMAL DISEASES
COMMITTEE ON IMPORT/EXPORT
COMMITTEE ON SHEEP AND GOATS

SUBJECT MATTER: FUNDING AND PLANNING OF INTEGRATED AND COMPREHENSIVE ANIMAL HEALTH SURVEILLANCE

BACKGROUND INFORMATION:
Effective procedures and tools to detect disease agents in United States (US) livestock, poultry, wildlife, and aquatic populations are crucial for animal health protection, maintenance and restoration, for assurance of food security, and for documentation of the U.S. animal health status for national and international partners and stakeholders.

Animal health surveillance is a central function of the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS). Veterinary Services leads the initiative in building the National Animal Health Surveillance System (NAHSS). Guidance is provided by the National Animal Health Safeguarding Review Principles and Recommendations, and resolutions of the United States Animal Health Association (USAHA) and the American Association of Veterinary Diagnosticians (AAVLD). The NAHSS is to be a ‘comprehensive, coordinated and integrated’ system that will enhance efficacy and efficiency of surveillance for high impact foreign animal diseases, emerging diseases and endemic diseases.

Surveillance planning and funding for implementation have traditionally been tied to specific ‘program’ diseases. This mechanism of funding prevents flexibility resulting in a lack of harmonization of surveillance planning and implementation.
Difficulties in resource allocation slow down the planning process, which also has been hampered by insufficient human resources, and delay the implementation of integrated and comprehensive surveillance activities. This places animal agriculture at risk of undetected introduction and/or spread of animal diseases, including high impact foreign animal and emerging diseases. The USAHA and AAVLD recognize that comprehensive and integrated surveillance is essential for the continued protection of our animal populations from disease. USAHA and AAVLD support identifying and leveraging resources to achieve maximum surveillance efficacy and efficiency for diseases that are currently present in the United States, as well as for those that threaten our animal populations or may arise in the future.

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 ensure continued highest priority for integrated and comprehensive surveillance planning and implementation. The USAHA also urges the National Assembly of State Animal Health Officials, the Animal Agriculture Coalition, and the National Association of State Departments of Agriculture to initiate and support a legislative effort to create a system that allows funding for inter-species, multiple disease based comprehensive and integrated surveillance to support continued, effective and efficient protection of the United States' livestock, poultry, wildlife, and aquatic populations from disease.

RESOLUTION NUMBER: 6 APPROVED
SOURCE: COMMITTEE ON AQUACULTURE
SUBJECT MATTER: FUNDING FOR VIRAL HEMORRHAGIC SEPTICEMIA SURVEILLANCE

BACKGROUND INFORMATION:

Viral Hemorrhagic Septicemia (VHS) has historically been considered to be the most serious viral disease of salmonids reared in freshwater environments in Europe. More recently, VHS has been associated with marine finfish species, and most recently has become an emerging disease of freshwater fish in the United States.
REPORT OF THE COMMITTEE

Great Lakes region of the United States and Canada.

VHS was first detected in the Great Lakes region in the Bay of Quinte, Lake Ontario, in 2005, and was subsequently detected in an archived 2003 sample from Lake St. Clair. VHS virus also was detected in Lake St. Clair in 2005 and in Lake Ontario, Lake Erie, Lake St. Clare and the St. Lawrence River in 2006 in a variety of fish species. The virus has also been documented from inland waters in New York (Consensus Lake, Skaneateles Lake, Little Salmon River in Mexico, Oswego County, the Seneca - Cayuga Canal, and an isolated farm pond in Ransomville, Niagara County), Wisconsin (Lake Winnebago), and Minnesota (Budd Lake near Harrison, MN). Prior to 2003, isolations of VHS virus (VHSV) were limited in North America to saltwater finfish from the Atlantic and Pacific Oceans, including Chinook and coho salmon, Pacific herring, Atlantic herring and cod. Since 2005, the list of species known to be affected by VHSV has risen to more than 40, including a number of ecologically and recreationally important fish. In many instances, VHSV has been associated with extensive fish mortality, albeit only in wild fish. Because of the threat of this emerging disease to farmed species, a surveillance program must be developed, immediately implemented and then maintained to minimize potential risks and help prevent impacts of this disease on aquaculture fish species in the United States.

RESOLUTION:

The United States Animal Health Association (USAHA) requests the United States Department Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) and the United States Department of Interior (DOI), Fish and Wildlife Service (FWS) obtain the necessary funding to develop, implement and maintain a national viral hemorrhagic septicemia virus (VHSV) surveillance program to determine changes in the geographic distribution of VHSV and the fish species affected. Additionally, the information that is collected through this surveillance program should be disseminated to commercial and public aquaculture managers.
The effective management of animal health and all hazards emergencies is dependent upon a comprehensive system coordinating and integrating federal, state and local emergency management. The United States Department of Agriculture (USDA) has worked with other federal agencies to further develop and integrate animal emergency management activities within the National Infrastructure Protection Plan (NIPP) and the National Response Plan (NRP). There have been continued efforts among federal agencies defined through the Emergency Support Functions (ESF) and emergency management training and exercises to create a more coordinated and integrated federal level emergency management effort. USDA is working to integrate federal animal emergency efforts with states through the Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) Area Emergency Coordinators, other APHIS personnel, and other USDA entities such as the Cooperative State Research Education and Extension Service.

Within each state the authority to regulate and respond to livestock disease lies primarily with state animal health officials. It is the responsibility of state animal health officials within each state to coordinate animal emergency management to integrate with their livestock industries, to coordinate with other state government agencies through their state emergency management agency and to coordinate with other states’ animal emergency planning and response activities within their respective Federal Emergency Management Agency (FEMA) regions. In order to respond effectively to animal emergency events, planning and response activities must be integrated into each specific livestock species production industry. State animal emergency management planning and response must be further developed within regional, state, and local levels to successfully integrate into animal production systems in order to ensure an acceptable level of business continuity. Failure to adequately support such capabilities may threaten the economic viability of our livestock industries and endanger our nation’s critical food supply.
REPORT OF THE COMMITTEE

The present level of state emergency management planning and response capabilities varies between individual states and is not adequate to ensure an effective animal emergency management system in many states at this time. Appropriate staffing of state animal health emergency management personnel must be accomplished in order to ensure effective emergency management capabilities to protect the livestock industry from foreign animal disease events, all hazards emergencies and ensure an acceptable level of continuity of business within production agriculture. Adequate state level staffing to address animal health emergency planning and response efforts has broad effects that act to ensure the safety and health of United States citizens, food systems, agriculture infrastructure and the economy.

RESOLUTION:

The United States Animal Health Association (USAHA) supports the development of a system to provide adequate funding for state animal health agencies to enhance the state level emergency management capabilities needed to protect the livestock industries and other appropriate animal-related criteria within each state.

The USAHA urges the National Assembly of State Animal Health Officials, the Animal Agriculture Coalition, the National Association of State Departments of Agriculture and the American Veterinary Medical Association to work collaboratively in a legislative effort involving the Congress and the United States Department of Homeland Security (DHS) and the United States Department of Agriculture (USDA) to create a system of funding that ensures employment of adequate state personnel to develop animal health emergency management capabilities that will prevent, protect, respond to and recover from livestock disease and all hazards animal emergencies.

In addition, USAHA requests DHS and other federal partners, including the United States Department of Agriculture (USDA), United States Department of Health and Human Services (HHS), and the Environmental Protection Agency (EPA) implement the policies and directives included in Homeland Security Presidential Directive (HSPD) #9 to secure a successful animal health emergency management system.
RESOLUTION NUMBER:  8  APPROVED
SOURCE:  USAHA/AAVLD COMMITTEE ON ANIMAL
HEALTH INFORMATION SYSTEMS
SUBJECT MATTER: INFORMATION TECHNOLOGY FOR
SURVEILLANCE

BACKGROUND INFORMATION:

Effective procedures and tools to detect disease agents in United States (US) livestock, poultry and aquatic populations are crucial for the protection, maintenance and restoration of animal and public health, assurance of food safety and security, and documentation of the US animal health status for national and international partners and stakeholders.

Animal health surveillance is a central function of the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS). Guided by the National Animal Health Safeguarding Review and resolutions of the United States Animal Health Association (USAHA) and the American Association of Veterinary Laboratory Diagnosticians (AAVLD), plus the ever greater challenges to the health of our animal populations, VS leads the initiative in building the National Animal Health Surveillance System (NAHSS). The NAHSS is to be ‘a comprehensive, coordinated and integrated’ system that will enhance efficacy and efficiency of surveillance for high impact foreign animal diseases, emerging diseases and endemic diseases.

Central to all disease surveillance activities are the collection, analysis and dissemination of information. All three of these activities are dependent on properly designed and executed information systems. Achieving proper design and execution requires the linkage of high quality technical information technology skills and knowledge with veterinary program expertise which ensures that the designed systems match the purpose and needs of surveillance programs. An effective union that adds value to the information collected is often difficult to achieve but becomes impossible without the deep integration of information technology and veterinary medical specialists. Mixed units of technical specialists ultimately yield more effective systems than separate groups who are conceptually isolated as could be the result of plans for reorganization of USDA information technology systems.
REPORT OF THE COMMITTEE

RESOLUTION:
The United States Animal Health Association (USAHA) requests that the United States Department of Agriculture (USDA) commit the necessary resources and management support to maintain the integration of animal health specialists and information technology specialists in the development of information technology systems capable of linking to State regulatory and laboratory data bases and the National Animal Health Laboratory Network. The USAHA also urges USDA to seek input from State regulatory, laboratory and industry stakeholders at all stages of the development of new or revision of existing information systems that support animal health surveillance programs.

RESOLUTION NUMBER: 9 APPROVED
SOURCE: USAHA/AAVLD COMMITTEE ON ANIMAL HEALTH INFORMATION SYSTEMS
SUBJECT MATTER: UNITED STATES NATIONAL REPORTABLE ANIMAL DISEASE LIST
BACKGROUND INFORMATION:
The Committee is tasked with evaluating animal disease information systems that provide information to stakeholders for activities and decisions related to maintaining the health of animals and people, controlling and eradicating disease, and assuring the well-being of animals and profitability of animal industries. In 2006, the Committee formally identified the need for a unified national list of notifiable and reportable diseases. The United States Animal Health Association (USAHA) previously recommended that the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), Centers for Epidemiology and Animal Health (CEAH) compile and evaluate current state reporting and notification requirements. Although all States have a required reportable diseases list, there exists large variability in these lists. Requirements for federal reporting are related only to program diseases or foreign animal diseases (FADs).

A National List of Reportable Animal Diseases will provide one standardized national reportable animal diseases list, demonstrate to trading partners and other countries that the United States has a uniform national list of reportable diseases,
assist in meeting international reporting obligations and validate the United States’ required international reporting to the World Organization for Animal Health (OIE) as well as required export certifications, and improve zoonotic and endemic animal disease reporting in the United States.

The World Organization for Animal Health (OIE) List of Notifiable Diseases currently provides a list of diseases that have implications related to international spread, zoonotic potential, and potential for significant mortality or morbidity. This list can serve as a starting point in the development of a national list of reportable diseases for the United States.

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 cooperation with state animal health officials and industry, develop a United States National List of Reportable Animal Diseases. The National List of Reportable Animal Diseases should include appropriate reporting criteria. The List of Diseases Notifiable to the World Organization for Animal Health (OIE) should be used as a starting point in developing a United States National List of Reportable Animal Diseases.

RESOLUTION NUMBER: 10 Combined with 3
SOURCE: COMMITTEE ON WILDLIFE DISEASES
SUBJECT MATTER: VACCINE FOR THE VARIOUS STRAINS OF EPIZOOTIC HEMORRHAGIC DISEASE IN CERVIDS.

RESOLUTION NUMBER: 11 Combined with 2
SOURCE: COMMITTEE ON WILDLIFE DISEASES
SUBJECT MATTER: FINALIZE THE CHRONIC WASTING DISEASE HERD CERTIFICATION PROGRAM AND INTERSTATE MOVEMENT OF FARMED OR CAPTIVE DEER, ELK AND MOOSE RULE.
REPORT OF THE COMMITTEE

RESOLUTION NUMBER: 12 Combined with 4
SOURCE: COMMITTEE ON WILDLIFE DISEASES
SUBJECT MATTER: ADDITION OF RETROPHARYNGEAL LYMPH NODES AS AN ACCEPTABLE TISSUE, ALONG WITH THE OBEX, IN STATE CWD MONITORING PROGRAMS.

RESOLUTION NUMBER: 13 Combined with 1 and 75
SOURCE: COMMITTEE ON WILDLIFE DISEASES
SUBJECT MATTER: PUBLICATION OF THE PROPOSED CERVID BRUCELLOSIS RULE IN THE FEDERAL REGISTER

RESOLUTION NUMBER: 14
Combined with 5, 16, 24, 41, 58, 61 and 67
SOURCE: COMMITTEE ON WILDLIFE DISEASES
SUBJECT MATTER: FUNDING AND PLANNING OF INTEGRATED AND COMPREHENSIVE ANIMAL HEALTH SURVEILLANCE

RESOLUTION NUMBER: 15 Combined with 64
SOURCE: COMMITTEE ON WILDLIFE DISEASES COMMITTEE ON SHEEP AND GOATS
SUBJECT MATTER: COOPERATIVE RESEARCH AND MANAGEMENT OF WILDLIFE/LIVESTOCK DISEASE INTERACTIONS

BACKGROUND INFORMATION:
The significance of diseases involving wildlife and livestock has increased opportunities for conflict between natural resource and livestock interests. The concerns are valid for the potential for disease transmission in either direction between wildlife and livestock. Domestic and wild species frequently share the same habitat and may share several pathogens. This interface creates many complex problems. Unfortunately, these problems are
not always easily solved scientifically and so remedy is sought through political and/or legal channels.

Agriculture and wildlife interests share common risks and threats such as foreign animal disease introduction, loss of land/habitat to urban sprawl and land developments. It is imperative that we work together to preserve our common interests. Working together will require extensive cooperation, coordination, communication, and collaboration between several agencies and interest groups. It will also require respect for the responsibilities, authorities, skills, and livelihoods of all partners, and will help to develop trust.

Of immediate concern is domestic sheep/bighorn sheep (Ovis canadensis spp.) disease interactions. Bighorn sheep are currently at just 1-2% of their historical numbers with the majority of them inhabiting public lands in the western United States managed by federal and state agencies. In recent years, some but not all bighorn sheep die-offs and declines have been temporally and spatially associated with domestic sheep contact. The complete range of mechanisms/causal agents that lead to epizootic disease events are not fully understood. Separation of wild and domestic sheep has been practiced to reduce the potential for additional bighorn sheep die-offs. Consequently, bighorn/domestic sheep disease interactions and their management impact the domestic sheep industry as well as bighorn sheep conservation.

The United States Animal Health Association (USAHA) Committees on Wildlife Diseases and Sheep and Goats are establishing a working group comprised of representatives of state and federal animal health agencies, wildlife and public land managements, the American Sheep Industry and Foundation for North American Wild Sheep (FNAWS) to develop best management practices for raising domestic sheep and goats on public lands where contact between domestic sheep and bighorn sheep may occur.

RESOLUTION:

The United States Animal Health Association (USAHA) urges the United States Secretary of Agriculture and the United States Secretary of the Interior to seek resources through the President’s budget to fund research to better elucidate the epidemiology and pathogenesis of bighorn-domestic sheep disease interactions so informed and effective management...
REPORT OF THE COMMITTEE

decisions can be made.

RESOLUTION NUMBER:  16
Combined with 5, 14, 24, 41, 58, 61 and 67
SOURCE: COMMITTEE ON INFECTIOUS DISEASES OF CATTLE, BISON AND CAMELIDS
SUBJECT MATTER: FUNDING AND PLANNING OF INTEGRATED AND COMPREHENSIVE ANIMAL HEALTH SURVEILLANCE

RESOLUTION NUMBER:  17 APPROVED
SOURCE: COMMITTEE ON INFECTIOUS DISEASES OF CATTLE, BISON AND CAMELIDS
SUBJECT MATTER: BOVINE VIRAL DIARRHEA VIRUS CONTROL COST BENEFIT ANALYSIS IN BEEF AND DAIRY PRODUCTION

BACKGROUND INFORMATION:

The control and reduction of bovine viral diarrhea virus (BVDV) in the cattle population of the United States is a grassroots effort driven by the dairy and beef cattle industries. The National Cattleman’s Beef Association, Academy of Veterinary Consultants, American Association of Bovine Practitioners and the United States Animal Health Association (USAHA) all have BVDV control committees or subcommittees, however, there is not a single entity acting as a coordinator for these activities.

RESOLUTION:

The United States Animal Health Association (USAHA) urges the United States Department of Agriculture (USDA) to conduct an analysis to determine if the negative economic impact of bovine viral diarrhea virus (BVDV) infection in both beef and dairy cattle would warrant the development of an organized BVDV control and reduction program.
RESOLUTION NUMBER: 18 APPROVED
SOURCE: COMMITTEE ON INFECTIOUS DISEASES OF CATTLE, BISON AND CAMELIDS
SUBJECT MATTER: ESTABLISHMENT OF A CHECK TEST PANEL FOR TESTING CATTLE FOR BOVINE VIRAL DIARRHEA VIRUS PERSISTENT INFECTION

BACKGROUND INFORMATION:
Cattle persistently infected (PI) with bovine viral diarrhea virus (BVDV) are a major source of infection for naïve animals. Control, reduction, or eradication of BVDV is dependent on the reduction of exposure of naïve animals by removing PI cattle from herds. Laboratories conducting BVDV PI testing are not required to demonstrate proficiency, and there are no national standards for validation of tests. Licensing of tests by the United States Department of Agriculture (USDA), Center for Veterinary Biologics (CVB) is only required when tests kits are sold commercially. The claims for accuracy and sensitivity of test kits only apply when the kit is used according to the manufacturers’ recommendations, and the manufacturer does not guarantee kit results when laboratories modify test kit protocols. The economic consequences of false positives and false negatives in BVDV PI detection are significant, and therefore, proficiency testing for BVDV PI is needed.

RESOLUTION:
The United States Animal Health Association (USAHA) urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Services (APHIS) to support efforts by state and industry bovine viral diarrhea virus (BVDV) control programs to evaluate laboratory proficiency in BVDV persistent infection testing of cattle. Pending appropriate funding, this support should include the development of a check test panel available on an ongoing basis to assess laboratory proficiency in BVDV testing. Samples used in panels may include serum, whole blood, buffy coat and skin biopsy.
REPORT OF THE COMMITTEE

RESOLUTION NUMBER: 19  APPROVED
SOURCE: COMMITTEE ON INFECTIOUS DISEASES OF HORSES
SUBJECT MATTER: REQUEST FOR SERUM FROM THE NATIONAL ANIMAL HEALTH LABORATORY NETWORK FOR AN EQUINE PIROPLASMSOSIS SEROLOGICAL SURVEY

BACKGROUND INFORMATION:
Equine Piroplasmosis (EP) is currently classified as a Foreign Animal Disease to the United States. However, due to past issues with import testing, the causal agents, Babesia equi and/or Babesia caballi, possibly exist at some undetermined prevalence level in the country’s resident horse population.
Concern over this issue was addressed by way of resolutions in 2006 from the United States Animal Health Association (USAHA) to the United States Department of Agriculture (USDA) that was based upon recommendations from the EP Subcommittee of the USAHA committee on the Infectious Diseases of Horses. The major resolution adopted by USAHA advocated conducting a slaughter horse survey to estimate the prevalence or lack thereof of EP infection in the United States (US) resident horse population.

Due to unforeseen circumstances, this is no longer a viable option. The EP Subcommittee met by conference call on July 9, 2007 and discussed alternative strategies for achieving this goal. An alternative discussed and unanimously approved was to make application to the Centers for Epidemiology and Animal Health (CEAH) and request that residual sera collected during the 1998 National Animal Health Monitoring System (NAHMS) survey be tested by competitive enzyme linked immunosorbent assay (C-ELISA) for the presence of antibodies to EP. The sera would carry no identification (ID) whatsoever as to animal name/numerical ID, premises of origin or state from which they originated.

The outcome of such a survey would help greatly in resolving the current uncertainty regarding the prevalence of EP in the domestic US horse population. If a significant prevalence of EP infection is found in our horse population, then the issue can be responsibly addressed.

RESOLUTION:
The United States Animal Health Association (USAHA)
requests that the National Animal Health Laboratory Network (NAHLN) laboratories make available and submit residual banked equine serum samples to the National Veterinary Services Laboratory (NVSL) for testing by competitive enzyme linked immunosorbent assay (C-ELISA) for the presence of antibodies to equine piroplasmosis (EP). The absolute requirement is that all samples submitted for evaluation carry no identification (ID) whatsoever as to animal name/numerical ID, date of collection, premises of origin or the laboratory or state from which they originated.

USAHA also requests the United States Department of Agriculture (USDA) to determine what constitutes a representative number of samples from the above NAHLN submissions to provide meaningful estimates of the current prevalence of EP in the United States resident horse population or accept the previously statistically recommended number of 15,000 samples and use previously identified funding which was obtained through the slaughter surveillance initiative.

RESOLUTION NUMBER: 20 APPROVED
SOURCE: COMMITTEE ON INFECTIOUS DISEASES OF HORSES
SUBJECT MATTER: REQUEST FOR SERUM FROM THE NATIONAL ANIMAL HEALTH MONITORING SYSTEM FOR AN EQUINE PIROPLASMOsis SEROLOGICAL SURVEY

BACKGROUND INFORMATION:
Equine Piroplasmosis (EP) is currently classified as a Foreign Animal Disease to the United States. However, due to past issues with import testing, the causal agents, Babesia equi and/or Babesia caballi, possibly exist at some undetermined prevalence level in the country’s resident horse population.

Concern over this issue was addressed by way of resolutions in 2006 from the United States Animal Health Association (USAHA) to the United States Department of Agriculture (USDA) that was based upon recommendations from the EP Subcommittee of the USAHA committee on the Infectious Diseases of Horses. The major resolution adopted by USAHA advocated conducting a slaughter horse survey to estimate the
REPORT OF THE COMMITTEE

prevalence or lack thereof of EP infection in the United States (US) resident horse population.

Due to unforeseen circumstances, this is no longer a viable option. The EP Subcommittee met by conference call on July 9, 2007, and discussed alternative strategies for achieving this goal. An alternative discussed and unanimously approved was to make application to the Centers for Epidemiology and Animal Health (CEAH) and request that residual sera collected during the 1998 National Animal Health Monitoring System (NAHMS) survey be tested by competitive enzyme linked immunosorbent assay (C-ELISA) for the presence of antibodies to EP. The sera would carry no identification (ID) whatsoever as to animal name/numerical ID, premises of origin or state from which they originated.

The outcome of such a survey would help greatly in resolving the current uncertainty regarding the prevalence of EP in the domestic US horse population. If a significant prevalence of EP infection is found in our horse population, then the issue can be responsibly addressed.

RESOLUTION:

The United States Animal Health Association (USAHA) requests that the Centers for Epidemiology and Animal Health (CEAH) provide residues of sera collected during the 1998 National Animal Health Monitoring System (NAHMS) survey to be tested by competitive enzyme linked immunosorbent assay (C-ELISA) for the presence of antibodies to Equine Piroplasmosis (EP). The sera would carry no identification (ID) whatsoever as to animal name/numerical ID, premises of origin or state from which they originated.

RESOLUTION NUMBER: 21 APPROVED

SOURCE: COMMITTEE ON PUBLIC HEALTH AND RABIES
SUBJECT MATTER: STRATEGIC INITIATIVES AGAINST RABIES

BACKGROUND INFORMATION:

The United States (U.S.) is enzootic for wildlife rabies. A single rabid animal may result in mass exposures to the public and the administration of hundreds of courses of human rabies postexposure prophylaxis. Production of Human Rabies Immune
Globulin (HRIG) is, in particular, time and labor intensive and relies upon a pool of hyperimmune human donors. Supply shortages of rabies biologicals occur with disconcerting frequency. Strategic planning for episodic increases in demand for rabies biologicals, e.g. natural or man-made disaster, or mass exposures, is currently lacking.

Exposure to suspected rabies infected dogs is still the cause of over 90 percent of human exposures to rabies and of over 99 percent of human deaths worldwide. Yet requirements for importation of domestic animals to the U.S. from canine-rabies enzootic countries are the same as from countries that pose a much lower risk of rabies translocation.

The use of a licensed oral rabies vaccine has been effective in controlling rabies in certain wildlife rabies reservoir species. However, there is only a single licensed vaccine available for this endeavor. Its efficacy is not uniform across the range of target species, and unit cost is rising.

RESOLUTION:

The United States Animal Health Association (USAHA) requests that the United States Department of Health and Human Services (HHS), Center for Disease Control and Prevention (CDC) consider creation of strategic federal stockpiles of human rabies biologicals, improved research support for novel alternatives to current human rabies biologicals and encourage investment and innovation in the commercial sector thereby ensuring adequate production and distribution capacity for cost effective and efficacious products.

The USAHA requests HHS, CDC strengthen federal regulations to minimize the opportunity for the importation of rabies infected domestic animals from rabies endemic countries. The USAHA also requests HHS and the United States Department of Homeland Security (DHS) offer financial incentives to small, innovative, biotech business ventures for production of new, cost effective, and efficacious oral wildlife rabies vaccines and delivery systems to better serve current and future program needs and support preparedness efforts.
REPORT OF THE COMMITTEE

RESOLUTION NUMBER: 22 APPROVED
SOURCE: COMMITTEE ON PUBLIC HEALTH AND RABIES
SUBJECT MATTER: THE NORTH AMERICAN RABIES MANAGEMENT PLAN

BACKGROUND INFORMATION:
On September 8th, 2007 during world rabies day the Centers for Disease Control and Prevention (CDC) announced the United States (U.S.) had eliminated the canine rabies variant. This was made possible by the success of a collaborative project of Federal, State, Local, and academic partners. This program resulted in elimination of canine rabies variant, endemic in Mexico, in coyotes from South Texas using RABORAL V-RG® (Merial) and the continued surveillance and vaccination barrier of the Texas/Mexico border. Continued progress in the eastern U.S. with Canada to control the raccoon rabies variant and new programs to study the control of skunk rabies variant utilizing oral vaccines are reviewed at the annual United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS) Rabies Management Team meeting. At these meetings, the North American Rabies Management Plan has been developed with state, tribal, U.S., Canada, and Mexico agencies to plan the management, control and elimination of terrestrial rabies in North America.

RESOLUTION:
The United States Animal Health Association (USAHA) supports the United States Department of Health and Human Services (HHS), Centers for Disease Control and Prevention (CDC) continued surveillance and control of the canine variant of rabies to prevent the reintroduction of this strain into the United States. USAHA also encourages the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS) and the HHS, CDC to allocate appropriated funding and resources to assist state and local agencies in maintaining this canine-free rabies status and expand the coordinated regional wildlife rabies control and vaccination programs through the newly developed North American Rabies Management Plan with the ultimate goal of eliminating terrestrial strains of rabies regionally, nationally and throughout the North American continent.
RESOLUTION NUMBER:  23    NO ACTION
SOURCE:  COMMITTEE ON ANIMAL WELFARE
SUBJECT MATTER:  BAN ON DOUBLE-DECK TRAILERS OF EQUINES INTENDED FOR SLAUGHTER

RESOLUTION NUMBER:  24
Combined with 5, 14, 16, 41, 58, 61 and 67
SOURCE:  COMMITTEE ON ANIMAL HEALTH INFORMATION SYSTEMS
SUBJECT MATTER:  FUNDING AND PLANNING OF INTEGRATED AND COMPREHENSIVE ANIMAL HEALTH SURVEILLANCE

RESOLUTION NUMBER:  25    APPROVED
SOURCE:  COMMITTEE ON TUBERCULOSIS
SUBJECT MATTER:  TUBERCULOSIS TEST REQUIREMENT FOR RODEO/EVENT CATTLE
BACKGROUND INFORMATION:

The 2006 discovery of two separate instances of bovine tuberculosis (TB), one case in a bucking bull and the other in a roping steer, has resulted in traces to cattle in several states as well as the destruction of a herd of beef cattle. The relative risk posed by rodeo/event cattle is much greater than the risk from feeder cattle. Compared to feeder cattle, roping and bull dogging steers may remain in the population much longer, are more likely to be commingled with breeding beef cattle, may have multiple owners in a comparatively short time period and are frequently commingled with event/rodeo cattle of various owners at roping events and rodeos. In addition, current events indicate that there is a need for more tuberculosis surveillance in bucking bulls. This is clearly demonstrated by the number of exposed cattle traces related to the positive bucking bull.

Most United States (U.S.) breeders of eventing cattle are cattle producers whose ranches are located in bovine TB Accredited Free states. These cattle producers follow management practices identical to those of other purebred and commercial beef producers and their cattle seldom commingle with Mexican origin cattle or dairy cattle. It should be recognized
that these cattle pose a low risk of transmitting TB. Testing these cattle provides little if any benefit to the efforts to control and eradicate bovine TB from the U.S.

It should also be recognized that a testing requirement for native cattle that have never been exposed to Mexican origin cattle or dairy cattle as a condition for interstate movement for cattle shows and for sale as breeding stock may discourage the development of an alternative, low-risk source of eventing cattle.

RESOLUTION:

The United States Animal Health Association (USAHA) urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS) to implement a regulation requiring that all bucking bulls, roping steers and bulldogging steers be tested negative for tuberculosis (TB) within 12 months prior to any interstate movement. Except that the movement of animals out of the birth herd would be exempt from the TB test provided that an accredited veterinarian places a statement on the Certificate of Veterinary Inspection that the birth herd has had no exposure to Mexican cattle or dairy cattle.

USAHA also urges USDA-APHIS to implement a regulation requiring that an official Certificate of Veterinary Inspection accompany the aforementioned cattle that required a test and the test date of the last negative tuberculosis test for each animal is indicated on the Certificate.

RESOLUTION NUMBER: 26 APPROVED
SOURCE: COMMITTEE ON TUBERCULOSIS
SUBJECT MATTER: COLLECTION OF SERUM FROM CERVIDS ROUTINELY TESTED BY THE SINGLE CERVICAL TEST FOR EVALUATION OF THE RAPID TEST FOR TUBERCULOSIS IN CERVIDS

BACKGROUND INFORMATION:

At the 2006 United States Animal Health Association (USAHA) meeting the following resolution was approved as Resolution Number 21: “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) validate a
serological tuberculosis test for captive cervids. USAHA urges USDA-APHIS-VS to take the lead in organizing a pilot project with industry so that prior to each single cervical test injection in captive cervids a blood sample is collected and serum submitted to the National Veterinary Services Laboratory (NVSL) for evaluation of the VetTB Stat-PakTM rapid test for one year. Serum should be banked for evaluation of a future serology test. Results of this evaluation should be submitted for review by the Scientific Advisory Subcommittee on Tuberculosis”.

This Resolution had the following response: “The United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) maintains interest in enhancing and approving new, reliable tests for tuberculosis. We specifically look forward to testing methods that will exceed the accuracy of our current tests and reduce the impact of testing on producers and their livestock. For these reasons, VS fully supports this recommendation. Implementation of this project will be heavily dependent on the industry for providing samples, providing assistance with the purchase of suspects and reactors for confirmatory testing, assistance during testing, and with the promotion of this effort within the industry. Implementation of this project is also dependent on the availability of time, personnel, and financial resources. VS fully intends to pursue”.

RESOLUTION:

The United States Animal Health Association (USAHA) urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS) to expedite the validation process for tuberculosis (TB) serological tests for cervids to enhance surveillance for TB.

RESOLUTION NUMBER: 27 APPROVED

SOURCE: COMMITTEE ON TUBERCULOSIS

SUBJECT MATTER: DESIGNATION OF TUBERCULOSIS SEROLOGICAL TESTS FOR PROVISIONAL STATUS

BACKGROUND INFORMATION:

Preliminary data presented at the Scientific Advisory
Subcommittee (SAS) on Tuberculosis (TB) on October 20, 2007, indicates that the PriTest SeraLyte-Mbv™, Chembio BovidTB STAT-PAK™, and Chembio Mapia™ Mycobacterium bovis test technologies show promise for potential use in the national Bovine TB Eradication Program. Test sensitivity values reported were 81.5%, 70.4% and 70.4% respectively. Additional data is now needed to more critically evaluate these tests according to proposed use in an official capacity. Designation of these tests as provisional, as per applicable United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS) memoranda will support the collection of additional data for evaluation by the TB SAS and USDA-APHIS.

This designation will initiate a more formal process allowing USDA-APHIS to work with the test developers in identifying specific uses for these tests in the national Bovine TB Eradication Program and to provide guidance regarding additional test samples needed for further consideration and evaluation as official TB program tests.

RESOLUTION:

The United States Animal Health Association (USAHA) urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS) to designate the PriTest SeraLyte-Mbv™, Chembio BovidTB STAT-PAK™, and Chembio Mapia™ tests as provisional tests for Mycobacteria bovis diagnosis in cattle.

RESOLUTION NUMBER: 28
Combined with 47, 60 and 63 APPROVED
SOURCE: COMMITTEE ON TUBERCULOSIS
COMMITTEE ON TRANSMISSIBLE DISEASES OF SWINE
COMMITTEE ON IMPORT-EXPORT
COMMITTEE ON BRUCELLOSIS
SUBJECT MATTER: MINIMUM EXPORT RULES FOR GOATS AND SWINE

BACKGROUND INFORMATION:

The livestock industry of the United States has much to offer other countries through the exportation of our livestock
To be competitive with other livestock exporting countries, exporters in the United States need to keep preparation costs as low as possible and the tuberculosis test, in particular, requires two visits by a veterinarian to conduct the test.

Title 9, Code of Federal Regulations, Part 91, relating to the inspection and handling of livestock for exportation requires certain testing to be eligible for exportation.

Part 91.5 relating to cattle exportation was amended on August 22, 2007 to allow the exportation of cattle without the need for a tuberculosis or brucellosis test unless required by the importing country.

Part 91.6 still requires a tuberculosis and brucellosis test even if not required by the importing country. Part 91.9 requires a brucellosis test for swine even if not required by the importing country.

Most states in the United States are free of both brucellosis and tuberculosis so it should not be a major risk for an importing country. If the importing country believes there is some risk for the two diseases, they can require the tests in their import protocols.

RESOLUTION:

The United States Animal Health Association (USAHA) proposes that the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) publish a proposed rule eliminating the requirement for the brucellosis and tuberculosis test for goats intended for exportation, and the brucellosis test for breeding swine intended for exportation unless required by the importing country.

RESOLUTION NUMBER: 29 APPROVED
SOURCE: COMMITTEE ON DIAGNOSTIC LABORATORY AND VETERINARY WORKFORCE DEVELOPMENT
SUBJECT MATTER: SUPPORT FOR HIGH-CONTAINMENT BIOSAFETY LABORATORIES

BACKGROUND INFORMATION:

High containment biosafety level (BSL)-3, BSL-3 Ag, and BSL-4 laboratory space is vital to our ability for early detection and response to any potential emerging and foreign animal disease or
bioterrorist event.

Laboratories must be capable of handling disease agents in a manner that allows the safe handling of diagnostic materials and the ability to conduct research to detect and prevent emerging and exotic infectious agents.

These same laboratories assist livestock producers, veterinarians, pet owners, wildlife managers and public health professionals in every state on a daily basis by providing surveillance and diagnostic services for these diseases.

RESOLUTION:

The United States Animal Health Association (USAHA) supports continuing operation of existing, and construction of new, high-containment biosafety laboratories. Furthermore, USAHA recommends funding and coordination by federal agencies, including the United States Department of Agriculture (USDA), for maintaining regulatory oversight of these laboratories.

RESOLUTION NUMBER: 30 APPROVED
SOURCE: COMMITTEE ON DIAGNOSTIC LABORATORY AND VETERINARY WORKFORCE DEVELOPMENT
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 the nation’s federal, state and university laboratory resources to allow authorities to better respond to any type of animal health emergency, 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 United States Department of Agriculture (USDA), Cooperative State Research Education and Extension Service (CSREES) and Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) to receive United States Department of Homeland Security (DHS) grants to initiate the network. In order to ensure that the NAHLN is fully
capable of responding to any animal health emergency, funding will be required for appropriate facilities, training and equipment. USDA-APHIS-VS and the Canadian Food Inspection Agency (CFIA) have established a collaborative relationship to produce, distribute and use proficiency panels and reference materials in order to harmonize the diagnosis of major animal diseases between the United States and Canada.

This initiative is separate from, but integrates with and supports, the Veterinary Workforce Expansion Act (VWEA, S. 914, H.R. 2206) by providing training opportunities for veterinarians in public health practice.

It is essential that annual appropriations be provided for the full implementation, maintenance and long-term support of the NAHLN.

RESOLUTION:

The United States Animal Health Association (USAHA) reiterates the need for the Secretary of Agriculture and the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) to request line-item funding in the USDA budget in the amount of $35 million per year for ongoing support of the National Animal Health Laboratory Network (NAHLN) and to ensure that adequate funding is available for transfer and full implementation of newly developed and validated assays from federal and other laboratories to the NAHLN laboratories.

USAHA requests the House Agriculture and the Senate Agriculture, Rural Development and Related Agencies’ Subcommittees on Appropriations provide $35 million annually for the infrastructure support needed to fully implement the NAHLN.

RESOLUTION NUMBER: 31 APPROVED
SOURCE: COMMITTEE ON DIAGNOSTIC LABORATORY AND VETERINARY WORKFORCE DEVELOPMENT
SUBJECT MATTER: NATIONAL VETERINARY MEDICAL SERVICES ACT (PL 108-161)

BACKGROUND INFORMATION:
The National Veterinary Medical Services Act (NVMSA) is a student loan repayment program for veterinarians who
practice in underserved areas. This loan repayment program is to be administered by the United States Department of Agriculture (USDA). The Secretary of Agriculture can determine veterinary shortage areas in rural practice, urban practice, federal government agencies, and discipline areas. Recently highlighted awareness of bioterrorism and foreign animal disease threats to public health and food safety has heightened the urgency of a fully funded and implemented program. The NVMSA also creates a reserve corps of veterinarians available for mobilization in the event of an animal disease emergency or disaster. Adequate funding for NVMSA is $20 million annually.

Enacted in December 2003 and appropriated for both FY06 and FY07, NVMSA's rules remain unwritten by USDA, rendering the program non-functional. The Administration has not included funding for NVMSA in the President's budget, prioritize its rule-making process, or attempt to develop NVMSA's reserve emergency veterinary corps component.

RESOLUTION:

The United States Animal Health Association (USAHA) requests that the United States Congress fully fund the National Veterinary Medical Services Act (NVMSA) for $20 million in the FY08 Agriculture Appropriations bill and requests that the administration budget NVMSA for $20 million in FY09.

USAHA requests the United States Department of Agriculture (USDA) promulgate the regulations for NVMSA no later than 270 days after adoption of this resolution. USAHA recommends that the first phase of NVMSA's implementation should prioritize shortages of large and mixed animal practitioners in rural communities and training of veterinary laboratorians because of urgent national security concerns for public health, bioterrorism preparedness, and food supply security.
RESOLUTION NUMBER:  32  APPROVED
SOURCE:  COMMITTEE ON DIAGNOSTIC LABORATORY AND VETERINARY WORKFORCE DEVELOPMENT
SUBJECT MATTER:  SUPPORT FOR STAFFING AND OPERATION OF THE NATIONAL WILDLIFE RESEARCH CENTER’S NEW BIOSAFETY LEVEL-3 AGRICULTURE WILDLIFE DISEASE RESEARCH LABORATORY

BACKGROUND INFORMATION:
It is critical to ensure there is adequate laboratory space to address national wildlife disease problems because of the important impact wildlife diseases have on human and domestic animal health. The construction and operation of a Biosafety Level-3 Agriculture (BSL-3 Ag) laboratory at the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS) National Wildlife Research Center (NWRC), Fort Collins, Colorado will enhance the nation’s ability to address significant wildlife disease issues. In support of the construction of the NWRC BSL-3 Ag facility, the United States Animal Health Association (USAHA) passed Resolution 8 at its 2005 meeting in Hershey, Pennsylvania. The 30% design phase of the NWRC Wildlife Disease Building (WDB) is complete and “Solicitation for Offerers” for development and construction is underway. Functional operation of the facility is scheduled for spring 2010. This resolution supports efforts for the staffing and operation of a 70,000 square foot Biosafety Level 3-Agriculture laboratory at the NWRC, Fort Collins, Colorado.

The NWRC has unique capabilities to address research, surveillance, diagnostics and disease control efforts in wildlife. These programs are the first line of defense against catastrophic and newly emerging animal diseases, some of which are transmissible to humans. An essential component of an increased capacity for addressing these disease programs is the construction of a BSL-3 Ag research laboratory and wildlife disease diagnostic and research facility at the NWRC. This facility will support expanding research, methods development, and operational efforts to better understand and combat emerging and invasive wildlife diseases.

During the past 18 months USDA, WS has played a critical role in efforts for first detection for Asian subtypes of highly
REPORT OF THE COMMITTEE

pathogenic avian influenza (HPAI). Through the WS operational program over 75,000 wild bird samples and 50,000 environmental samples were collected in collaboration with 50 state agencies. The 75,000 wild bird samples were analyzed at a number of different laboratory facilities under stringent requirements laid out in the Interagency Strategic Plan by the National Animal Health Laboratory Network (NAHLN). The 50,000 environmental samples were all analyzed at the NWRC. While the HPAI screening was conducted under BSL-2 conditions, the effort and capacity of the NWRC for surge wildlife disease diagnostics were demonstrated. Construction and operation of the WDB will enhance USDA's ability to meet the challenges imposed by newly and re-emerging wildlife disease and to comply with Homeland Security Presidential Directive (HSPD) 9, the USDA Strategic Plan and the APHIS Strategic Plan by providing APHIS with Biosafety Level-3 (BSL-3) laboratory and Biosafety Level-3(Ag) wildlife holding/testing facilities in support of: (1) enhancement of operational capacity of federal BSL-3 laboratory diagnostic surge capacity; (2) development of laboratory diagnostic methods for wildlife pathogens and diseases impacting domestic animal and human health; (3) development of field sampling and diagnostic methods to support surveillance and monitoring activities for wildlife pathogens and diseases within and across United States borders; (4) development and efficacy evaluation of methods to prevent/control/contain (e.g. vaccines) wildlife diseases; (5) determination of wildlife host range and reservoir potential for pathogens of program importance toward development of wildlife disease risk assessment models relating to animal and human health and farm biosecurity; (6) development of methods for the protection of animal and public health and protection of the food supply; (7) directed efforts toward methods development for foreign animal diseases.

The NWRC laboratory will be utilized to conduct research on zoonotic wildlife diseases that affect wild and domestic animals, and that may impact human health. The facility will be instrumental in development of methods to identify, monitor, control, eradicate, and prevent the introduction of wildlife diseases into the United States and the North American continent. The BSL-3 laboratory environments will provide for support and surge capacity for other APHIS surveillance activities for domestic and foreign animal diseases during times of emergency.

A fully staffed facility will be able to respond to outbreaks
of wildlife diseases and catastrophic emergencies. In addition, the facility could provide emergency surge capacity to the National Animal Health Laboratory Network.

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), the Secretary of Agriculture, and the House and Senate Subcommittees on Agriculture Appropriations secure funding for the staffing and operation of the 70,000 square foot Biosafety Level 3-Agriculture laboratory at the National Wildlife Research Center, Fort Collins, Colorado, at an estimated annual cost of $3,500,000.

RESOLUTION NUMBER: 33 APPROVED

SOURCE: COMMITTEE ON DIAGNOSTIC LABORATORY AND VETERINARY WORKFORCE DEVELOPMENT

SUBJECT MATTER: VEHICLE RESTRICTIONS IN FOOT-AND-MOUTH DISEASE QUARANTINE REGIONS OF HIGH DENSITY FOOD ANIMAL POPULATIONS

BACKGROUND INFORMATION:

There are approximately 500,000 dairy cows and calves in a 40 mile radius of Tulare, California. Dairy operations and calf facilities are often located across rural roads from each other or short distances away. California’s Highway 99, a heavily used north/south vehicle and trucking corridor runs through the center of the Tulare milk shed. Similar densities of food animal livestock operations are scattered throughout the nation.

In the event of a foot-and-mouth disease (FMD) outbreak within or near the Tulare milk shed, there are United States Departments of Agriculture (USDA) and Homeland Security (DHS) vehicle restrictions that would affect ingress/egress. Also the United States Federal Bureau of Investigation (FBI) restrictions may occur until intentional disease introduction is ruled out. Vehicle quarantine measures as part of the FMD management/eradication program could prove to be more costly within the milk shed than the disease itself. Most of the large Tulare calf ranches, which may consist of up to 80,000 animals per ranch, have only 4-
12 hours of feed inventory available, thus making them vulnerable to restricted movement of feed. Dairy farms and most feedlots will be somewhat less susceptible to the feed availability problem, but given enough time, they too will suffer great losses due to nutritional deficits. Moving fresh dairy milk off site will be an issue and the alternative of disposing milk in manure pits creates major waste management problems. Rapid and efficient disposal of dead stock will quickly become a vehicle related issue.

Dairy and calf operations must have the ability to obtain feedstuffs and transport milk and dead stock in a timely manner during FMD quarantines. Disinfection protocols are needed for vehicles to avoid animal health and animal welfare adverse effects.

RESOLUTION:

The United States Animal Health Association (USAHA) urges the United States Department of Agriculture (USDA), Agriculture Research Service (ARS) and the Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) and the United States Department of Homeland Security (DHS), Office of Health Affairs and the United States Federal Bureau of Investigation (FBI) to jointly develop protocols for vehicle movement in foot-and-mouth disease (FMD) outbreak areas with high density populations of food animals.

USAHA urges these agencies to formulate disinfection protocols for transportation modalities of feed, milk and dead stock during an FMD outbreak.

USAHA urges these agencies to evaluate the current status of FMD real-time pen-side diagnostic and milk tanker tests which are needed to ensure vehicles do not further the spread of FMD.

RESOLUTION NUMBER: 34  APPROVED AS AMENDED
SOURCE: COMMITTEE ON DIAGNOSTIC LABORATORY AND VETERINARY WORKFORCE DEVELOPMENT
SUBJECT MATTER: VETERINARY PUBLIC HEALTH WORKFORCE EXPANSION ACT (HR 1232, S. 746)
BACKGROUND INFORMATION:
Veterinary medicine is essential to public health and national security. There is a critical shortage of veterinarians in certain key public practice areas. The nation’s veterinary medical colleges are at capacity and can enroll only 2,500 students per year. Although these colleges provide a national resource by training veterinarians, only 26 States provide direct support to the 28 colleges. Federal support is needed to increase capacity in veterinary medical education.

The United States Congress has not directly supported veterinary medical education in over 30 years. According to animal health officials, nearly 6,000 veterinarians would be needed to respond to a major animal health catastrophe. Without a sufficient supply of veterinarians with the unique training needed to respond to an emergency, the nation’s public health infrastructure is at risk. The Veterinary Public Health Workforce Expansion Act (VPHWEA) was introduced in the 110th Congress by Senator Wayne Allard (CO) and Representative Tammy Baldwin (WI-2) in early 2007. The VPHWEA would authorize a competitive grants program for veterinary medical colleges and other eligible entities to increase capacity in veterinary medical education. At least an additional 400 students enrolled in a veterinary medical professional program are needed per year to meet the current United States population societal needs.

RESOLUTION:
The United States Animal Health Association (USAHA) requests that the United States House of Representatives and the United States Senate enact the Veterinary Public Health Workforce Expansion Act (VPHWEA) and appropriate the full amount of authorized funds to build capacity in veterinary medical education.

USAHA Executive Committee and Committee on Government Relations members are requested to provide relevant information to Members of Congress regarding the lack of capacity in the nation’s veterinary medical colleges and the need to pass the VPHWEA, as introduced, during regular visits to Washington. USAHA members are requested to formally support the VPHWEA and actively advocate its passage with their individual Members of Congress.
REPORT OF THE COMMITTEE

RESOLUTION NUMBER: 35  APPROVED
SOURCE: COMMITTEE ON JOHNE’S DISEASE
SUBJECT MATTER: NATIONAL JOHNE’S DISEASE DEMONSTRATION HERD PROJECT

BACKGROUND INFORMATION:

The Report of the Ad Hoc Steering Subcommittee of the United States Animal Health Association (USAHA) Committee on Johne’s Disease in 2002 indicated that demonstration herds are critical and of the highest priority to provide the validated management tools to implement a science-based National Johne’s Disease Program. As a result, the National Johne’s Disease Demonstration Herd Project was initiated in 2003 as a long-term project (at least 5 years) with objectives to 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 producers, 3) develop and evaluate management, testing, and monitoring strategies for use in control of Johne’s disease in cattle herds, 4) create the opportunity for add-on projects within states to address important research objectives.

The stated objectives of this project are being achieved. Preliminary evidence indicates a reduction in incidence of subclinical Johne’s disease in demonstration herds to date. Economic studies are underway but additional time is needed to complete the project. States have effectively used information generated to develop educational materials and to evaluate testing strategies to support the national control program, and several states are implementing additional add-on projects. In addition, the project has provided a large number of well-characterized biologic samples for researchers as part of the Johne’s Disease Integrated Project (JDIP), thereby promoting development of new diagnostics and vaccines to control Johne’s disease.

RESOLUTION:

The United States Animal Health Association (USAHA) recommends that the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS) continue to prioritize funding for the National Johne’s Disease Demonstration Herd Project.
RESOLUTION NUMBER: 36  APPROVED
SOURCE: COMMITTEE ON JOHNE’S DISEASE
SUBJECT MATTER: MILK ELISA TESTING FOR JOHNE’S DISEASE

BACKGROUND INFORMATION:
Evaluation of a United States Department of Agriculture (USDA)-approved milk enzyme linked immunosorbent assay (ELISA) has shown that it is comparable in accuracy to currently available serum ELISA kits. Incorporation of USDA-approved milk ELISAs into the Voluntary Bovine Johne’s Disease Control Program (VBJDCP) would allow dairy producers access to additional testing options.

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) incorporate the milk enzyme linked immunosorbent assay (ELISA) testing method into the Voluntary Bovine Johne’s Disease Control Program (VBJDCP) by recognizing it as an approved screening test for Johne’s disease and require that laboratories performing the milk ELISA test must pass an annual proficiency test under the direction of the National Veterinary Services Laboratory (NVSL).

RESOLUTION NUMBER: 37  APPROVED
SOURCE: COMMITTEE ON JOHNE’S DISEASE
SUBJECT MATTER: STRATEGIC PLAN FOR JOHNE’S DISEASE

BACKGROUND INFORMATION:
The current Johne’s Disease Strategic Plan was developed by the National Johne’s Working Group (NJWG) in 2001 to guide the work and efforts of the NJWG and the United States Animal Health Association (USAHA) Committee on Johne’s Disease through 2008. The USAHA Committee on Johne’s Disease at its meeting in 2007 approved a recommendation to develop a new strategic plan for Johne’s Disease, due to significant changes that have occurred in such things as the understanding of
REPORT OF THE COMMITTEE

Johne’s Disease, its management, availability and performance of diagnostic testing, state and federal funding and awareness of Johne’s Disease within the ruminant industries.

The United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) has, and continues to be, substantially involved in the development of national program standards and funding for the Voluntary Bovine Johne’s Disease Control Program. It continues to have a vested interest in the future of the national Johne’s Disease control and management efforts.

RESOLUTION:

The United States Animal Health Association (USAHA) requests that United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) provide financial and personnel support for the development of the new national Strategic Plan for Johne’s Disease.

RESOLUTION NUMBER: 38 APPROVED

SOURCE: COMMITTEE ON JOHNE’S DISEASE

SUBJECT MATTER: MILK ELISA TESTING FOR JOHNE’S DISEASE IN THE NATIONAL PROGRAM

BACKGROUND INFORMATION:

Evaluation of a United States Department of Agriculture (USDA)-approved milk enzyme linked immunosorbent assay (ELISA) has shown that it is comparable in accuracy to currently available serum ELISA kits. Incorporation of USDA-approved milk ELISAs into the Voluntary Bovine Johne’s Disease Control Program (VBJDCP) would allow dairy producers access to additional testing options. Dairy operations enrolled in the Dairy Herd Improvement Association (DHIA) typically have individual milk samples tested on a monthly basis for milk components such as somatic cells, protein and fat. These milk samples could also be used for milk ELISA testing for Johne’s disease. DHIA field personnel, who collect and submit milk samples for testing, receive training and must be certified by the Quality Certification Services (QCS) division of National DHIA. DHIA laboratories, which are incorporating the milk ELISA for Johne’s disease into
their current milk testing, are proposing to require labs to complete and pass a monthly proficiency test administered by QCS, in addition to passing an annual proficiency test under the direction of the National Veterinary Services Laboratory (NVSL), to ensure consistent and proper diagnostic procedures.

RESOLUTION:

The United States Animal Health Association, recognizing the Voluntary Bovine Johne’s Disease Control Program (VBJDCP) is a voluntary program, requests that the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS) to allow the Quality Certification Services (QCS)-certified and Designated Johne’s Coordinator (DJC)-approved Dairy Herd Improvement Association (DHIA) field personnel to collect and submit milk samples to approved laboratories for milk enzyme linked immunosorbent assay (ELISA) testing for Johne’s disease under the direction of the herd’s Johne’s certified veterinarian.

RESOLUTION NUMBER: 39  APPROVED
SOURCE: COMMITTEE ON LIVESTOCK IDENTIFICATION
SUBJECT MATTER: INCORPORATING STATE CODES ON ANIMAL IDENTIFICATION NUMERIC DEVICES

BACKGROUND INFORMATION:

Traditional means of rapid visual identification of cattle have utilized the numeric state code on ear tag devices. Many cattle industry members and state animal health officials have identified the need for visual identification continuing into the future.

Cattle producers have requested that state codes continue to be visible on ear tag devices to assist them in rapid visual cattle identification.

Brand inspectors utilize the state code in their daily work of determining animal ownership and state of origin.

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
REPORT OF THE COMMITTEE

Services (VS) incorporate the standard numeric state code onto animal identification number (AIN) ear tag devices for use in cattle.

RESOLUTION NUMBER: 40  Combined with 62  APPROVED
SOURCE: COMMITTEE ON LIVESTOCK IDENTIFICATION
COMMITTEE ON IMPORT/EXPORT
SUBJECT MATTER: EQUINE IDENTIFICATION: IMPORTED AND RETURNING HORSES

BACKGROUND INFORMATION:
Equine Piroplasmosis (EP) is classified as a Foreign Animal Disease in the United States. However, it is assumed that the infection exists at some undetermined prevalence level in horses that have been imported into the United States. This assumption is based on the fact that prior to February 1, 2004, the “official test” for Piroplasmosis, conducted on equine animals presented for importation into the United States, was the Complement Fixation (CF) test, a test that is known to occasionally yield “false negative” results. Some horse owners, importers or agents have compounded the problem by purposely treating EP infected horses with immunosuppressive medications resulting in these animals giving a false negative response to the CF test. An upgraded competitive enzyme linked immunosorbent assay (C-ELISA) test was specified as the “official test” for importation of equine into the United States on August 22, 2005, and is highly unlikely to yield “false negative” results in adult horses.

The lack of a reliable and traceable permanent identification system for horses imported into the United States makes it difficult to trace back potentially serologically-positive animals. An available option to determine the prevalence of EP in the equine population would be to conduct a serological survey. While a serological survey of the equine population may suggest a meaningful prevalence of EP in the resident horse population, it will neither be as effective or efficient as the detailed traceback that would be present with a highly functional traceability system in place. This has underscored the immediate need, as it pertains to dealing with EP and other important equine diseases, to establish a standard method of permanent identification and traceability for all horses imported into the United States.
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) implement provisions that require all horses imported into, or returning to, the United States be identified with permanent individual Identification and/or Radio Frequency Identification (RFID) microchips that comply with the International Organization for Standardization (ISO) 11784 and 11785 standards (134.2 kHz). Universal RFID readers should be present at all import centers and border stations to read both 125 and 134.2 kHz microchips.

RESOLUTION NUMBER: 41
Combined with 5, 14, 16, 24, 58, 61 and 67
SOURCE: COMMITTEE ON LIVESTOCK IDENTIFICATION
SUBJECT MATTER: FUNDING AND PLANNING OF INTEGRATED AND COMPREHENSIVE ANIMAL HEALTH SURVEILLANCE

RESOLUTION NUMBER: 42 APPROVED
SOURCE: COMMITTEE ON LIVESTOCK IDENTIFICATION
SUBJECT MATTER: UNITED STATES DEPARTMENT OF AGRICULTURE VETERINARY SERVICES PROCESS STREAMLINING SYSTEMS

BACKGROUND INFORMATION:
The Veterinary Services Process Streamlining system provides accredited veterinarians the ability to collect and disseminate animal information into health certificates, related test records and permits via functional electronic documents. These applications are not available to state and federal animal health officials for use in animal disease programs.

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
REPORT OF THE COMMITTEE

(VS), to immediately complete and deploy full functionality of their e-data collection system know as the Veterinary Services Process Streamlining (VSPS) system with full integration into USDA's mobile information technology applications by December 31, 2007.

Failure on the part of USDA to accomplish full deployment of VSPS and mobile information technology applications will result in initiation of the following:

1) USAHA will extend invitation to all State Animal Health Officials or associated information technology staff or company representation to participate in a state e-data management workshop, 2) USAHA will make arrangements for the workshop to be conducted near the Kansas City, MO airport, a central United States location, 3) the purpose of the USAHA workshop / agenda will be to develop and coordinate a state recognized e-data format and delivery of an online interstate movement permit, health certificate or equivalent thereof and related e-test documents.

RESOLUTION NUMBER: 43 APPROVED
SOURCE: COMMITTEE ON TRANSMISSIBLE DISEASES OF SWINE
SUBJECT MATTER: 30-DAY HEALTH RULE INTERPRETATION
BACKGROUND INFORMATION:

Historically, animal health officials have allowed accredited veterinarians, working within the context of a herd health plan requiring routine herd visits, to issue a Certificate of Veterinary Inspection (CVI) covering animals born into the herd since the previous herd visit without having to inspect the individual animals. Recently, the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) has reviewed the statute governing the interstate movement of animals outside a routine production flow and issued an interpretation disallowing this practice. The wording in question is contained in 9 Code of Federal Regulations (CFR) 161.3(a)(2) and reads as follows:

(2) Following the third and subsequent inspections of a herd or flock in a regular health maintenance program, an accredited veterinarian shall not issue a certificate, form, record or report which reflects the results of any inspection, test, vaccination or treatment performed by him or her with respect to any animal
in that program, unless he or she has personally inspected that animal within 30 days prior to issuance.

USDA-APHIS-VS has interpreted this language to mean that the individual animals must be inspected by the accredited veterinarian within 30 days prior to the issuance of a CVI. It is not uncommon in the swine industry today to transport weaned pigs interstate at less than 30 days of age. Similar movements also occur in other species as well (e.g. day-old chicks and dairy calves).

Through the practice of conducting routine herd health visits within the confines of an established herd health program, the accredited veterinarian can establish an understanding of the health status of the herd. It is medically sound to believe that the newborn animal assumes the health status of the herd or flock into which it is born or hatched. Thus by inspecting the herd or flock, the accredited veterinarian can issue a CVI with confidence in the integrity of the health of the animals yet to be born or hatched into the herd or flock. The veterinarian’s knowledge of the herd or flock accumulated through a regular health maintenance program exceeds that which could be gained from a one-time inspection of only those animals being shipped.

The current interpretation places veterinarians at risk of violating their accreditation while failing to improve the health status of United States (US) livestock or the safety of interstate movements. The proposed interpretation actually enhances the security of livestock shipped interstate by encouraging producers to establish herd health programs involving routine herd visits by accredited veterinarians. This promotes a much more thorough understanding of the health status of US livestock and poultry and provides for the early recognition of potential disease risks associated with interstate movement.

These proposed changes have the support of the American Association of Swine Veterinarians, the American Association of Bovine Practitioners, the American Association of Avian Pathologists, the Animal Agriculture Coalition, the National Pork Board’s Swine Health Committee and the National Pork Producers Council.

RESOLUTION:

The United States Animal Health Association (USAHA) respectfully requests that the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service
REPORT OF THE COMMITTEE

(APHIS), Veterinary Services (VS) change the wording in 9 Code of Federal Regulations (CFR) 161.3(a)(2) as follows:

(2) Following the third and subsequent inspections of a herd or flock in a regular health maintenance program, an accredited veterinarian shall not issue a certificate, form, record or report which reflects the results of any inspection, test, vaccination or treatment performed by him or her with respect to any animal residing in the herd or flock at the time of the last inspection or born into the herd or flock since the last inspection in that program, unless he or she has personally inspected that animal herd or flock within 30 days prior to issuance.

USAHA also urges the USDA-APHIS to adopt these proposed changes while awaiting approval of the amended final rule.

RESOLUTION NUMBER:  44   APPROVED
SOURCE:   COMMITTEE ON TRANSMISSIBLE DISEASES OF SWINE
SUBJECT MATTER:  INTEGRATED AND COMPREHENSIVE SWINE DISEASE SURVEILLANCE PLANNING

BACKGROUND INFORMATION:

Effective procedures and tools to detect disease agents in the United States (US) commercial swine compartment are crucial for swine health protection, maintenance and restoration, for assurance of food security, and for documentation of the US animal health status for national and international partners and stakeholders.

Surveillance planning and funding for implementation have traditionally been tied to specific ‘program’ diseases. This mechanism of funding prevents flexibility resulting in a lack of harmonization of surveillance planning and implementation. The difficulty within the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) to allocate existing resources to the development of an integrated and comprehensive surveillance system hampers the advancement of the program. In addition, the lack of funding and insufficient human resources will continue to further delay development and implementation of this surveillance
system. Without a comprehensive and integrated animal health surveillance system, animal agriculture will continue to be unnecessarily placed at risk of undetected introduction and/or spread of animal diseases, including foreign and emerging swine diseases.

The US pork industry supports the development and implementation of a comprehensive and integrated surveillance system and recognizes this system as essential for the continued health of US livestock. In addition, the industry supports leveraging resources to maximize surveillance efficiency to detect and monitor endemic, emerging and foreign animal diseases that significantly impact US livestock.

In an effort to support comprehensive surveillance, the pork industry worked directly with the USDA's National Surveillance Unit (NSU) to develop and implement a swine business plan for integrated and comprehensive swine surveillance. As a result, the swine industry has prioritized industry surveillance objectives and communicated those objectives to the NSU for planning purposes.

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 make integrated and comprehensive surveillance planning a high priority and to provide the funding and human resources necessary to the National Surveillance Unit (NSU) to complete the planning process for integrated and comprehensive surveillance for the commercial swine compartment by June 30th 2008.

RESOLUTION NUMBER: 45 APPROVED
SOURCE: COMMITTEE ON TRANSMISSIBLE DISEASES OF SWINE
SUBJECT MATTER: MARKET SWINE SURVEILLANCE PROGRAM

BACKGROUND INFORMATION:

The current market swine surveillance program provides a valuable infrastructure for sampling the United States (US) market swine population. Fourteen out of the top 35 swine slaughter
REPORT OF THE COMMITTEE

plants that are currently collecting samples for market surveillance provide access to 50% of the US market swine population, or approximately 200,000 head out of the 405,000 head harvested daily.

Market swine surveillance has been recognized as a key component of the industry’s move to an integrated and comprehensive swine disease surveillance program for the commercial compartment. Market swine surveillance provides access to samples using methods that are more economically feasible and less burdensome to the industry. In order to utilize this surveillance stream more effectively the swine industry has taken significant steps to expand surveillance objectives, enhance traceability, and take advantage of research opportunities to make market swine surveillance more cost-effective and valuable to the industry.

In late 2007, the swine industry prioritized and communicated national surveillance programming objectives to the National Surveillance Unit. This prioritization process yielded a number of economically important diseases that could be included in market swine surveillance as part of a comprehensive swine surveillance program. The list included Classical Swine Fever, Foot and Mouth Disease, Pseudorabies, Erysipelas, Swine Brucellosis, Trichina and Toxoplasmosis. Currently there are validated tests for detecting Pseudorabies, Toxoplasmosis, and Trichina at harvest. Antibody and antigen tests for detecting Classical Swine Fever are in the process of being validated by the National Animal Health Laboratory Network.

The program standards for the National Animal Identification System (NAIS) for swine require reporting and recording of the Premises Identification Number (PIN) of the sending premises for all market swine arriving at the first point of concentration in the harvest chain. The program standards also require the use of official NAIS tags bearing the source premises identification number or official animal identification number (AIN) in market breeding swine moving to the first point of concentration. These two requirements are being implemented by the swine industry as part of the Swine identification (ID) Plan under the NAIS and will support risk-based surveillance and statistically significant sampling from both market swine populations.

Market swine surveillance is being used in a two phase pilot study to determine the prevalence and distribution of Porcine Reproductive and Respiratory Syndrome (PRRS) in high risk
NOMINATIONS AND RESOLUTIONS

swine populations in hog dense areas. PRRS is estimated to cost the pork industry $540-$700 million annually and the results from these studies will be important to the industry as it moves forward with strategies to mitigate the economic effects of this disease. Market swine surveillance can also be beneficial in determining prevalence and distribution of other important diseases to the industry including Actinobacillus pleuropneumoniae, Actinobacillus suis, and Mycoplasma hyopneumonia in a rapid and cost effective manner. This information on these diseases will assist with decisions on how to deal with these diseases as an industry.

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 maintain funding for market swine surveillance in Fiscal Year (FY) 08 and in FY 09 and in the long term increase funding in future years to expand and integrate market swine surveillance into the swine industry’s comprehensive surveillance program.

RESOLUTION NUMBER:  46   APPROVED
SOURCE:   COMMITTEE ON TRANSMISSIBLE DISEASES OF SWINE
SUBJECT MATTER:  HAZARD ANALYSIS CRITICAL CONTROL POINTS AND SWINE PROGRAM DISEASES

BACKGROUND INFORMATION:

The United States (US) pork industry has worked cooperatively with the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) Swine Health Programs (SHP) to explore the use of Hazard Analysis Critical Control Points (HACCP) principles as a methodology to develop and maintain flexible, simple and effective disease programs for the swine industry. The industry supports the utilization of HACCP principles to define program standard guidelines for the control of pseudorabies virus (PRV) and swine brucellosis (SB) in the commercial swine compartment.

RESOLUTION:
REPORT OF THE COMMITTEE

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) Swine Health Programs (SHP) to continue to work with industry to adapt and implement the Hazard Analysis Critical Control Points (HACCP) principles to define program standards for the Pseudorabies and Swine Brucellosis Programs. Further, it is requested that USDA-APHIS-VS, SHP present such prototypes to USAHA's Committee on Transmissible Diseases of Swine during its annual meeting in 2008.

RESOLUTION NUMBER: 47
Combined with 28, 60 and 63
SOURCE: COMMITTEE ON TRANSMISSIBLE DISEASES OF SWINE
SUBJECT MATTER: MINIMUM EXPORT RULES FOR GOATS AND SWINE

RESOLUTION NUMBER: 48 APPROVED
SOURCE: COMMITTEE ON LIVESTOCK IDENTIFICATION
SUBJECT MATTER: OFFICIAL BRUCELLOSIS VACCINATION ‘840’ RADIO FREQUENCY IDENTIFICATION TAGS

BACKGROUND INFORMATION:

The ongoing cooperative brucellosis eradication program has made great strides in elimination of the disease. Currently 49 states, Puerto Rico, and the Virgin Islands are classified as Brucellosis-Free. However, an ongoing potential threat concerns both state animal health officials and cattle producers in the western United States. Private practitioners, producers and state animal health officials have all identified the need for and have voiced support for development of an “Radio Frequency Identification Device (RFID) Official Brucellosis Vaccination Tag” that visually identifies the state where the animal was vaccinated. Such a tag, if made available for use on a voluntary basis, would offer the choice for the producer and his veterinarian to replace the metal clip tag in current use with an RFID tag. Over a period
of time this would allow for the identification of a large number of “momma cows” on producer operations. The use of an Official RFID Brucellosis Vaccination Tag over the next four to five years would have a significant impact on acceptance of RFID to enhance the brucellosis eradication program as well as identifying 60-70% of adult female cattle on producer operations where calfhood vaccination is practiced. The majority of livestock health officials, brand inspectors and livestock producers are familiar with the “state two digit code” and routinely use this information to identify the state where the cattle were vaccinated.

Benefits of an RFID Official Brucellosis Vaccination Tag would include: maintenance of the familiar state coded tags and the current vaccination reporting system; increase acceptance of RFID technology by accredited veterinarians; aid in transition from metal ear tags to 840 coded RFID tags; enable automated reporting of brucellosis vaccination by accredited veterinarians; increased utilization of electronic identification systems; and enabling transition over time to electronic systems for those who are not inclined to utilize newer technology.

RESOLUTION:

The United States Animal Health Association (USAHA) encourages the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) to make available to accredited veterinarians a Radio Frequency Identification Device (RFID) Official Brucellosis Vaccination Tag that is orange in color and carries the two digit state code, as an option, for use as an official identification device for official vaccination of heifer calves.

USAHA also urges that USDA-APHIS-VS subsidize these tags so that they are available through appropriate channels to accredited veterinarians at a reasonable cost, which is estimated to be between twenty-five cents and fifty cents per tag ($0.25-0.50/tag). Additionally, USAHA urges that USDA-APHIS-VS work with data service providers to expedite integration of disease management systems through the creation of a new brucellosis reporting module which would include online ordering of tags, online printable report forms and online reporting of brucellosis vaccination.

RESOLUTION NUMBER: 49 APPROVED
SOURCE: COMMITTEE ON SCRAPIE
REPORT OF THE COMMITTEE

SUBJECT MATTER: APPROVAL OF RECTAL BIOPSY AS AN OFFICIAL LIVE ANIMAL TEST FOR SCRAPIE.

BACKGROUND INFORMATION:

Detection of scrapie in the live animal is an important component of the Scrapie Eradication Program. Biopsy of the third eyelid lymphoid tissue has proven to be beneficial but there are several limitations on its use. Some of the limitations are due to the distribution of the abnormal scrapie prion protein but more commonly it is due to lack of sufficient lymphoid follicles to make a diagnosis.

Studies evaluating the use of recto-anal mucosa associated lymphoid tissue (RAMALT) have shown sensitivity and specificity roughly equivalent to the third eyelid test. There are several additional advantages to RAMALT sampling. There is a large amount of suitable tissue to sample and multiple sites can be sampled allowing repeat sampling over time. Restraint of the animal is still required but is generally easier and is much less a factor for the person obtaining the sample than with third eyelid sampling.

With proper training and equipment RAMALT sampling is relatively easy for most people and should result in an increase in diagnostic samples. Producers may find this technique more acceptable as well.

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) approve rectal biopsy (RAMALT) as an additional live animal test for scrapie.

RESOLUTION NUMBER: 50 APPROVED

SOURCE: COMMITTEE ON SCRAPIE

SUBJECT MATTER: SCRAPIE ERADICATION PROGRAM FUNDING

BACKGROUND INFORMATION:

To continue progress regarding efforts towards scrapie
eradication, enhanced surveillance and enforcement of regulations is paramount. Surveillance activities must be doubled in order to find the diminishing number of scrapie-positive animals. Funding requests are currently inadequate to effect eradication in a reasonable amount of time.

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 request adequate funding for the National Scrapie Eradication Program’s budget to achieve eradication and conduct subsequent surveillance. This amount is equal to $10 million beyond the Fiscal Year 2007 appropriation or a total budget of $28.6 million.

RESOLUTION NUMBER: 51 APPROVED
SOURCE: COMMITTEE ON SCRAPIE
SUBJECT MATTER: GENOTYPE EDUCATION
BACKGROUND INFORMATION:

There is ample international evidence to demonstrate that no genotype is fully resistant to all types of scrapie in sheep. Recent findings indicate that certain genotypes once thought to be fully resistant are susceptible to other prion types.

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) increase efforts to educate producers about these findings so that they may make informed decisions regarding genetic selection and flock management.

RESOLUTION NUMBER: 52 APPROVED
SOURCE: COMMITTEE ON SCRAPIE
SUBJECT MATTER: GOAT GENOTYPING RESEARCH
BACKGROUND INFORMATION:

The American Dairy Goat Association (ADGA) board
REPORT OF THE COMMITTEE

passed the following resolution and requests the United States Animal Health Association’s (USAHA) consideration: “ADGA supports research characterizing goat scrapie genotypes. This work could result in tools for breeders to use in selection for goat scrapie-resistant genotypes, and potentially to provide options for conserving animal genetics in infected herds”.

RESOLUTION:

The United States Animal Health Association (USAHA) encourages the United States Department of Agriculture (USDA), Agricultural Research Services (ARS) and Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) to continue funding research efforts in goat scrapie genotyping. USAHA further encourages agencies within USDA to share data and biological materials in support of this research.

RESOLUTION NUMBER: 53 APPROVED

SOURCE: COMMITTEE ON TRANSMISSIBLE DISEASES OF POULTRY AND OTHER AVIAN SPECIES

SUBJECT MATTER: AMENDMENT OF THE NATIONAL ORGANIC PROGRAM SECTION 205.239, TO MAKE ACCESS TO THE OUTDOORS OPTIONAL FOR POULTRY

BACKGROUND INFORMATION:

The National Organic Program (NOP) was formed to provide a mechanism for certification of organic foods and became effective in October 2001. There are many distinctive and unique requirements for the production and processing of organic foods including poultry. Section 205.239, of the NOP requires that United States Department of Agriculture (USDA) certified organic poultry have “access to the outdoors” during their production life. This outdoor access enhances the likelihood that such poultry will have direct contact with migratory and wild birds as well as other animals, substantially increasing the risk of Avian Influenza (AI), Exotic Newcastle Disease, and other diseases. Disease control is a priority for certified organic poultry as well as conventionally reared poultry. In over 50 years of progress, the poultry industries of this country have moved their flocks inside and this action has contributed significantly to the improvement in health of the
nation’s chicken and turkey flocks. Avian influenza has been a long-standing threat to the health of our poultry and now takes on new potential public health and media perception identities. Migratory and wild birds are known carriers of AI virus and contact between them and domestic poultry must be prevented.

In 2005, The United States Animal Health Association (USAHA) passed Resolution 46 with similar wording and identical intent to the present Resolution, requesting that the USDA Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) “use their good offices to influence the National Organic Program (NOP) to change section 205.239, a, 1 of the NOP regulations by eliminating the words ‘Access to the outdoors’ as a requirement for production of USDA certified organic poultry.” USDA-APHIS-VS did indeed forward the resolution to the Agricultural Marketing Service (AMS), the responsible agency for the NOP, discussed the concerns with AMS, and at the request of AMS, provided recommendations and guidance on biosecurity and avian disease prevention and control practices for organic poultry operations. Those recommendations included identification of high risk areas such as wetlands, migratory flyways, and other congregating points for waterfowl and shore birds, as well as areas with high densities of poultry production; implementing preventive measures such as indoor confinement or use of outdoor enclosures with solid roofs and netted sides in these areas; providing feed and water indoors; and prohibiting access to surface water.

While these measures are appreciated, the regulation remains unchanged, and continues to require access to the outdoors, with no qualification of that requirement. Some producers who desire to confine organic birds for biosecurity reasons have resorted to obtaining a letter from the state veterinarian recommending confinement, in order to obtain temporary or year-to-year approval of confinement from the organic certifier. We are not requesting that access to the outdoors be prohibited, only that outdoor access not be required (i.e., that it be optional except in cases of elevated risk) and that provisions be included to prevent contact with wild birds.

RESOLUTION:

The United States Animal Health Association (USAHA)
REPORT OF THE COMMITTEE

urges the United States Department of Agriculture (USDA), Agricultural Marketing Service (AMS) to change section 205.239, a, 1 of the National Organic Program (NOP) regulations by adding a provision allowing poultry producers the option of forgoing the requirement for access to the outdoors. As amended, Section 205.239 would read:

§ 205.239 Livestock Living Conditions.
(a) The producer of an organic livestock operation must establish and maintain livestock living conditions which accommodate the health and natural behavior of animals, including:
   (1) Access to the outdoors, shade, shelter, exercise areas, fresh air, and direct sunlight suitable to the species, its stage of production, the climate, and the environment;
   (2) Poultry producers are permitted to eliminate access to the outdoors if included as part of a comprehensive disease control program.

RESOLUTION NUMBER: 54 APPROVED
SOURCE: COMMITTEE ON TRANSMISSIBLE DISEASES OF POULTRY AND OTHER AVIAN SPECIES
SUBJECT MATTER: MOVEMENT PROTOCOLS FOR EGGS, EGG PRODUCTS, AND DAY-OLD CHICKS WITHIN, OUT OF, AND INTO DISEASE CONTROL AREAS

BACKGROUND INFORMATION:
In Highly Pathogenic Avian Influenza (HPAI) outbreaks, the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), and Incident Commanders (IC) can quarantine any site, area, county and/or state after the Index Case has been determined. The National Response Plan (NRP) includes a 96 hour “no movement” moratorium for non-infected farms in a Control Area which creates a major concern for the egg industry. The egg industry in the United States (US) has developed their production for “just-in-time” basis. Farms are composed of numerous barns with up to six million birds on one site. Egg producing farms can handle eggs by “in line” processing (on site) or “off line” processing where eggs are delivered to a
separate grading and/or breaking facility for further processing. Each day, eggs move from production sites to food service distributors, retail stores, and distribution centers of fast-food restaurants and grocery store chains. If an in-line egg production operation cannot move eggs, their fast-food restaurant customers will run out of eggs within 24 hours. Within 48 hours, eggs will disappear from shelves of large retail grocery store chains. In addition, customers nationwide will lose faith in the safety and security of our food supply.

Due to current table egg production methods and limitations on egg storage capacity (48 hours) a protocol has been developed whereby non-infected egg production premises can document on a daily basis the influenza-free status of their chickens, eggs and egg products. Daily documentation will provide assurance to the Incident Commander, State Veterinarian, APHIS, consumers, and customers of the safety of eggs and egg products moving into normal market channels.

Documentation that table egg flocks in a Control Area are free of avian influenza can be achieved by providing the Incident Commander critical information each day from each house at an egg production site, including mortality, water and feed consumption, and reverse transcriptase polymerase chain reaction (RT-PCR) test results. Testing tracheal swabs from a minimum of five chickens from daily mortality and/or euthanized sick birds from each house at a production site will detect a flock prevalence rate of 10/100,000 or 0.01%. This level of testing would be seven times more rigorous than USDA's 2002-2003 exotic Newcastle disease (END) testing program in California. If a positive is found, the Incident Commander will immediately quarantine the farm. In addition to daily surveillance, several standard operating procedures have been recommended to reduce the probability for introduction of avian influenza onto a premises. These procedures address potential problems such as manure movement, by-products, pullet movement, and spent hen movement. Egg companies, the United Egg Association, the United Egg Producers, State Veterinarians, academia, and other regulatory individuals have reviewed and support the Egg Movement Protocol, SOP (Standard Operating Procedures) and testing procedures.

The HPAI Movement Control Model Plan from the Egg Industry is available for reference.
RESOLUTION:
The United States Animal Health Association (USAHA) resolves that the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) incorporate business continuity as part of the National Highly Pathogenic Avian Influenza (HPAI) Response Plans by including movement protocols within, out of, and into a Control Area as exemplified by the protocol developed by the United States Egg Industry.

RESOLUTION NUMBER: 55 APPROVED
SOURCE: COMMITTEE ON TRANSMISSIBLE DISEASES OF POULTRY AND OTHER AVIAN SPECIES
SUBJECT MATTER: INCLUSION OF SWINE AND POULTRY WORKERS IN PANDEMIC INFLUENZA PLANNING

BACKGROUND INFORMATION:
Recent research has demonstrated that swine and poultry workers, especially those who work in large confinement facilities, are at markedly increased risk of zoonotic influenza virus infections. In serving as a bridging population for influenza virus spread between animals and man, these workers may introduce zoonotic influenza virus into their homes and communities as well as expose domestic swine and poultry to human influenza viruses. Prolonged and intense occupational exposures of humans working in swine or poultry confinement buildings could facilitate the generation of novel influenza viruses, as well as accelerate human influenza epidemics. Because of their potential bridging role, such workers should be recognized as a priority target group for annual influenza vaccines and receive special training to reduce the risk of influenza transmission. They should also be considered for increased surveillance and priority receipt of pandemic vaccines and antivirals.

RESOLUTION:
The United States Animal Health Association (USAHA) urges the United States Department of Health and Human Services (HHS) Assistant Secretary for Preparedness and Response and the Centers for Disease Control and Prevention
(CDC) Advisory Committee on Immunization Practices to recognize swine and poultry workers, including farmers, caretakers, processing plant workers, veterinarians, federal, state, and private agricultural emergency response personnel, and agricultural diagnostic laboratory personnel, as a priority target group for annual influenza vaccines, training in use of personal protective equipment, increased surveillance for influenza, and priority receipt of pandemic vaccines and antiviral drugs.

RESOLUTION NUMBER: 56 APPROVED
SOURCE: COMMITTEE ON TRANSMISSIBLE DISEASES OF POULTRY AND OTHER AVIAN SPECIES
SUBJECT MATTER: LOW PATHOGENICITY AVIAN INFLUENZA PROGRAM FUNDS

BACKGROUND INFORMATION:
Low pathogenicity avian influenza (LPAI) has existed in the Live Bird Marketing System (LBMS) of the Northeast and other locations for 15 years. An extensive campaign has reduced the prevalence and incidence of LPAI within the LBMS in the Northeast. Recent test results demonstrate the effectiveness of this effort.

Current progress within the market system is due, in large part, to the provision of personnel and other resources to establish control at various levels of the supply continuum. The LPAI national effort has expanded to the point that some 30 states are being recruited and funded for LPAI efforts and the United States Department of Agriculture (USDA) anticipates additional states participating.

Total funding for the LPAI effort program is now limited. The impact of this level of funding in this environment of increased participation is diminished resources for existing program participants. The reduced level of funding threatens to reverse LPAI market system progress made over the past two years.

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 request additional funding to fully support a national low
REPORT OF THE COMMITTEE

pathogenicity avian influenza (LPAI) program and for Congress to appropriate these monies.

RESOLUTION NUMBER: 57 APPROVED
SOURCE: COMMITTEE ON TRANSMISSIBLE DISEASES OF POULTRY AND OTHER AVIAN SPECIES
SUBJECT MATTER: NEED FOR ONGOING FUNDING FOR DEVELOPMENT OF ADDITIONAL METHODS FOR DEPOPULATION OF POULTRY AND LIVESTOCK

BACKGROUND INFORMATION:
The United States Animal Health Association (USAHA) applauds the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) support over the last year in the development of practical and humane solutions for mass depopulation of poultry in response to disasters and epizootic and zoonotic diseases. However, gaps still exist in our response capability and ongoing funding is needed beyond the current avian influenza response commitment. For example, adequate solutions for depopulation of caged layers have not been developed sufficiently to address both the need for timely disease containment and limiting the exposure of personnel performing the depopulation.

RESOLUTION:
The United States Animal Health Association (USAHA) requests that the United States Department of Agriculture (USDA), Agricultural Research Service (ARS) and Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), and the USDA Cooperative State Research, Extension, and Education Service continue to fund research and implement policy in support of new practical methods and humane solutions for depopulation and disposal of poultry.
RESOLUTION NUMBER: 58
Combined with 5, 14, 16, 24, 41, 61 and 67
SOURCE: COMMITTEE ON FOREIGN AND EMERGING
ANIMAL DISEASES
SUBJECT MATTER: FUNDING AND PLANNING OF
INTEGRATED AND COMPREHENSIVE ANIMAL
HEALTH SURVEILLANCE

RESOLUTION NUMBER: 59 APPROVED
SOURCE: COMMITTEE ON PARASITIC DISEASES
SUBJECT MATTER: IMPORT REPTILE TICK CONTROL

BACKGROUND INFORMATION:
Very high numbers reptiles infested with exotic ticks continue to be brought into the United States (US) from countries throughout the world, and these imported exotic ticks may serve as vectors for animal diseases such as heartwater, that threaten the US livestock industry. Program components have been drafted to permit, certify, inspect, and treat, if necessary, such imported reptiles. The United States Department of Agriculture (USDA) under the Animal Health Protection Act has clear authority and responsibility to prohibit or restrict the importation of animals and to impose post-importation quarantine measures to prevent the introduction or dissemination of any pest or disease into the United States.

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) expedite the implementation of regulations to require permits and inspection certification for reptiles entering the United States. USAHA also urges USDA-APHIS-VS to carry out a program in collaboration with the United States Department of Homeland Security (DHS), Customs and Border Protection (CBP); and the United States Department of Interior (DOI), Fish and Wildlife Service (FWS); and, in conjunction with affected states, to ensure effective control measures are taken to eliminate any ticks imported on reptiles into the United States.
REPORT OF THE COMMITTEE

RESOLUTION NUMBER: 60 Combined with 28, 47 and 63
SOURCE: COMMITTEE ON IMPORT-EXPORT
SUBJECT MATTER: MINIMUM EXPORT RULES FOR GOATS AND SWINE

RESOLUTION NUMBER: 61 Combined with 5, 14, 16, 24, 41, 58 and 67
SOURCE: COMMITTEE ON IMPORT / EXPORT
SUBJECT MATTER: FUNDING AND PLANNING OF INTEGRATED AND COMPREHENSIVE ANIMAL HEALTH SURVEILLANCE

RESOLUTION NUMBER: 62 Combined with 40
SOURCE: COMMITTEE ON IMPORT/EXPORT
SUBJECT MATTER: EQUINE ID: IMPORTED AND RETURNING HORSES

RESOLUTION NUMBER: 63 Combined with 28, 47 and 60
SOURCE: COMMITTEE ON BRUCELLOSIS
SUBJECT MATTER: MINIMUM EXPORT RULES FOR GOATS AND SWINE

RESOLUTION NUMBER: 64 Combined with 15
SOURCE: COMMITTEE ON SHEEP AND GOATS
SUBJECT MATTER: FUNDING FOR BIGHORN SHEEP RESPIRATORY DISEASE COMPLEX RESEARCH

RESOLUTION NUMBER: 65 APPROVED
SOURCE: COMMITTEE ON IMPORT EXPORT
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 into the United States (US) is free of pathogens which do not exist in the US and pose a risk to the US livestock population.

Since Bovine Spongiform Encephalopathy (BSE) has become the primary 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 encourages 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 exist in the United States. Importations of ruminant serum have been authorized by USDA-APHIS-VS in limited quantities for development research and diagnostic purposes by both governmental and private institutions.

Gamma radiation 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.

Resolution number 13 approved at the 2004 United States Animal Health Association (USAHA) annual meeting recommended that USDA-APHIS allow the importation of gamma irradiated commercial shipments of FBS.

At the 2005 USAHA annual meeting, USDA-APHIS responded that a proposed rule for the importation of irradiated FBS was still being prepared for publication. A resolution from both the Committees on Import/Export and Biologics and Biotechnology asking USDA-APHIS to continue the follow up was approved at the 2005 USAHA annual meeting.
REPORT OF THE COMMITTEE

At the 2006 USAHA annual meeting, USDA-APHIS responded that the risk assessment had been completed and that a proposed rule was being prepared.

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), publish a proposed rule to allow the importation of fetal bovine serum (FBS) from countries free of foot and mouth disease (FMD) and bovine spongiform encephalopathy (BSE) following gamma irradiation as provided in Veterinary Services (VS) notice 98-05 in approved private irradiation facilities to inactivate other diseases of concern to the livestock industry.

RESOLUTION NUMBER: 66 APPROVED
SOURCE: COMMITTEE ON IMPORT/EXPORT
SUBJECT MATTER: IMPORT REQUIREMENTS FOR SEMEN, EMBRYOS AND LIVE ANIMALS

BACKGROUND INFORMATION:

The United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Service (VS), National Center for Imports and Exports (NCIE) maintains a website with current negotiated international export health requirements for poultry, live animals, embryos and semen. The National Association of Animal Breeders (NAAB) and Certified Semen Services (CSS) have met with and worked with USDA, APHIS, VS, NCIE for several years attempting to get the import requirements for live animals, semen and embryos posted on the same website to serve importers as a reference. USDA does not routinely issue the import requirements for these products and animals when import permits are applied for and issued to importers. As businesses involved in the export of live animals and germplasm grow and develop, the import of genetically superior live animals or their germplasm becomes an important aspect of business planning and development. Having a website maintained by USDA, with the most current import requirements posted for reference by importers is important in facilitating efficient information and transparent international import health
requirements for both domestic businesses and international trading partners

RESOLUTION:

The United States Animal Health Association (USAHA) urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Service (VS), National Center for Imports and Exports (NCIE) to develop and maintain a website with the most current import health requirements for live animals, semen and embryos as well as poultry and hatching eggs.

RESOLUTION NUMBER: 67
Combined with 5, 14, 16, 24, 41, 58, and 61
SOURCE: COMMITTEE ON SHEEP AND GOATS
SUBJECT MATTER: FUNDING AND PLANNING OF INTEGRATED AND COMPREHENSIVE ANIMAL HEALTH SURVEILLANCE

RESOLUTION NUMBER: 68 APPROVED
SOURCE: COMMITTEE ON SHEEP AND GOATS
SUBJECT MATTER: BRUCELLA OVIS ELISA TEST

BACKGROUND INFORMATION: The United States (US) sheep industry has an urgent need for reliable and consistent results on Brucella ovis enzyme linked immunosorbent assay (ELISA) testing to detect Brucella ovis infection in rams.

RESOLUTION: The United States Animal Health Association (USAHA) requests that the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), National Veterinary Services Laboratory (NVSL) distribute the standard operating protocol (SOP) for performing the Brucella ovis enzyme linked immunosorbent assay (ELISA) to laboratories, complete validation (per ISO17025 standards) of the NVSL Brucella ovis ELISA before the 2008 spring ram testing season, and develop a
REPORT OF THE COMMITTEE

national proficiency test program for Brucella ovis. These actions will provide for reliable and consistent results on antibody testing for Brucella ovis for the United States sheep industry.

RESOLUTION NUMBER:  69  APPROVED
SOURCE:    COMMITTEE ON SHEEP AND GOATS
SUBJECT MATTER:   APPROVAL OF CIDRS® AND PREGNANT MARE SERUM GONADOTROPIN FOR REPRODUCTIVE MANIPULATION OF SHEEP AND GOATS

BACKGROUND INFORMATION:

Reproductive manipulations of sheep and goats such as artificial insemination, embryo transfer and timed matings require drugs, hormones and delivery devices not currently approved or available in the United States (US). Legal and ethical availability of these types of drugs and hormones would facilitate productivity and genetic progress of US flocks and herds and enhance planned reproduction systems for veterinarians and producers, while providing proper and transparent knowledge of the products in use in food producing breeding animals.

These hormones (progesterone and pregnant mare serum gonadotropin (PMSG), used in combination) are labeled and available in many sheep and goat producing countries outside the US. Availability here would level the playing field for US producers.

CIDRs (a progesterone-impregnated plastic device for intra-vaginal delivery to synchronize estrus) have been “fast tracked” through the Food and Drug Administration (FDA), Center for Veterinary Medicine (CVM) Minor Use and Minor Species (MUMS) approval process since the summer of 2006, but they are still not available for use for the fall 2007 breeding season.

RESOLUTION:

The United States Animal Health Association (USAHA) respectfully requests that the Food and Drug Administration (FDA) expedite the completion of the approval of CIDRs. We also request that steps be taken to expedite the approval of pregnant mare serum gonadotropin (PMSG) through the Minor Use and Minor Species (MUMS) process to allow enhanced reproduction.
systems in sheep and goats.

RESOLUTION NUMBER: 70 APPROVED
SOURCE: COMMITTEE ON SHEEP AND GOATS
SUBJECT MATTER: BULK MILK TEST TO DETECT BRUCELLA MELITENSI IN GOAT FLOCKS

BACKGROUND INFORMATION:
Brucella melitensis infection in goats causes severe systemic disease in humans, who are often infected by consumption of raw goat milk products. It is responsible for more clinical cases of brucellosis and more human suffering worldwide than all other brucellae. A bulk milk test for goat brucellosis is needed in the diagnostic battery of brucellosis tests in small ruminants. The Pasteurized Milk Ordinance (PMO) requires annual testing of dairy goat flocks, however, no flock level test is available for screening; and goats have to be tested individually by serology. This is time consuming, costly, and stressful for the animals.

National Veterinary Services Laboratory (NVSL) and other research partners developed an indirect enzyme linked immunosorbent assay (ELISA) (using Brucella melitensis strain 16M antigen) to detect brucella antibodies in goat milk. Initial research on this test using individual milk samples from experimentally-infected goats and laboratory simulated mock-bulk milk suggest this test may be a good bulk milk test for goats, especially in herds segmented in groups of 50 animals or less (N.D. Funk, L.B. Tabatai, P.H. Elzer, S.D. Hagius, B.M. Martin, and L.J. Hoffman. Indirect Enzyme-Linked Immunosorbent Assay for Detection of Brucella melitensis-Specific Antibodies in Goat Milk. J Clin Micro 2005; 43(2):721-5.).

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) support and facilitate the development and validation of the Brucella melitensis indirect enzyme linked immunosorbent assay (ELISA) for screening bulk tank goat milk so that it may be considered for use as an official test to fulfill the
REPORT OF THE COMMITTEE

requirements of the Pasteurized Milk Ordinance (PMO).

RESOLUTION NUMBER:  71  APPROVED
SOURCE:  COMMITTEE ON SHEEP AND GOATS
SUBJECT MATTER:  MINOR USE ANIMAL DRUG PROGRAM

BACKGROUND INFORMATION:
The approval of animal drugs for use in minor species is critical to the appropriate treatment of sheep and goat disease and to the maintenance of animal health. The National Research Support Program-7 (NRSP-7) provides much-needed and valuable services to the sheep and goat industries throughout the United States. The continued work of this program will be essential to the sustainability and growth of the industry through the availability of Food and Drug Administration (FDA)-approved medications for use in sheep and goats.

The United States Animal Health Association (USAHA) supports and appreciates the efforts of the NRSP-7. The research conducted under this program will be essential to the sustainability of the small ruminant industries and to the maintenance of sheep and goat health. The USAHA acknowledges the importance of research conducted under the NRSP-7.

RESOLUTION:
The United States Animal Health Association (USAHA) urges Congress to appropriate continuing funding for the National Research Support Program-7 (NRSP-7) program and urges the Food and Drug Administration (FDA) and the United States Department of Agriculture (USDA) to include funding for the NRSP-7 in their budget requests at a level that meets the needs of minor uses and minor species requests.

RESOLUTION NUMBER:  72  APPROVED
SOURCE:  COMMITTEE ON BRUCELLOSIS
SUBJECT MATTER:  CALFHOOD VACCINATION OF BISON

BACKGROUND INFORMATION:
The current Brucellosis Uniform Methods and Rules
(UM&R) and Code of Federal Regulations (CFR) specify official brucellosis vaccinates as animals vaccinated at 4 – 12 months of age. Bison do not become sexually active until they reach an age which is approximately 12 months greater than the age at which cattle become sexually active. Bison management provides for brucellosis vaccination at an age up to 18 months which would result in increased numbers of bison vaccinated for brucellosis.

RESOLUTION:
The United States Animal Health Association (USAHA) encourages the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) to rapidly institute changes in the Code of Federal Regulations (CFR) and Uniform Methods and Rules (UM&R) for brucellosis that specify official brucellosis vaccinated bison as those vaccinated at 4-18 months of age.

RESOLUTION NUMBER: 73 APPROVED
SOURCE: COMMITTEE ON BRUCELLOSIS
SUBJECT MATTER: BRUCELLOSIS IN THE GREATER YELLOWSTONE AREA

BACKGROUND INFORMATION:
The state and federal governments and the livestock industries have spent billions of dollars since 1935 to eradicate Brucella abortus infection from cattle in the United States (US), and the presence of B. abortus in the US has significant economic impact upon the livestock industry and may have an impact on international trade. The efforts to eradicate B. abortus are contributing to the national herd becoming free of the disease. The United States Animal Health Association (USAHA) supports the efforts of the Greater Yellowstone Area (GYA) state and federal agencies in their efforts to prevent exposure of livestock to brucellosis from elk and bison in the GYA and encourages the efforts of the GYA state agencies to control brucellosis in bison and elk in the GYA.

The only known remaining focus of brucellosis caused by B. abortus in the United States is the bison and elk in the GYA and all signatory parties (Secretaries of the United States Department of Agriculture (USDA) and United States Department of the Interior
REPORT OF THE COMMITTEE

(USDI), and the Governors of the states of Montana, Idaho, and Wyoming) to the original Greater Yellowstone Interagency Brucellosis Committee (GYIBC) Memorandum of Understanding (MOU), which created the GYIBC, agreed that the objective is to eliminate B. abortus from the GYA. A plan to eliminate B. abortus from bison and elk in Yellowstone National Park, Grand Teton National Park, and the National Elk Refuge, and other areas of the GYA, consistent with the objectives of the original GYIBC MOU, is urgently needed. Wyoming lost its Brucellosis Class Free classification in 2004, and Idaho lost its Brucellosis Class Free status in 2006, due to transmission of B. abortus from wildlife to cattle. Both states have subsequently regained Class Free status. A brucellosis affected cattle herd, thought to be infected by wildlife, was disclosed in Montana in 2007, and if a second affected cattle herd is disclosed within two years, Montana will lose its Brucellosis Class Free classification as well. The loss of Brucellosis Class Free status in a state is extremely costly to the cattle industry and is a significant setback to the Bovine Brucellosis Eradication Program.

RESOLUTION:

The United States Animal Health Association (USAHA) strongly urges the Secretaries of the United States Departments of Agriculture (USDA) and Interior (USDI) and the Governors of the states of Montana, Idaho and Wyoming to take all steps and actions necessary to eliminate the last known vestiges of Brucella abortus from the United States, including, but not limited to: 1) providing necessary fiscal and human resources, and requesting additional funding as needed from Congress; 2) assuring collaboration among all relevant state and federal agencies; 3) utilizing all available, scientifically credible technologies and multidisciplinary management practices to prevent the spread of brucellosis in, between and among cattle, bison and elk; 4) providing strong direction to these agencies to expeditiously develop a comprehensive, coordinated plan to eliminate Brucella abortus from the elk and bison herds in the Greater Yellowstone Area (GYA).
NOMINATIONS AND RESOLUTIONS

RESOLUTION NUMBER:    74   APPROVED
SOURCE:    COMMITTEE ON BRUCELLOSIS
SUBJECT MATTER:  CELEBRATE THE ERADICATION OF BRUCELLOSIS IN LIVESTOCK FROM THE UNITED STATES WHEN THE COUNTRY IS DECLARED BRUCELLOSIS FREE

BACKGROUND INFORMATION:

Efforts to eradicate brucellosis caused by Brucella abortus in the United States (US) began in 1934 as part of an economic recovery program to reduce the cattle population because of the Great Depression and concurrent severe drought conditions. A number of states saw this as an opportunity to reduce the level of brucellosis, which was the most significant livestock disease problem in the US at the time. In 1934 and 1935, the reactor rate in adult cattle tested was 11.5%.

In 1954, the magnitude of the brucellosis problem in the US in terms of economics to the cattle industry and human health prompted Congress to appropriate funds for a comprehensive national effort to eradicate brucellosis. The brucellosis eradication program was designed as a cooperative effort between the federal government, the states, and livestock producers. As the science and technology of brucellosis has developed over the years through research and experience, the eradication program has been modified as needed.

In December 2000, there were no affected cattle herds in the US. This was the first time in the history of the brucellosis program that the US had no known brucellosis affected herds. The State-Federal Brucellosis Eradication Program has made tremendous progress since its inception. Only one state has not been recognized as being officially brucellosis free. That state is in the progress of being recognized officially brucellosis free at this time. This successful eradication effort has resulted in the elimination of this disease from a geographically larger area, with more numbers of livestock, than any other country in the world. This effort deserves a celebration to not only recognize the people involved in the effort but to also educate the public on the significance of the effort and how it has improved the economics of livestock production resulting in safer and cheaper food for the nation.
REPORT OF THE COMMITTEE

RESOLUTION:
The United States Animal Health Association (USAHA) requests that the United States Department of Agriculture (USDA), Animal and Plant Inspection Service (APHIS), Veterinary Services (VS) hold a celebration, in conjunction with the USAHA annual meeting, to recognize the tremendous combined efforts of the livestock industry, states, and USDA in eradicating brucellosis from livestock in the United States, once brucellosis has been declared eradicated in livestock.

RESOLUTION NUMBER: 75 Combined with 1 and 13
SOURCE: COMMITTEE ON BRUCELLOSIS
SUBJECT MATTER: PUBLICATION OF THE PROPOSED CERVID BRUCELLOSIS RULE IN THE FEDERAL REGISTER

RESOLUTION NUMBER: 76 APPROVED
SOURCE: COMMITTEE ON BRUCELLOSIS
SUBJECT MATTER: BRUCELLOSIS LABORATORY CONSOLIDATION

BACKGROUND INFORMATION:
During the committee meeting, the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) presented an overview of proposed laboratory consolidation as part of a suite of adjustments to national brucellosis surveillance to reflect declining budgetary resources, reduce redundancy, and improve program efficiency.

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 expedite the consolidation of brucellosis testing laboratories, moving toward a system of regional laboratories. USDA-APHIS-VS should consider the following as the move to laboratory consolidation is made: 1) establish 12 regional
brucellosis laboratories; 2) eliminate USDA funding for 17 laboratories and transfer their samples to regional laboratories; 3) maintain funding for 7 state laboratories that do not serve as regional laboratories; 4) any of the 17 labs that lose USDA funding may decide to continue operating will need to seek alternate funding or charge user fees; 5) include approval of all brucellosis laboratories based on national standards; and 6) those national standards include, but are not limited to, ensuring that state animal health officials receive information on numbers of samples performed on animals that originate from that state, but are slaughtered in packing plants and tested in laboratories in other states, standards for turnaround time, rapid communication of test results, and standardization of tests performed.

RESOLUTION NUMBER: 77 APPROVED
SOURCE: COMMITTEE ON BRUCELLOSIS
SUBJECT MATTER: PROPOSED ADJUSTMENTS TO NATIONAL BRUCELLOSIS SURVEILLANCE

BACKGROUND INFORMATION:
The United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) presented an overview during the committee meeting of proposed adjustments to national brucellosis surveillance to reflect declining budgetary resources, reduce redundancy, and improve program efficiency. Adjustments to national surveillance occurred in the 1970s with unintended consequences to nationwide brucellosis prevalence.

RESOLUTION:
The United States Animal Health Association (USAHA) endorses the concepts of the proposed adjustments to national brucellosis surveillance. It urges caution in adopting the adjustments to prevent the unintended re-occurrence of brucellosis, as has occurred in the past. It also urges that no funding changes be implemented until Code of Federal Regulations (CFR) changes, if needed, are finalized. The proposed adjustments should be made publically available for review and comment. Any changes should receive a risk analysis. The efforts of the working groups that generated the proposed
adjustments should be publicly acknowledged. Special attention should be given to the ramifications of reducing Brucellosis Ring Test (BRT) testing. Special attention should also be given to the ramifications of relying on slaughter surveillance until mandatory identification of the breeding herd is in place, which would assure necessary traceability.
REPORT OF THE COMMITTEE ON PARASITIC DISEASES

Chair: Joseph L. Corn, Athens, GA
Vice Chair: J. Mathews Pound, Kerrville, TX

Bob H. Bokma, MD; Corrie C. Brown, GA; Leroy M.. Coffman, Fl; A. A. Cuthbertson, NV; J. Kieth Flanagan, FL; John E. George, TX; Chester A. Gipson, MD; Larry L. Hawkins, MO; Thomas J. Holt, FL; Lee C. Jan, TX; Ralph C. Knowles, FL; Ulysses J. Lane, NC; Linda L. Logan, APO; Terry F. McElwain, WA; Daniel G. Mead, GA; Andrea Mikolon, CA; Don L. Notter, KY; James E. Novy, TX; Richard E. Pacer, MD; Kelly R. Preston, TX; Jack L. Schlater, IA; Robert C. Stout, KY; Lee Ann Thomas, MD; Paul O. Ugstad, TX; Gale Wagner, TX; Sherrilyn H. Wainwright, CO; Kenneth Waldrup, TX; James A. Watson, MS; John B. Welch, TX; David W. Winters, TX.

The Committee met on Wednesday, October 24, 2007 at John Ascuaga’s Nugget Hotel, Reno, Nevada. At least 45 persons were in attendance, including nine members of the Committee. Reports were provided on a number of parasitic disease issues of interest.

Dr. John E. George, Knipling-Bushland U.S. Livestock Insects Research Laboratory, Agriculture Research Service (ARS), United States Department of Agriculture (USDA), noted that in South Texas the foundation principles on which the Cattle Fever Tick Eradication Program (CFTEP) operates in 2007 have changed little since the days the national campaign began 101 years ago. The major differences are that: 1) white-tailed deer have been added to the list of hosts that must be treated, and 2) the pasture vacation method as traditionally implemented has been invalidated -- deer must be treated after cattle are removed. Major eradication program issues in 2007 are similar to those of the past few years and include: 1) widespread acaricide resistance in Mexico and the diagnosis of resistant populations of *Boophilus microplus* in South Texas, 2) continued ingress of fever ticks from northeastern Mexico on cattle, equines, white-tailed deer, nilgai, American elk, bison, and axis deer, 3) maintenance and spread of cattle fever ticks by the white-tailed deer in Texas and growing risks from exotic ungulate species, 4) growth of “game ranch” operations, and 5) regulatory conflicts between animal health and wildlife interests.
REPORT OF THE COMMITTEE

When a premise is determined to be infested with *Boophilus microplus* or *B. annulatus* a rancher may go through the process of removing cattle and treating deer on the property or may elect to leave the cattle in place and gather them every 14 days for up to nine months for a treatment with coumaphos. Based on results of experiments by ARS, an eradication treatment of cattle with injections of doramectin every 25 to 28 days has been approved and will decrease the number of treatments needed by 50 percent. On many large ranches the cost and difficulty of gathering cattle is prohibitive. Acaricide formulations that are long-acting or which could be administered without gathering the cattle would have great value to the eradication program. Research by scientists at the ARS laboratories in Kerrville and Moore Field, Texas has produced injectable ivermectin microspheres that can protect a treated animal for four months or more with a single injection; and a formulation of liquid molasses that can be consumed ad libitum and protect cattle long enough to accomplish tick eradication. New long-acting injectable formulations of macrocyclic lactones, such as Ivomec Gold®, are being tested and may be marketed in the future. These kinds of products would reduce to only three or four the number of treatments needed by cattle in a herd to eradicate an infestation of *Boophilus* ticks. For more than a decade cattle fever ticks have been eradicated from white-tailed deer by systematically feeding them ivermectin-medicated corn.

In Mexico, demonstrated resistance of *B. microplus* to organophosphate, pyrethroid, amidine (amitraz), and phenylpyrazole (fipronil) acaricides is widespread. There is now preliminary evidence of populations of the tick that are resistant to ivermectin. In addition to increasing pressure in Mexico for selection of resistance to ivermectin by the use of inexpensive generic formulations, the intense use of ivermectin formulated as Ivomec Gold® in northeastern Mexico for the eradication of *B. microplus* and *B. annulatus* is likely to lead to problems with ivermectin resistance that will compromise the effort. As explained above, ivermectin and related macrocyclic lactone endectocides are essential tools of the CFTEP in Texas. The spread of ivermectin resistant ticks into Texas could have drastic effects on the continuing success of the CFTEP. Preserving the future of macrocyclic lactones for both Mexico and the United States is vital.
Dr. Mat Pound, Knipling-Bushland U.S. Livestock Insects Research Laboratory, USDA-ARS, gave an update on white-tailed deer and cattle fever ticks. During the early years of the CFTEP (1907-1943), a paucity of white-tailed deer in the Southeastern United States minimized their importance as alternative hosts for the ticks. Later, however, changes in wildlife management regulations and land usage has resulted in dense populations of white-tailed deer throughout the Southeastern states, included within the Permanent Fever Tick Quarantine Zone and the adjacent Free Area along the Texas-Mexico Border from Del Rio to Brownsville, Texas. In addition, many ranchers in the area are choosing to switch from ranching cattle to rearing the much more lucrative white-tailed deer. Not only does this practice increase densities of deer, but perhaps more importantly because regulations require cattle within the Quarantine Zone to be inspected for fever ticks before movement out of the Zone, a reduction in cattle within the Zone also reduces their function as sentinels in discovering and remediating new fever tick infestations.

As a result, in the last few years the incidental examination of deer has indicated an increased potential for deer-related fever tick infestations, and more recently, the intentional capture and examination of deer for fever ticks at selected locations has demonstrated high percentages (50-82 percent) of fever tick infested deer. In addition to infested deer being observed within the Permanent Quarantine Zone, heavily infested deer have been found in association with two of the three Temporary Blanket Quarantines that now total over 1,116 square miles.

Currently, there are four methods to reduce the influence of deer on the Eradication Program, systematic treatment of cattle in infested premises by dipping in coumaphos or injecting with doramectin, depopulation of deer, feeding of macrocyclic lactone-medicated whole kernel corn, and use of ‘4-Poster’ Deer Treatment Bait Stations to apply topical acaricide to deer. With fewer cattle present and the relatively high cost to ranchers of repeatedly gathering and treating the animals, systematic treatment is relative rare and ranchers are also reluctant to depopulate deer herds from which they gain significant royalties from hunting leases. Medicated corn is used extensively by program personnel, however by agreement with the Food and...

PARASITIC DISEASES

Dr. Mat Pound, Knipling-Bushland U.S. Livestock Insects Research Laboratory, USDA-ARS, gave an update on white-tailed deer and cattle fever ticks. During the early years of the CFTEP (1907-1943), a paucity of white-tailed deer in the Southeastern United States minimized their importance as alternative hosts for the ticks. Later, however, changes in wildlife management regulations and land usage has resulted in dense populations of white-tailed deer throughout the Southeastern states, included within the Permanent Fever Tick Quarantine Zone and the adjacent Free Area along the Texas-Mexico Border from Del Rio to Brownsville, Texas. In addition, many ranchers in the area are choosing to switch from ranching cattle to rearing the much more lucrative white-tailed deer. Not only does this practice increase densities of deer, but perhaps more importantly because regulations require cattle within the Quarantine Zone to be inspected for fever ticks before movement out of the Zone, a reduction in cattle within the Zone also reduces their function as sentinels in discovering and remediating new fever tick infestations.

As a result, in the last few years the incidental examination of deer has indicated an increased potential for deer-related fever tick infestations, and more recently, the intentional capture and examination of deer for fever ticks at selected locations has demonstrated high percentages (50-82 percent) of fever tick infested deer. In addition to infested deer being observed within the Permanent Quarantine Zone, heavily infested deer have been found in association with two of the three Temporary Blanket Quarantines that now total over 1,116 square miles.

Currently, there are four methods to reduce the influence of deer on the Eradication Program, systematic treatment of cattle in infested premises by dipping in coumaphos or injecting with doramectin, depopulation of deer, feeding of macrocyclic lactone-medicated whole kernel corn, and use of ‘4-Poster’ Deer Treatment Bait Stations to apply topical acaricide to deer. With fewer cattle present and the relatively high cost to ranchers of repeatedly gathering and treating the animals, systematic treatment is relative rare and ranchers are also reluctant to depopulate deer herds from which they gain significant royalties from hunting leases. Medicated corn is used extensively by program personnel, however by agreement with the Food and...
Drug Administration (FDA); it can only be deployed for six months during the year to allow for a two month withdrawal period to avoid tissue residues in the venison during hunting season. While the ‘4-Poster’ system has proven quite efficacious against the three-host blacklegged and lone stars ticks, it has not been specifically demonstrated against the one-host cattle fever ticks. In addition, initial deployments in south Texas have occasionally been obstructed by detrimental effects of javelina and feral hogs on the devices. Researchers are nearing completion of two very promising hog exclusion systems that should obviate the effects of these animals. Thus currently, the only feasible, though expensive and labor intensive, method for controlling fever ticks on white-tailed deer is the medicated corn, and it is only authorized for use for six months of the year. Considering that regulations governing systematic treatment cattle and pasture vacation require up to nine months, use of the ‘4-Poster’ or some other topical treatment method that does not cause residues in the venison must be employed to extend treatment of deer to at least nine months.

Dr. Bob Hillman, Texas Animal Health Commission (TAHC), and Dr. Paul Ugstad, Veterinary Services (VS), Animal and Plant Health Inspection Service (APHIS), USDA, gave an update on the Cattle Fever Tick Eradication Program. Cattle Fever Ticks (Boophilus microplus and Boophilus annulatus) are tiny pests, but they cause a very big problem. Fever ticks can carry the protozoa, Babesia bovis or B. bigemina, the causative agents for Bovine Babesiosis, which is also known variously as cattle tick fever, Texas cattle fever, Spanish fever, splenic fever or murraine fever.

The defenses of the United States against reintroduction or reestablishment of fever ticks into the tick’s former habitat consist of the Fever Tick Quarantine Line, the USDA Tick Force, Port Veterinarians and TAHC inspectors and veterinarians. In 1906 the range of the fever ticks extended from south Texas north and eastward to Maryland and Pennsylvania, including all of the southern states and southern California. In the late 1930s a permanent quarantine area was established along the Rio Grande from Del Rio, Texas to the Gulf of Mexico. This Fever Tick Eradication Quarantine Area, ranging from a few hundred yards to several miles wide was created as a barrier to continuous re-introduction of fever ticks from Mexico, where both the ticks and
bovine babesiosis are prevalent. Fever ticks were eradicated from the United States, except for a small area in central Florida, by 1943. The Fever Tick Eradication Quarantine Area and the men and women who work in the tick program are the barriers to re-establishment of fever ticks in their historic range.

Each year incursions of fever ticks are identified in the Fever Tick Eradication Quarantine Area. The number of cases varying with climactic conditions, numbers of tick infested stray or smuggled livestock, budget constraints, wildlife hosts and fever tick efforts in northern Mexico. During the last four years, fever tick infestations have been much higher than historic infestations. At the end of September 2007 there were sixty-seven fever tick infested premises in the state of Texas. Forty-two of these were located within the Fever Tick Eradication Quarantine Area. The other twenty-five were located in the Free Area. The number of fever tick infestations in the Free Area has been cause for concern. In order to contain infestation in the Free Area of Texas, the TAHC, with concurrence from USDA established three Temporary Preventive Quarantine Areas around tick infestations or exposures in the Free Area. The three Temporary Preventive Quarantine Areas include a portion of Starr County (July 3, 2007), parts of Maverick, Dimmit and Webb Counties (August 2, 2007) and a portion of Zapata County (August 29, 2007). These Temporary Preventive Quarantine Areas were established to enable the agencies to contain and eradicate the fever tick outbreaks and to prevent the movement of infested livestock from these newly infested premises. As of October 6, 2007 there were 20 infested premises in the Maverick, Dimmit and Webb Temporary Preventive Quarantine Area and six infested premises in the Zapata County Temporary Preventive Quarantine Area.

USDA and TAHC have detailed staff to work these quarantine areas. Duties include scratch inspection and treatment of cattle, horses and other livestock on infested premises, exposed premises and for movement. Over 10,000 head of livestock have been inspected and treated since creation of the Temporary Preventive Quarantine Areas. In these areas animals that are hosts for fever ticks must be scratch inspected, treated and permitted for movement from or within the quarantine area. Cattle on infested premises must be treated every seven to fourteen days with coumaphos or every twenty-eight days with
REPORT OF THE COMMITTEE

doramectin for six to nine months. Horses or other susceptible livestock must also be treated as directed by the TAHC to eliminate fever ticks. Horses are allowed to move into and out of the quarantine areas if treated every fourteen days and moved on a fourteen day pass.

Whenever fever tick infestation is discovered outside the Fever Tick Eradication Quarantine Area a major concern is the possibility that fever ticks were moved to other areas of Texas or to other states prior to identification of the infestation. TAHC and USDA staff has determined that 783 cattle were moved from the area, which is now the Maverick, Dimmit, Webb County Temporary Quarantine Area, prior to identification of infestation in the area. Four hundred and fifty nine of these cattle have been traced. Tracing activities are ongoing for the remainder of the cattle. There were movements of potentially tick infested cattle to Kansas, Colorado, Oklahoma and Wyoming. To date, none of the traced cattle have been tick infested.

Wildlife hosts for fever ticks are a special concern. There is ample evidence which shows that white-tailed deer, elk, red deer and nilgai antelope can all serve as effective hosts for fever ticks. The recent discovery of fever ticks on an axis deer suggests that this species may also be a fever tick host. There is clear evidence that these wild and exotic species are capable of maintaining fever ticks in the absence of cattle. TAHC rules require treatment or removal of wild and exotic hosts that are present on fever tick infested premises. Treatment options are very limited for free-ranging species. These options include feeding of ivermectin medicated whole kernel corn and the utilization of the 4-Poster treatment system, which utilizes a pyrethrin to control ticks. TAHC rules require treatment of hides and capes of animals harvested on infested premises.

As result of the significant increase in fever tick infestations outside the Fever Tick Eradication Quarantine Area TAHC and Texas-VS requested that USDA conduct a needs assessment for the fever tick program. This assessment identified significant needs for additional resources. Three-hundred and forty-thousand dollars in end-of-year funds was made available to the fever tick force to fulfill immediate needs. The assessment also identified the need for an additional $17 million over the next two years to
successfully eliminate fever tick infestation from the Temporary Preventive Quarantine Areas and to assure sufficient interdiction efforts on the border to prevent continued incursion of ticks into Texas and the U.S.

In addition to the short term needs of the fever tick eradication effort, there are long term needs for the fever tick program. In early 2006 USDA completed a five year strategic plan for the fever tick program. This plan includes five major objectives:

1. prevent entry of fever ticks into the U.S.  
2. enhance and maintain effective surveillance to rapidly detect cattle fever tick incursions  
3. prevent establishment of fever ticks by eradicating infestations resulting from fever tick incursions  
4. identify and procure tools and knowledge to maintain the U.S. free of cattle fever ticks  
5. Foster collaboration and cooperation with Mexico to eliminate cattle fever ticks in areas of Mexico that impact the U.S.

If we are to ultimately be successful in preventing fever tick incursions into Texas and the US, we must provide the necessary resources to accomplish the objectives. The estimated costs for full implementation of all elements of the strategic plan are approximately $8 million each year for five years. The strategic plan has not yet been funded.

Dr. Javier Rojas, Commission of Mexico America (COMEXA), gave an update on the screwworm eradication project. Strategies of eradication of the screwworm made by COMEXA in Mexico, Central America and Panama, Libya and Aruba, and actions that are taking place in Jamaica were discussed. There were comments about the project that COMEXA is going to start with the financial support of the Inter American Bank of Development and USDA-APHIS and the Mexican Secretary of Agriculture, Ranching, Rural Development, Fisheries, and Food supply (SAGARPA) National Services of Animal and Plant Health Quality and Food Safety (SENASICA) in the border of Brazil and Uruguay and with Paraguay as an observer. Also, discussed was the outbreak that occurred this past September in a dog that came from Trinidad and Tobago to the United States through Miami. The infested animal was detected in Mississippi by
a private veterinarian four days after arrival. This shows the risk of any country infested with screwworm for the countries screwworm free.

The participation of COMEXA in Commission on Livestock Development for Latin America and the Caribbean (CODEGALAC) meeting this year in Colombia where Ecuador and Venezuela showed interest in having a screwworm eradication program was discussed. Also discussed was the COMEXA participation in an World Organization for Animal Health (OIE) meeting in Argentina in which Argentine cattleman asked if Argentina is going to be involved in the Brazil-Uruguay-Paraguay project. Also, Cuba has showed interest in a screwworm eradication program.

Dr. Pat Berger, USDA-APHIS-VS gave an update on the tropical bont tick eradication program in St. Croix, United States Virgin Islands. From early 2002 to present 12 tropical bont tick infested premises were identified. Six of the 12 are vacant and monitored. Three of the 12 have livestock or horses, but have not had incidents of tropical bont tick infestations for 15 months to 2.5 years. One primary hotspot on the West End has been a site of recent infestations. St. Croix tropical bont tick eradication since 1967 has been modeled on APHIS *Boophilus microplus* eradication protocols. *Amblyomma variegatum*, a 3-host tick, has a life cycle of at least 191 days. Each stage of the cycle can survive dormancy for extended periods of time dependent of wet/dry periods and host availability.

Dr. Joseph Corn, Southeastern Cooperative Wildlife Disease Study (SCWDS), University of Georgia, gave an update on surveys for infestations of wildlife by *Amblyomma variegatum* in St. Croix, U.S Virgin Islands. Surveys of small mammals and birds were conducted at nine premises in the western area of St. Croix during 2005-2006. Eight of these nine premises were classified as *A. variegatum*-infested premises during 2001-2006. Surveys for *A. variegatum* infestation of white-tailed deer and feral cattle were conducted in the mountainous rain forest and surrounding areas in the western end of St. Croix. This area is central to all of the recent *A. variegatum*-infested premises. A total of 6,714 specimens representing 26 ectoparasite species were collected, but specimens of *A. variegatum* were not found on small mammals, birds, white-tailed deer or feral cattle. The
absence of *A. variegatum* on wildlife and feral cattle in this survey was indicative of the low abundance of *A. variegatum* in St. Croix during the survey period. This absence of the tick does not rule out wildlife involvement if *A. variegatum* becomes more abundant, nor does it rule out the possibility that infestations of wildlife, especially deer or feral cattle, occurred at a prevalence below which we could detect. Isolated infestations of wildlife and feral cattle might occur, and even at a low prevalence, infestations of white-tailed deer and feral cattle might result in the survival of isolated populations of *A. variegatum*, at least for periods of several years.

Dr. Thomas Edling, PETCO Animal Supplies, Inc., Dr. Jamie Reaser and Mr. Marshall Meyers, Pet Industry Joint Advisory Council gave a presentation on the pet trade, parasitic diseases and exotic animal imports. The American Pet Product Manufacturers Association (APPMA) estimates that nearly 63 percent of American households have at least one companion animal, and that the total number of pets in the US is approximately 360 million. While dogs and cats are the most common pets in the US, the diversity of companion animals is high and increasing. Pets confer considerable joy and security to their owners, and research indicates that pet companionship substantially benefits human well-being and health. The collective benefits pets provide to their human companions can foster a substantial human-animal bond. The deepening of this bond has greatly improved the quality of life for many pets in recent decades.

However, as is true of all human activities, the benefits of companion animals are not without risks and impacts. A wide range of parasitic diseases can be transmitted from pets to people, domestic animals (including livestock), and wildlife. Most “traditional” pets (e.g., dogs, cats, parakeets, goldfish) have been captive bred for decades (if not centuries) and their parasites are widely recognized and readily managed. The increasing number and diversity of “non-traditional” pets (e.g., wild caught animals or those reared in relatively small numbers such as sugargliders) does present new challenges for parasitic disease identification and management.

Pet acquisition and care supports a thriving industry, with
an estimated annual market value of $40.8 billion in the U.S. alone. The Pet Industry Joint Advisory Council (PIJAC) and its members recognize that minimizing the risk of parasitic disease transmission is not only to the benefit of the industry, but also to pets, the public (esp. pet owners), other industries (e.g., cattle industry) and the environment. Thus, individual companies are implementing proactive biosecurity measures and PIJAC has developed industry-wide campaigns that engage all industry segments, as well as state and federal agencies and other relevant partners. Examples of projects include: The National Reptile Improvement Plan (NRIP), The Bd-Free 'Phibs Campaign, Habitattitude™, and taxon-specific reference manuals and best practices guidelines.

Dr. Freeda Isaac, VS-APHIS-USDA, gave an update on the Analysis of Pathways for Exposure of Domestic Ruminant Livestock and Ruminant Wildlife in the Continental United States to *Ehrlichia ruminantium* (heartwater). This presentation summarized a pathways analysis prepared by USDA-APHIS-VS, Center for Animal Disease Information and Analysis (CADIA) for USDA-APHIS-VS, National Center for Import-Export (NCIE) that shows the pathways for introducing *Ehrlichia ruminantium* (heartwater) into domestic ruminant livestock and ruminant wildlife in the United States. A pathways analysis is a systematic assessment of the paths along which an exotic disease agent (also referred to as the hazard) might enter the United States and establish an outbreak of the disease. This technique is also applicable for delineating the paths along which a disease agent that is present domestically might spread to one or more new states or regions and establish an outbreak of disease. A pathways analysis, in turn, is integral to a risk assessment that has the purpose of estimating, in qualitative or quantitative terms, the likelihood of an outbreak of disease occurring from the identified pathway(s) and the consequences of it. A pathways analysis entails a four-step process. The first step involves establishing an understanding of host, agent, and environmental interactions for the foreign or domestic disease in question based on scientific literature, expert opinion, personal experience or other sources of information. The second step involves developing a list of potential pathways for release of the disease agent into a susceptible livestock and/or human population based upon the aforementioned understanding of host,
agent, and environmental interactions. The third step involves using data from governmental, public domain, or other sources to evaluate the feasibility of each pathway. Finally, entry points of each feasible pathway into the United States, if a foreign disease agent, or state(s) and/or region(s), if a domestic disease agent, are used to identify the populations of animals and people, if a zoonotic disease, at-risk for possible exposure to the disease agent in question. This four-step approach was used to identify pathways that might serve as a conduit for release of *Ehrlichia ruminantium* (Heartwater) into the United States.

The hazard identified in this pathways analysis is the release of *E. ruminantium*, the causal agent of the disease known as Heartwater, into domestic ruminant livestock and ruminant wildlife in the United States. *E. ruminantium* is a gram-negative intracellular rickettsia. The organism is extremely fragile and does not survive very long outside the host. *Amblyomma* spp. ticks are only important to the identified hazard to the extent that these arthropods serve as an intermediate host (vector) for *E. ruminantium*. By virtue of being an intermediate host, *Amblyomma* spp. ticks are required for transmission of these rickettsial organisms from an infected ruminant to a new uninfected but susceptible ruminant in order to sustain a disease outbreak.

Five pathways were identified for release of *E. ruminantium* (Heartwater) into the U.S.: (1) importation of *E. ruminantium*-infected species, (2) migrating cattle egrets serving as a transport host for *E. ruminantium*-infected *Amblyomma* spp. ticks, (3) mechanical transport of *E. ruminantium*-infected *Amblyomma* spp. ticks by humans and imported animals, reptiles, and other birds, (4) mechanical transport of *E. ruminantium*-infected *Amblyomma* spp. ticks by fomites, and (5) smuggling of live *E. ruminantium*. Each pathway was evaluated for its importance using data confined to the calendar years 2000-2005.

The analysis of the first pathway, importation of *E. ruminantium*-infected animal species, found that legal importation of domestic ruminants from African or Caribbean countries where heartwater exists is currently not a feasible pathway to consider for release of this disease agent into the general animal population in the United States. Current regulations prohibit the entry of domestic ruminants from heartwater affected countries into the United States due to the presence of foot and mouth disease in those countries. Although the importation of wild zoo ruminants from Canada and Mexico could be considered a potential...
REPORT OF THE COMMITTEE

pathway, current regulations require these animals to have been in those countries for at least 60 days so it is unlikely that heartwater infected animals would remain undetected in those countries. Illegal importation of these ruminants would not be considered a feasible pathway since the size of the animals and the inspection processes at US ports of entry would make this a difficult thing to accomplish.

The second pathway which is mechanical transport of *E. ruminantium*-infected *Amblyomma* spp. ticks by migrating cattle egrets is a feasible pathway. Three islands in the Caribbean (Antigua, Guadeloupe, and Marie-Galante) are known to be infected with *E. ruminantium* and contain the vector *A. variegatum* (tropical bont tick). Studies have shown that cattle egrets infested with the tropical bont tick migrate from these islands to the United States. There is also evidence to suggest that more of the Caribbean Islands are infected with heartwater.

The third pathway analysis, mechanical transport of *E. ruminantium*-infected *Amblyomma* spp. ticks by humans and imported animals, reptiles, and other birds identified several feasible pathways. There are large numbers of visitors and importations of reptiles from heartwater endemic areas into the United States. Airline and cruise ship passengers from heartwater endemic countries could serve as mechanical vectors for infected ticks as well as legal and illegal importation of reptiles. Legal importation of birds and NEOISI mammals would also be a feasible pathway for these animals to serve as vectors for infected ticks. Importations from Canada and Mexico of these same animals which originated from heartwater countries could serve as a pathway. The legal importation of poultry and ratites would not be an effective pathway since there is a temporary ban on the importation of these animals due to avian influenza from many heartwater endemic countries.

The fourth pathway which is the mechanical transport of *E. ruminantium*-infected *Amblyomma* ticks by fomites is also a feasible pathway. There is bedding in reptile cages as well as feedstuffs and equipment from heartwater endemic countries on which ticks could be transported into the United States.

The fifth pathway analysis, smuggling of live *E. ruminantium* agent into the United States could be a possibility. Currently, although heartwater is considered a select agent, there is no system currently which tracks international laboratories
which maintain stocks of *E. ruminantium*. Although this would not be as likely a pathway as others previously described, it is still a possibility.

In summary there have been several pathways identified in this assessment which warrant a more detailed review by APHIS-VS of what mitigations can take place under existing regulations to minimize the introduction of *E. ruminantium* and *E. ruminantium*-infected *Amblyomma spp.* ticks. A further analysis to quantify some of the risks could also be undertaken while new regulations are developed to address additional mitigations. Discussion with other agencies such as the Fish and Wildlife Service to assess regulatory authorities and current import control measures would be important in order for APHIS VS to determine the best approach in development of import regulations for non-domestic livestock species.

Dr. Thomas J. Holt, Florida Department of Agriculture and Consumer Services gave a report on the Florida perspective on tick associated diseases and exotic animal imports. The introduction of exotic ticks and their potential for carrying foreign animal diseases continue to be of great concern to animal health officials and the animal industries of Florida.

Florida strongly supports the current need to enhance the Cattle Fever Tick Eradication Program in Texas. This program serves to protect our livestock industries throughout the southern United States. In addition, we need to strengthen other border surveillance and prevention efforts to prevent the entry of exotic ticks. For Florida, this means an increased effort by USDA and Department of Homeland Security (DHS) to inspect and prevent entry of animals and animal products that may harbor such ticks and diseases.

We have recently been concerned over increased reporting and sampling of livestock ticks in Florida. Whether this is due to acaricide resistance or the spring drought followed by late summer rains remains unclear, but we have enhanced our tick surveillance in the field and identification by the National Veterinary Services Laboratories. Thus far we have not detected any exotic ticks on livestock this year. The SCWDS and their cooperating agencies also play a valuable role in monitoring Florida wildlife for invasive or exotic tick species.

Our concerns also explain the very strict restriction requirements for cattle entering Florida from both the U.S. Virgin Islands and the U.S. Virgin Islands.
Islands and the Commonwealth of Puerto Rico which involve multiple acaricide treatments, inspections, and quarantine. Livestock movements from these islands must be restricted because of ticks which serve as vectors for bovine and equine piroplasmosis, prevalent diseases in these areas, as well as Heartwater present in other areas of the Caribbean. Should any of these exotic ticks or diseases be introduced and established in Florida, expected restrictions for Florida livestock moving to other states could be devastating to our industries.

In addition, we also remain very concerned over the issue reported on at this Committee meeting in 2005. Tick infested reptiles continue to be imported into the United States on a daily basis from around the world without restriction. An estimated 50,000 permitted reptiles are imported into Miami on a weekly basis and many more reptiles are imported legally that do not require permitting of any kind. Of those reptiles requiring permits, it is estimated that less than 10 percent are inspected at all and those observed to be infested with ticks may or may not be reported by Fish and Wildlife to DHS or to USDA. There are no restrictions placed on the free movement of tick infested reptiles imported from Africa, Asia, and South America to destinations throughout the United States.

Tick species introduced into the United States with imported reptiles have been well documented and now include 32 exotic tick species, with little known as to their role in the spread of animal or human disease. In a survey carried out by the Florida Department of Agriculture in 2005, seven *Amblyomma* species were detected in tick collections from 119 ticks taken from imported reptiles. Previously in work reported by Dr. Mike Burridge, University of Florida, four *Amblyomma* species were collected from imported reptiles, all of which have been shown to be competent vectors for heartwater, a devastating disease of livestock in Africa.

While tick infested reptiles imported through Florida are sold as pets, Wildlife officials and the general public in Florida are also concerned about the potential illegal release of these animals into the wild, as they may become larger, unmanageable, and a burden to pet owners. The release of reptiles into suitable habitats could result in the establishment of breeding colonies of exotic ticks on Florida wildlife and domestic animals. Such exotic ticks could also introduce heartwater or other diseases into Florida and other parts of the Southeastern United States with
subsequent spread via domestic ticks.

A Resolution calling for action by USDA, with responsibility for protecting the health of our livestock from foreign pests and diseases, is again submitted to the Committee. This same Resolution was passed by this Committee in 2005 and approved by the Board of Directors and the general membership of USAHA and forwarded to USDA. USDA did carry out a pathway analysis for animal exposure to heartwater as reported in April 2007. This report did conclude that legal and illegal reptile importations into the United States are feasible pathways for release of tick vectors with or without *Ehlichia* infection, but concluded that they could not substantiate the importance of such introductions because of a lack of data.

Published reports are available to document the entry of exotic ticks capable of transmitting heartwater, the establishment in some cases of breeding populations within captive reptile colonies, and the increasing numbers of reptiles entering the United States. The USDA study did report that 90 percent of the legally imported reptiles are imported through Miami and Los Angeles, and noted that the Southeastern United States is ecologically best suited to the establishment of heartwater vector ticks in the United States. Because of the continued danger to our livestock in the United States and the growing industry involving the importation of reptiles, steps need to be taken to control this risk.

As a first step in implementing the Resolution, requirements for pre-movement permitting and a certification of tick free status for reptiles entering the United States should be put in place. This would allow for regulatory enforcement and place responsibility on exporting countries and exporters to control ticks on reptiles sent to this country. Such requirements would then allow federal officials to refuse entry of those reptiles that have been inspected and found to be tick infested. Even if inspections continue to be below 10 percent of the reptile shipments imported, random inspections could serve to place incentives to implement control measures prior to arrival. This limited action could serve not only to lessen the risk but also provide additional data to evaluate the severity of the risk based on reptile species, countries of origin, and the pathogenicity of the associated ticks. Initial planning has been carried out in Florida working with the affected reptile industry leadership to design a program by establishing control measures based on risk.
REPORT OF THE COMMITTEE

Although the Florida reptile industry has been willing to work with state and federal officials to control this problem, they have also expressed the need to take any regulatory action at a federal level, as opposed to an individual state level because of the ease in which marketing channels could be changed to circumvent regulatory controls. Rather than moving tick infested reptiles through Miami, they could easily be diverted to ports in other states and then moved without detection between states.

Imported reptiles infested with exotic ticks, capable of carrying diseases to animals and people, should not be allowed to continue to be imported without restriction. The associated reptile industries have shown a willingness to work with us and it is time USDA and cooperating federal and state agencies take steps to mitigate the risk of foreign disease entry via the entry of tick infested reptiles into the United States.
The Committee met on Tuesday, October 23, 2007 from 8:00 a.m. to 12:00 p.m. at John Ascuaga’s Nugget Hotel, Reno, Nevada. There were 13 members and guests in attendance. The Committee held a theme-based meeting focused on the issue of lack of harmonization in the pharmaceutical approval process that jeopardizes trade in U.S. meat and poultry product in the global marketplace.

John Nappier, Pfizer Animal Health discussed the science behind the drug approval process in the realm of human food safety, highlighting the similarities and differences between the United States, Japan, Codex and European Union (EU) reviews. These differences lead to different minimum residue limits standard (MRLS) and subsequent withdrawal periods. The point was made that all review methods result in the safe production of meat, milk and eggs.

Kevin Smith, U.S. Meat Export Federation, provided a background on the economic impact of meat exports and emphasized that in a world with expanding free trade residue detection may be a barrier that countries will use to protect their native production.

Paul Sundberg, National Pork Board, presented the U.S. pork experience with the implementation of the Japan “positive list,” a minimum residue limit (MRL)-based residue protection program. No violations have occurred in the 17 months post-implementation.

Jim Bradford presented for Collette Kaster, Smithfield Foods, on the implications the rapid change in withdrawal times required due to the enforcement of the positive list. Economic hardship fell on companies heavily reliant on Japan exports that could have been avoided with better understanding of the situation by pharmaceutical
REPORT OF THE COMMITTEE

companies and the pork industry. Better communication in the future and active participation in international standard setting organizations is required by all associated with the production of livestock products.

Michael Senn, Pfizer Animal Health, described the risk analysis and communication plan employed by a pharmaceutical company in the rapid distribution of new requirements in meat destined for export.

Jennifer Greiner, Elanco Animal Health, described the interaction of U.S. and global standard-setting agencies and described the necessity for communication from all stakeholders. The full report is included in these proceedings at the end of this report.
The demand for animal protein is rapidly increasing due to a growing population, improving diets and rising per capita incomes. Pork, beef and poultry meat serve as an excellent source of protein to meet this global demand. Based on the geographical location of the population growth compared to areas of food animal production, meat trade will be necessary to more efficiently meet the dietary needs and desires of consumers worldwide. Sanitary and Phytosanitary (SPS) aspects of animal diseases, pathogens and residues are rapidly developing to be significant barriers to global meat trade.

In order to provide for the free trade of meat, international standards and guidelines can serve as the reference points to ensure consumers globally of safe meat products. The Codex Alimentarius Commission (Codex) and the World Organization for Animal Health (OIE) serve as the globally recognized bodies to advance and establish SPS standards and guidelines.

The Codex mandate is to develop food standards, guidelines and related text for protecting the health of consumers and for ensuring fair trade practices in food trade. The OIE mandate is to develop standards, guidelines and recommendations regarding animal diseases and zoonoses for ensuring the sanitary safety of international trade in terrestrial animals and their products. Collectively these two international governmental bodies provide reference points for addressing SPS aspects of animal diseases, pathogens and residues.

The meat sector (including farmers, processors, and the merchandising chain) and governments have a collective role and responsibility in providing consumers safe food products. Working together, all stakeholders need to support independent, science-based, international standards, thereby providing consumers confidence in the regulations that protect public health.

The unique and collective roles of each in the meat sectors allow for the global sourcing of meat products while ensuring public health. The roles include:

- Input suppliers: provide a safe and effective product
REPORT OF THE COMMITTEE

- Food animal producers: raise a healthy, high quality animal by providing proper care and sanitation
- Processors: harvest a safe and high quality meat product
- Trading companies: source product globally to meet customer needs
- Distribution companies: provide safe and efficient transport of products
- Retailers: provide a safe, high quality choice of nutritious meat products
- Governments: ensure regulatory structure and oversight supporting food safety, animal and zoonoses disease control, as well as consumer handling and nutrition information

The meat sector, in cooperation with government regulators, needs to work to provide for the production and choice of quality, nutritious and safe products. Together, input suppliers, food animal producers, processors, traders, distributors and retailers need to work with governments to rapidly establish international standards and guidelines to provide for global meat trade. As science evolves, based on the newest science, stakeholders need to work together to implement the appropriate animal disease controls, pathogen protection levels and maximum residue levels to protect public and animal health. Sound, science-based, domestic and international regulations serve to provide consumers confidence in their domestic regulatory authorities, a safe food supply and a choice of meat products sourced globally. Ultimately, these actions will minimize the constraints on trade.
The Committee met on Saturday, October 20, 2007 at 6:00 p.m. at John Ascuaga’s Nugget Hotel, Reno, Nevada. There were 32 members and three guests in attendance. Chair Jim Leafstedt called the meeting to order, welcoming members to the meeting. He expressed his gratitude for the work of the committee chairs. Attendees introduced themselves.

Leafstedt reviewed procedures for committee meetings, highlighting that Roberts Rules of Order should be used for reference. The question of quorums was discussed, including the proposed change for the bylaws, which would be voted on by the membership.

Dr. Bret Marsh, Chair of Committee on Nominations Resolutions, outlined the process for chairs in submitting resolutions.

Dr. J. Lee Alley, Secretary, covered issues relating to committee reports. Chairs received packets with information regarding formats, and details for the report. Alley also covered meeting security. Badges are required for all attendees, and any issues should be brought to USAHA staff.

Procedure for press coverage was discussed by Ben Richey, executive director. Chairs were encouraged to provide information to Larry Mark for press releases and increase visibility for the association.

Leafstedt and Dr. Lee Myers, president, discussed the newly established USAHA Executive Committee Liaisons.
liaisons were established to improve communication between the EC and committee chairs. The list was distributed to chairs.

Discussion on year-round communication was led by Leafstedt regarding operation and chair succession by committees. Discussion followed-up a conference call held for chair earlier in September.

Leafstedt indicated USAHA was establishing a policy for recording at the annual meeting. Discussion included pros and cons of allowing interested groups to record presentations at the annual meeting. It was determined that USAHA should proceed with development of such a policy, and distributed to chairs for comment, which would be used to see if such a policy should be implemented.

Leafstedt recognized new chairs for 2007, including: Ms. J. Amelita Facchiano, Animal Welfare; Dr. Scott Wells, Johne’s Disease; and Dr. Jim Bradford, Pharmaceuticals. Leafstedt also recognized retiring chairs, for 2007. These include: Dr. Scott LaPatra, Aquaculture; Dr. Robert Tully, Biologics and Biotechnology; Dr. Robert Cook, Captive Wildlife and Alternative Livestock and Dr. Steven Halstead, Animal Welfare (2006).
The Committee met on October 22, 2007 from 1:00 p.m. to 6:00 p.m. in Southern Pacific AGB at John Ascuaga’s Nugget Hotel, Reno, Nevada. A total of 37 people attended the meeting including 16 Committee members.

The first speaker was Dennis Slate, Wildlife Services (WS), Animal Plant and Health Inspection Service (APHIS), United States Department of Agriculture (USDA). Slate provided an update on wildlife related rabies activities. The use of immunohistochemistry testing has enhanced surveillance. Canine variant rabies has been eliminated in Texas. Gray fox variant continues to be a problem, both in foxes and coyotes. There is ongoing work to improve the efficacy and delivery systems of oral bait rabies vaccine. There is ongoing collaborative work with both Canada and Mexico to address disease along the borders.

The next speaker was Erin Kennedy, Centers for Disease Control and Prevention (CDC). Kennedy provided an overview of World Rabies Day 2007. It is estimated that there are over 55,000 human deaths annually caused by rabies world wide. World Rabies Day was a multi-partner effort to bring attention to rabies around the world. There was good media coverage and good
education and outreach efforts. There were seventy seven events in the United States with participation by twenty five Colleges of Veterinary Medicine. Seventy three countries participated. The next World Rabies Day is October 28, 2008.

Christine Bunck, United States Department of the Interior, was the third speaker. She addressed surveillance for high pathogenic H5/H7 avian influenza in wild birds in the United States in 2006 and 2007. The focus of efforts in 2006 was in Alaska. In 2007, surveillance efforts expanded. Over 27,000 birds were tested. No high pathogenic avian influenza was found. Positive results for low pathogenic avian influenza were found in 2.7 percent of birds tested. Virus isolation is still ongoing. Three hundred ninety two different viruses of varying H and N types have been found to date. No H5N1 was found.

The fourth speaker was Tracey Lynn, Veterinary Services (VS), APHIS-USDA, reporting on the Subcommittee for Zoonotic Disease and Surveillance. The other lead for this Subcommittee is Tracee Treadwell of CDC. Recent initiatives over the last year were avian influenza, a food safety subgroup, and communications. There was discussion about next steps for this group. The group has been successful in meeting initial objectives. There is still a need for ongoing efforts. Wildlife agencies should be included in agriculture and public health initiatives.

Responses to the six Resolutions from 2006 were provided to Committee members.

The Committee approved two Resolutions. Voting was by a majority of the members present with each vote being unanimous. The two Resolutions were forwarded to the Committee on Nominations and Resolutions.

The Committee approved two recommendations. Voting was by a majority of the members present with the votes being unanimous. The recommendations are:

1) the United States Animal Health Association (USAHA) provide comments on Federal Register 55729 CDC proposed rule on animal import regulation during the comment period published in the Federal Register which has been extended to December 1, 2007. In addition, we recommend that USAHA investigate the opportunity to
issue joint comments with other organizations such as American Veterinary Medical Association (AVMA).

2) The Committee recommends that USAHA officially recognize World Rabies Day.

COMMITTEE ON PUBLIC HEALTH AND RABIES MISSION STATEMENT

The purpose of the Committee on Public Health and Rabies is to enhance public health and environmental quality for all animals, including humans. It provides a liaison with United States Animal Health Association (USAHA) to livestock producers and handlers, private and public veterinarians and their organizations and agencies. It will encourage increased coordination among agriculture, wildlife and public health agencies in the detection, identification, prevention, control, and eradication of infectious and non-infectious diseases and conditions affecting animals and the common environment of animals and humans. With emphasis on facilitating communication and data sharing between the animal and human health communities to recognize emerging and re-emerging zoonotic diseases.

Objectives:

1. Establish a forum for all zoonotic diseases, both existing and emerging problem. Create Zoonotic Subcommittees as needed.

2. Objectives related to rabies are:
   i. to maintain an awareness of the animal rabies situation, primarily in North America but other portions of the world as well
   ii. to assess its impact on all animals including livestock, wildlife, pets, and humans
   iii. to monitor regulatory programs of various public and animal health agencies in North America
   iv. to develop program recommendations
   v. to share information on new technologies

3. Assist in maintaining and developing healthy animal populations by improving the environmental quality through information for handling of hazardous wastes, recycling, disinfection in management and production.
REPORT OF THE COMMITTEE

4. Review and recommend programs as a Committee or in conjunction with other Committees in reducing and preventing disease agent transmission through foods or feeds of animal or poultry origin intended for consumption.

5. Promote education and training initiatives for livestock producers and handlers, and private and public practitioners in defining their role in maintaining and enhancing the public’s health and environmental quality.
REPORT OF THE COMMITTEE ON PUBLIC RELATIONS AND INFORMATION TECHNOLOGY

Chair: Martha A. Littlefield, Baton Rouge, LA
Vice-Chair: Karen Conyngham, Austin, TX

J Lee Alley, AL, Kathleen Connell, WA; Thomas Holt, FL; Larry Mark, VA; Lee Myers, GA; James Watson, MS Richard Willer, AZ.

The Committee convened at 10:00 AM on Wednesday, October 24, 2007 at John Ascuaga’s Nugget Hotel, Reno, Nevada. The Vice-Chair presided and welcomed all in attendance. The Chair participated in the meeting via tele-conference.

The Committee Report from the 2006 meeting was reviewed and approved. One mission of last year’s Committee was the creation of a new generic United States Animal Health Association (USAHA) business card that can be used at any meeting or event where USAHA may have an information table or display booth. The card lists the new contact information for USAHA and on the verso contains the following text:

“The United States Animal Health Association (USAHA) – serving as the nation’s animal health forum for more than a century – is a science-based, voluntary organization. Members come from state, federal and international animal and public health agencies, allied industry and professional organizations, livestock producers, academia and animal health professionals. Join Today!” The new card has been printed and is very attractive. It was available at the 2007 Annual Meeting.

Action item remaining from 2006: writing a concise, information letter that Annual Meeting attendees can customize and submit to their Association web sites or newsletter reviewing the major issues (bullet points) of the Annual Meeting general session and any noteworthy Committee Reports. It was determined that the Allied Industry groups are distributing information about the annual meeting to their members directly. There was no interest in such a document from the district-at-large (DAL), so this action item was dropped. The Committee again discussed renovation of the existing USAHA display booth. It was suggested by Ben that he do an investigation into the time and cost involved in refurbishing the booth with high-quality photos and support literature. He will then report to the Executive Committee (EC) to see if there is interest from the EC in pursing this project.
REPORT OF THE COMMITTEE

Lee Myers recommended that Ben compile a generic Power Point presentation about USAHA that can be distributed to any interested organization and USAHA’s Allied Industry representatives to encourage interest and membership in USAHA among producers and veterinary groups that may not already be aware of USAHA.

The Committee reviewed possible ways to build upon the success of the news alerts. Martha asked if a version of the alerts could be sent out in straight text. Ben said that this is already an option, the alerts can be sent out in either .html or .txt formats and USAHA members just need to subscribe to whichever version they prefer. Lee Myers suggested that an occasional topic for the top section of the news alerts could feature either a short personal biography on a USAHA member or if a Committee has undertaken a project that they would like to publicize, a short review could be included on that project.

The Executive Committee has asked the Committee to continue to evaluate the USAHA web site for further possible enhancements to maximize “e-communications”. The USAHA web master will be working with Ben to re-work the background navigation structure for the site. After that is completed, the web master would like to incorporate more photos and add some “spice” to the overall look of the site.

The USAHA office occasionally receives requests for articles from past Annual Meeting proceedings. Ben will look into possibly digitizing the proceedings archive. This information could then be made available to USAHA members via a password protected section on the web site. The Committee thanks and commends Dr. Dick McCapes and Dr. J. Lee Alley for their efforts in assisting the USAHA office in reviewing the Association’s archives prior to the relocation of the office from Virginia to Missouri.

Lee Myers recommended that Ben contact the Communication Officers for State Departments of Agriculture (COSDA) and develop a working relationship with them to further awareness of USAHA. See: www.nasda.org/StaticContent/cosda/

Ben will look into drafting a 3-year plan for outreach and
PUBLIC RELATIONS AND INFORMATION TECHNOLOGY

awareness of USAHA which could focus on different groups each year, such as various producer associations, agricultural and veterinary groups, etc. This plan will be developed in conjunction with the Executive Committee.

Finally, it was agreed upon by the majority of the Committee that the Committee disband since Committee attendance at the Annual Meeting is always very low and it is difficult to recruit new members. Now that the USAHA office has an Executive Director and staff, it will be more efficient for Ben to work directly with the EC on public relations issues. However Ben will maintain contact with resource members within USAHA for input on both web content and public outreach and awareness activities. Katie Wetherall of the California Department of Food and Agriculture graciously offered to share her public relations experience and resources with Ben as needed.
REPORT OF THE COMMITTEE ON SALMONELLA

Chair: Patrick L. McDonough, Ithaca, NY
Vice Chair: Douglas Waltman, Oakwood, GA

Joan M. Arnoldi, WI; Deanna L. Baldwin, MD; Marilyn F. Balmer, MD; Richard E. Breitmeyer, CA; Max Brugh, GA; Jones W. Bryan, SC; Karen E. Burns-Grogan, GA; Tony A. Caver, SC; Stephen R. Collett, GA; Kevin G. Custer, IA; Sherrill Davison -Yeakel, PA; Robert J. Eckroade, PA; John I. Enck, Jr., PA; James M. Foppoli, HI; Rose Foster, MO; Tony G. Frazier, AL; Richard K. Gast, GA; Hashim M. Ghori, AR; Eric N. Gingerich, PA; Randy R. Green, DC; Jean Guard-Bouldin, GA; Chris S. Hayhow, KS; Carl J. Heeder, MN; Ruud Hein, DE; Bill W. Hewat, AR; Tom Holder, MD; Carolyn Inch, CAN; Hailu Kinde, CA; Dale C. Lauer, MN; Elizabeth A. Lautner, IA; Howard M. Magwire, MD; Jerry D. Maiers, NC; Edward T. Mallinson, MD; Beth E. Mamer, ID; James D. McKeen, IA; Hugo Medina, MN; David L. Meeker, VA; Donald S. Munro, PA; Thomas J. Myers, DC; Kakambi V. Nagaraja, MN; Steven H. Olson, MN; Robert L. Owen, PA; Stephen Pretanik, DC; Nancy Reimers, CA; John P. Sanders, WV; H. L. Shivaprasad, CA; Philip Stayer, MS; Bruce N. Stewart-Brown, MD; Hilary S. Thesmar, DC; Liz K. Wagstrom, IA; Gary L. Waters, MT; Scott J. Wells, MN; Nora E. Wineland, CO; Ching-Ching Wu, IN.

The Committee met from 12:30 p.m. to 6:00 p.m. on October 21, 2007, at John Ascuaga’s Nugget Hotel, Reno, Nevada. There were 39 members and guests in attendance. Dr. Patrick L. McDonough, Chair, and Vice Chair Dr. Doug Waltman, presided. The meeting was called to order at 12:30 p.m. and members were encouraged to sign-in. Dr. McDonough gave a brief overview of the Committee and its mission statement, reviewed the minutes of the 2006 Minneapolis meeting, gave a brief look at Salmonella in the world’s scientific literature, and then reviewed the speaker topic list as the meeting began.

Overview of Salmonella in the United States Report including FoodNet and National Antimicrobial Resistance Monitoring System (NARMS) updates – Centers for Disease Control and Prevention (CDC)

Dr. Casey Barton Behravesh, Centers for Disease Control and Prevention (CDC), Enteric Diseases Epidemiology Branch,
provided this update

Each year in the U.S. *Salmonella* infections cause an estimated: 1.4 million illnesses, 168,000 physician office visits, 15,000 hospitalizations, and 400 deaths. The National *Salmonella* Surveillance System collect reports of isolates of *Salmonella* from human sources from every state in the United States. This information is reported through the Public Health Laboratory Information System (PHLIS), an electronic reporting system, by the State Public Health Laboratory Directors and State and Territorial Epidemiologists to the CDC. The top 10 *Salmonella* reported including their frequency are as follows (Figure 1): Typhimurium-19.3 percent (including var. 5-, formerly var. Copenhagen), followed by Enteritidis-18.6 percent, Newport-9.1 percent, and Heidelberg-5.3 percent were the top 4 serotypes encountered; the next in order of frequency (all less than 4 percent) are Javiana, 1, 4,[5], 12:i:-, Montevideo, Muenchen, Saintpaul, and Braenderup. This report for 2005, the most recent data available, may be found at www.cdc.gov/ncidod/dbmd/phlisdata/Salmonella.htm and at www.cdc.gov/ncidod/dbmd/phlisdata/salmtab/2005/SalmonellaAnnualSummary2005.pdf.
**Human 2005**

<table>
<thead>
<tr>
<th>Rank</th>
<th>Serotype</th>
<th>Reported</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Typhimurium *</td>
<td>6982</td>
<td>19.3</td>
</tr>
<tr>
<td>2</td>
<td>Enteritidis</td>
<td>6730</td>
<td>18.6</td>
</tr>
<tr>
<td>3</td>
<td>Newport</td>
<td>3295</td>
<td>9.1</td>
</tr>
<tr>
<td>4</td>
<td>Heidelberg</td>
<td>1903</td>
<td>5.3</td>
</tr>
<tr>
<td>5</td>
<td>Javiana</td>
<td>1324</td>
<td>3.7</td>
</tr>
<tr>
<td>6</td>
<td>I 4,[5],12:i:</td>
<td>822</td>
<td>2.3</td>
</tr>
<tr>
<td>7</td>
<td>Montevideo</td>
<td>809</td>
<td>2.2</td>
</tr>
<tr>
<td>8</td>
<td>Muenchen</td>
<td>733</td>
<td>2.0</td>
</tr>
<tr>
<td>9</td>
<td>Saintpaul</td>
<td>683</td>
<td>1.9</td>
</tr>
<tr>
<td>10</td>
<td>Braenderup</td>
<td>603</td>
<td>1.7</td>
</tr>
<tr>
<td>11</td>
<td>Oranienburg</td>
<td>590</td>
<td>1.6</td>
</tr>
<tr>
<td>12</td>
<td>Mississippi</td>
<td>565</td>
<td>1.6</td>
</tr>
<tr>
<td>13</td>
<td>Infantis</td>
<td>505</td>
<td>1.4</td>
</tr>
<tr>
<td>14</td>
<td>Paratyphi B var. L(+)+ tartrate+</td>
<td>460</td>
<td>1.3</td>
</tr>
<tr>
<td>15</td>
<td>Thompson</td>
<td>428</td>
<td>1.2</td>
</tr>
<tr>
<td>16</td>
<td>Agona</td>
<td>367</td>
<td>1.0</td>
</tr>
<tr>
<td>17</td>
<td>Typhi</td>
<td>348</td>
<td>1.0</td>
</tr>
<tr>
<td>18</td>
<td>Hartford</td>
<td>239</td>
<td>0.7</td>
</tr>
<tr>
<td>19</td>
<td>Stanley</td>
<td>224</td>
<td>0.6</td>
</tr>
<tr>
<td>20</td>
<td>Berta</td>
<td>209</td>
<td>0.6</td>
</tr>
<tr>
<td>21</td>
<td>Hadar</td>
<td>205</td>
<td>0.6</td>
</tr>
<tr>
<td>22</td>
<td>Bareilly</td>
<td>201</td>
<td>0.6</td>
</tr>
<tr>
<td>23</td>
<td>Anatum</td>
<td>197</td>
<td>0.5</td>
</tr>
<tr>
<td>24</td>
<td>Poona</td>
<td>196</td>
<td>0.5</td>
</tr>
<tr>
<td>25</td>
<td>Mbandaka</td>
<td>190</td>
<td>0.5</td>
</tr>
<tr>
<td>26</td>
<td>Panama</td>
<td>148</td>
<td>0.4</td>
</tr>
<tr>
<td>27</td>
<td>Litchfield</td>
<td>141</td>
<td>0.4</td>
</tr>
<tr>
<td>28</td>
<td>Sandiego</td>
<td>138</td>
<td>0.4</td>
</tr>
<tr>
<td>29</td>
<td>Schwarzengrund</td>
<td>138</td>
<td>0.4</td>
</tr>
<tr>
<td>30</td>
<td>Brandenburg</td>
<td>134</td>
<td>0.4</td>
</tr>
</tbody>
</table>

Sub Total: 29507 (81.5)

All Other Serotyped: 3841 (10.6)

Unknown: 1113 (3.1)

Partially serotyped: 1684 (4.7)

Rough or nonmotile: 39 (0.1)

Sub Total: 6677 (18.5)

Total: 36184 (100)
Next Dr. Casey Barton Behravesh reviewed *Salmonella* serotype isolation rates in the United States per 100,000 population: 1970-2005 highlighting trends over this time period.

**FoodNet**

The next surveillance system reviewed was the Foodborne Diseases Active Surveillance Network or FoodNet (www.cdc.gov/foodnet/). FoodNet was established in 1996 and is the principal foodborne disease component of CDC’s Emerging Infections Program. FoodNet is a collaborative project of the CDC, the United States Department of Agriculture (USDA), the Food and Drug Administration (FDA) and 10 participating state health departments. FoodNet began active, population-based surveillance for laboratory-confirmed cases of infection caused by *Campylobacter, Listeria, Salmonella, STEC O157, Shigella, Vibrio, and Yersinia*. FoodNet personnel ascertain cases through contact with all clinical laboratories serving their surveillance areas. In 2004, FoodNet began collecting data on which laboratory-confirmed infections were associated with outbreaks.

The FoodNet catchment area accounts for 45 million persons or approximately 15 percent of the U.S. population. FoodNet conducts active laboratory-based surveillance at more than 650 clinical laboratories serving the catchment area to ascertain all laboratory-confirmed infections due to seven bacterial foodborne pathogens including *Salmonella*. Dr. Barton Behravesh outlined how the relative rates of *Salmonella* are calculated by FoodNet, i.e., the rate each year is compared with the 1996-1998 baseline, rates below 1 represent a decrease since baseline. Estimates show that the rate of *Salmonella* has remained steady compared to the baseline period. In fact, no statistically significant change was seen for *Salmonella* between 2006 and baseline. (see MMWR April 13, 2007 / 56(14);336-339 at www.cdc.gov/mmwr/preview/mmwrhtml/mm5614a4.htm?s_cid=mm5614a4_e)

Enhanced surveillance of foodborne infections as measured in FoodNet sites estimates that the rate of *Salmonella* has changed the least compared to the 1996 to 1998 baseline period versus other common foodborne bacterial infections monitored by FoodNet.

Of the six most common *Salmonella* serotypes in 2006,
only *typhimurium* has declined since the baseline, and its incidence since 2003 has been stable. Although *Salmonella* incidence did not decrease significantly overall, the incidence of *S. typhimurium* decreased significantly (41% [CI = 34%--48%]). In contrast, significant increases in incidence compared with baseline occurred for *S. enteritidis* (28%, CI = 4%--57%), *S. newport* (42%, CI = 7%--87%), and *S. javiana* (92%, CI = 22%--202%). The estimated incidence of *S. heidelberg* and *S. montevideo* did not change significantly compared with baseline (Figure 2).

Of the 5,957 (90 percent) *Salmonella* isolates serotyped, seven serotypes accounted for 64 percent of infections: *typhimurium*, 1,157 (19 percent); *enteritidis*, 1,109 (19 percent); *newport*, 531 (9 percent); *javiana*, 292 (5 percent); *montevideo*, 250 (4 percent); *Heidelberg*, 239 (4 percent); and a monophasic serotype identified as *Salmonella* I 4,[5],12:i:-, 239 (4 percent).

**NARMS**

Data from the human arm of the NARMS at the CDC was reviewed (www.cdc.gov/narms/). The NARMS program monitors changes in antimicrobial drug susceptibilities of selected enteric bacterial organisms in humans, animals, and retail meats to a panel of antimicrobial drugs important in human and animal medicine. The NARMS program consists of three areas: the CDC-human surveillance; the FDA Center for Veterinary Medicine (CVM)-retail food surveillance; and the USDA-animal surveillance (on-farm and slaughter).

NARMS results for *Salmonella* are available since 1996. NARMS started in 14 sites in 1996 and expanded nationwide in 2003. The trends in multidrug-resistant (MDR) *Salmonella*, and resistance to clinically important drugs: fluoroquinolones, nalidixic acid, ciprofloxacin, 3rd generation cephalosporins, and ceftriaxone were discussed. The percentage of non-typhi *Salmonella* Resistant to nalidixic acid, by Year, 1996-2005 showed that fluoroquinolone (e.g., ciprofloxacin) resistance is not yet widespread, although an increase in quinolone (e.g., nalidixic acid) resistance along with decreased susceptibility to ciprofloxacin has been observed since 1996. The percentage of non-typhi *Salmonella*-resistant to ceftiofur, by year, 1996-2005 have primarily been driven by the emergence of MDR AMPc in *Salmonella newport*. The MDR pattern is seen in at least 12 other non-typhi serotypes; resistance to extended-spectrum cephalosporins appears to be mediated by similar mechanisms.
found in a variety of *Salmonella* serotypes and is horizontally transmissible by plasmids.

**Salmonella Outbreaks in the USA**

In general, salmonellosis outbreaks of a common serotype or pulsed field gel electrophoresis (PFGE) pattern may be initially detected by CDC or by a state or local health department. Outbreaks of a common serotype may be detected from data collected through the National *Salmonella* Surveillance System. The Statistical Outbreak Detection Algorithm (SODA) is applied to these surveillance data to compare current vs. historical number of a serotype. Molecular subtyping is a critical investigation tool especially for the more common *Salmonella* serotypes. PFGE can be performed by PulseNet, the molecular subtyping network for foodborne disease surveillance) and OutbreakNet, the network of public health epidemiologists who investigate foodborne illnesses nationwide. Increases in a PFGE pattern can be detected at the state or national level. CDC is also notified of outbreak reports by investigators at local or state health departments. OutbreakNet is the network of public health epidemiologists who investigate foodborne illness nationwide. Reports from multiple states can be linked by CDC and information is shared between states. Most outbreaks are detected, investigated and controlled by local and state health departments. The CDC’s Enteric Diseases Epidemiology Branch collects reports of outbreaks investigated through the Electronic Foodborne Outbreak Reporting System (eFORS). Reporting is voluntary and is therefore incomplete. The definition of an outbreak used is: two or more cases of a similar illness resulting from the ingestion of a common food, which in investigation are linked to a food consumed in common. CDC collects reports of outbreaks investigated by local and state health departments including data on number of cases, implicated food, and etiology. The role of the Foodborne Disease Outbreak Response and Surveillance Team (ORST) is to conduct national surveillance on foodborne infections and outbreaks of foodborne illness and to assist in the investigation of foodborne disease outbreaks that take place in the United States or affect its population. From 1998 to 2002, *Salmonella* outbreaks with a single food vehicle identified implicated a wide range of food categories (www.cdc.gov/foodborneoutbreaks.htm). As reported in the most recent surveillance summary, of 162 outbreaks with a single food vehicle identified, the top five categories associated
with illness included: poultry, accounting for 31 percent of these outbreaks; vegetables, fruits and nuts with 26 percent; eggs with 13 percent; pork with 10 percent; and dairy with seven percent. As this data shows, multiple major food categories serve as important sources of *Salmonella* infections making *Salmonella* a difficult pathogen to control. Investigation of *Salmonella* outbreaks is very important to understand this wide range of food sources. Vegetables and fruits together caused nearly as many outbreaks as poultry during this time period, underscoring concern that produce items are an important source of infections due to *Salmonella*.

**Tomato Outbreaks of Salmonellosis**

Several recent outbreaks were reviewed in detail. First, Tomatoes are a well-documented vehicle for *Salmonella* outbreaks. Known multistate tomato-related *Salmonella* outbreaks have been occurring since 1990 to the present time. *Salmonella* infections were first linked to tomatoes in 1990, when *S. javiana* caused 176 illnesses in four Midwestern states. Since 1990, at least 11 multistate outbreaks were reported to CDC’s Electronic Foodborne Outbreak Investigation and Reporting System (EFORS).

These outbreaks have been due to multiple *Salmonella* serotypes though several are repeatedly associated with tomatoes. Tomato-associated salmonellosis is an accelerating issue as an increasing number of outbreaks have been reported in more recent years. Outbreaks are typically large and widely dispersed and have ranged in size from 43 cases to 510 cases. Typically Round or Roma tomatoes were implicated. When identified by trace back, the source of tomatoes has been farms in Virginia, Florida, South Carolina, Georgia, and Ohio. The majority of outbreaks were associated with restaurants or a substantial proportion of cases had tomato exposures at restaurants. Some outbreaks also involved pre-cut tomatoes. At least 1, 990 culture-confirmed infections were detected in the 11 tomato-associated outbreaks since 1990. These outbreaks may have resulted in an estimated 79,600 infections since an estimated 97.5 percent of *Salmonella* infections are not culture-confirmed.

A review of the four most recent tomato associated *Salmonella* outbreaks was presented. In 2005 and 2006, four large multistate salmonellosis outbreaks were linked to contaminated
tomatoes. All four of these multistate outbreaks involved tomatoes served at restaurants and involved both whole and pre-sliced tomatoes. Affected states were primarily in the Eastern U.S. and the distribution of cases typically corresponds to the tomato source as shown by trace back investigations in previous outbreaks. Massachusetts, Pennsylvania, and Ohio are the states involved in all 4 tomato-associated outbreaks. There were few cases in western states all of which had a travel history to the eastern US during their incubation period. One of the three outbreaks involved pre-cut tomatoes at a restaurant. Though a variety of *Salmonella* serotypes were seen in the multistate outbreaks, of special notice is a recurring outbreak of *Salmonella* Newport due to the same strain, PFGE Pattern A, in 2002, 2005 and 2006. The history of all *Salmonella* Newport isolates versus pattern A isolates since 2002 shows that PFGE pattern A, has a seasonal trend with peaks between September and January. The illnesses occurred during the same season and in a similar geographic distribution in all 3 outbreaks. This recurring pattern indicates that *Salmonella* is likely to be present in the tomato growing environment. To date, contaminated tomatoes most commonly originate from Florida, Virginia, or South Carolina. Contamination of tomatoes is likely occurring early in the distribution chain, such as at the farm or packinghouse, rather than at the individual restaurants. Possible sources of environmental *Salmonella* contamination include feces from domestic or wild animals in the growing environment.

**Dog food and *Salmonella schwarzengrund***

(www.cdc.gov/salmonella/schwarzengrund.html)

Next Dr. Casey Barton Behravesh discussed the *Salmonella schwarzengrund* outbreak in humans linked to dog food. A multi-state case-control study demonstrated an association between illness and purchase of dry pet foods produced by Mars Petcare US. Households with ill persons were significantly more likely than matched households without ill persons to usually purchase a brand of dry pet food made by Mars PetCare US that may have been produced at a single facility in Pennsylvania.

The Pennsylvania Department of Health (PADOH) conducted environmental testing in this pet food production facility. One of the environmental samples collected by PADOH yielded the outbreak strain of *Salmonella schwarzengrund*. In tests by the FDA of unopened bags of finished dog food produced by
this facility, two brands yielded the outbreak strain of *Salmonella schwarzengrund*. First investigation occurred in March 2006 with four cases in Pennsylvania, all who owned dogs or cats. The second investigation occurred in June 2006 with two cases in Pennsylvania, infants with turtle exposure. The third investigation was in May 2007 with five cases (three infants, one toddler, one adolescent), Ohio also had infant cases. There was a link to dog ownership, no common dog food or treat, and three cases had matching PFGE pattern (JM6X01.0015). During June 2007, the PADOH conducted interviews of several case-patients identified during 2007 using a hypothesis generating questionnaire. These interviews suggested exposure to dogs and/or dry dog food as a possible source of infection. Thirteen cases from Pennsylvania were then re-interviewed using a canine-specific questionnaire; eight (62 percent) owned one or more dogs and remaining cases reported canine exposure. Seven of the eight persons who owned dogs recalled the types of dog food recently purchased. Several brands were purchased, but the households of six (75 percent) case-patients purchased dog food products made by Manufacturer X. Opened bags of dog food (two different brands made by Manufacturer X) from the homes of two patients yielded *S. schwarzengrund* with an PFGE pattern indistinguishable from cases identified during 2006 and 2007 (JM6X01.0015). Both brands were produced by Manufacturer X at a facility in Western Pennsylvania. During May 2007, the PDOH recognized a cluster of *Salmonella schwarzengrund* infections with PFGE pattern 15 or the outbreak strain. *Salmonella schwarzengrund* is a rare serotype of *Salmonella*. Between January 1st, 2006 and September 28, 2007, 66 persons infected with the outbreak strain have been reported to CDC from 18 states, primarily in the northeastern United States. Approximately 40 percent of these cases are in infants. From January 1, 2006 to September 28, 2007, there were 66 cases in 18 states primarily in the northeastern United States. The outbreak strain was identified in samples from two Pennsylvania case households, from two brands of dry dog food (open bags) made by Manufacturer X, and from two dog stool specimens. A total of 45 case households and 144 geographically matched control households were interviewed in eight states including Delaware, Maine, Michigan, Minnesota, North Dakota, New York, Ohio and Pennsylvania. A total of 36 matched case-control sets were completed and analyzed. Contact with a dog was reported by 80 percent of case-patients; this
was significantly associated with illness (Matched Odds Ratio (mOR) = 2.8, 95 percent Confidence Interval (CI) = 1.1, 8.0). Among these households, two different brands of dry dog food were associated with human illness. One brand may have been produced at a single facility in Pennsylvania; additionally, several other brands produced at this facility by a single manufacturer (Mars Petcare US) were weakly associated with case status. Purchase of a brand produced at this facility was reported by 19 case-patient households and was significantly associated with human illness (mOR=5.3, 95 percent CI: 1.8, 17.2). Purchase of one of the facility brands by case-patient households in the two weeks before illness (or last two weeks for control households) was also significantly associated with human illness (mOR=4.1, CI: 1.4, 14.0). Purchase of the other brand associated with illness (mOR=15.8, 95 percent CI: 1.8, 748.9) was reported by only five case-patient households. As far as finished product sampling: on July 26, 2007, Manufacturer X stopped production at Plant 17 for inspection and cleaning; on July 27, 2007, the FDA made a second visit to Plant 17 collecting 150 samples representing seven brands and found that two samples of two brands of finished product were positive. On August 21, 2007, there was a voluntary recall of Krasdale Gravy and Red Flannel brands of dog food, and neither brand linked to human illness. The implications are that pet food is not a sterile product, and that pet owners must be aware of cross-contamination after feeding pets. The conclusion are that human illnesses have been linked with multiple brands of dry pet foods produced by Manufacturer X at a single Pennsylvania facility from persistent contamination in products from Plant 17. This is the first documented *Salmonella* outbreak of human illness associated with pet food in the U.S. Investigations are ongoing to determine why human illness, especially among infants, is associated with dry pet food. Factors under investigation include handling and storage of dry pet food, hand-washing practices, exposure of children to dry pet food, and location in the home where pets are fed.

**Salmonella tennesseee and Peanut Butter**

An epidemiologic study comparing foods that ill and well persons said they ate showed that consumption of Peter Pan peanut butter and Great Value peanut butter were both statistically associated with illness and therefore the likely source of the outbreak. Product testing has confirmed the presence of the
REPORT OF THE COMMITTEE

outbreak strain of *Salmonella tennessee* in opened jars of peanut butter obtained from ill persons.

From August 1, 2006 to July 31, 2007, there were 714 cases of *Salmonella tennessee* in 48 states. The outbreak was slow-growing from August through November, with a broad peak from December to January. A second peak occurred during the week of the product recall, suggesting increased detection in the setting of media attention and awareness. After the peanut butter recall, there was a marked decline in cases. This was the first U.S. outbreak linked to peanut butter and it was detected by routine *Salmonella* surveillance, enhanced by PFGE. The product was implicated by intensive multistate investigation and detected and unusually high frequency of urinary tract infections.

Contamination at single plant over months and widespread product distribution resulted in large, national outbreak which was controlled after product was recalled and production was halted. (MMWR June 1, 2007 / 56(21);521-524). (www.cdc.gov/mmwr/preview/mmwrhtml/mm5621a1.htm)

*Salmonella typhimurium* and *S. wandsworth* Outbreak

A multi-state case-control study demonstrated a strong association between illness and consumption of Veggie Booty, a snack of puffed rice and corn with a vegetable coating. CDC OutbreakNet staff shared this information with colleagues at the FDA on June 27, 2007. After being informed about the outbreak by FDA, the company that manufactures the product issued a voluntary recall on June 28. None of the 60 known illnesses from *Salmonella wandsworth* had onset after the product recall date. Persons were advised to discard any product in their possession. Interviews comparing foods eaten by ill and well persons show that consumption of Robert’s American Gourmet brand Veggie Booty was statistically associated with illness and therefore the most likely source of the outbreak. This was the first documented U.S. outbreak and only the second outbreak of *Salmonella wandsworth* documented worldwide. The outbreak almost exclusively affected toddlers, the exact reasons remain unknown; bloody diarrhea was prevalent among affected individuals who reported high and frequent product consumption. (www.cdc.gov/Salmonella/wandsworth_071107.htm?s_cid=ccu071607_Salmonella_r_e)
Recurring Multistate Outbreak of *Salmonella* Serotype Montevideo Illnesses Among Persons Exposed to Baby Birds

This report was also provided by Dr. Casey Barton-Behravesh. Note: this report discusses mail order hatcheries in the United States, which are not the hatcheries used by commercial poultry producers to acquire chicks. As an overview of the hatchery industry in U.S., there are estimated to be less than 100 hatcheries in the United States that supply baby birds.

Few published data exist that describe bird distribution patterns in the U.S., and any one hatchery may supply birds to customers in several states. Moreover there is no public health oversight in this industry, warning labels for consumers, or housing conditions of birds. From eggs hatched in hatcheries, the baby chicks are sent to agricultural feed stores or residences in cardboard boxes containing as many as 100-120 chicks or 80 turkey pouls or 60 ducklings or 32 goslings. In feed stores, baby birds are often promoted for sale as pets for children and are dyed attractive colors. Chicks are easily accessible to customers in the store. Sales of birds peak in the spring and summer, and decline in winter.

In the spring of 2006, a multistate cluster of *Salmonella montevideo* isolates from human stool samples were detected by OutbreakNet. Isolates had a rare PFGE pattern and were all indistinguishable from one another by PFGE, the pattern termed the outbreak strain, or Pattern A. PFGE data suggested a common source of contamination. Initial interviews with patients in three states indicated that exposure to baby poultry was frequently reported. Public health officials in New Mexico identified four patients with outbreak strain exposed to baby poultry and isolated the outbreak strain from environmental samples from New Mexico Hatchery A. On May 21, 2006, an EIS officer from CDC arrived in Santa Fe, New Mexico, to assist with multistate outbreak investigation, and two studies were conducted: case-patient interviews, and an agricultural feed store study. Case definition was a person submitting a stool sample isolate with outbreak strain from January 1 to June 30, 2006. Then a baby poultry-specific questionnaire was developed including dates and severity of illness, exposure to birds, location of purchase of baby poultry, and public health officials interviewed case-patients. Case-patient interview were conducted with 48/56 (86 percent) individuals, females 29/48 (60 percent), median age was two years (27 days-82 years), children less than six months were 12/46 (22 percent),
bloody diarrhea 25/48 (52 percent), hospitalized 8/48 (17 percent), and deaths were zero.

As far as exposure data: case patients exposed to baby poultry in the five days before illness were 42/48 (88 percent), purchased poultry for pets 18/42 (43 percent), purchased poultry for meat 14/42 (33 percent), purchased poultry for eggs 7/42 (17 percent), kept poultry inside the house 17/42 (40 percent). With regard to purchase information: those warned of health risk at purchase were 3/42 (7 percent), purchased birds from feed store 28/34 (82 percent), hatchery of origin identified 9/42 (21 percent), hatchery of origin was Hatchery A 7/9 (78 percent). It was determined during the investigation that a list of feed stores in New Mexico that advertise in internet Yellow Pages included 54 of 120 feed stores that sold baby birds. A questionnaire specific to baby bird sales was administered and representatives of all 54 feed stores interviewed. The scale of bird sales among the 54 feed stores selling baby birds in New Mexico revealed that 89,557 baby birds were sold in New Mexico feed stores. A median of 675 birds were sold by an individual feed store (range 50 - 23,100). Feed stores that were aware birds can cause salmonellosis were 46/54 (85 percent), warn customers that birds can cause salmonellosis 26/54 (56 percent), gave verbal warning 21/26 (81 percent), written warning 6/26 (22 percent), purchase chicks from Hatchery A 50/54 (93 percent). Actions taken by the 2006 inspection team included an unsuccessful attempt to visit Hatchery A, the New Mexico Livestock Board made it mandatory to place warning signs, and the MMWR with specific recommendations and educational messages published in March, 2007 www.cdc.gov/mmwr/preview/mmwrhtml/mm5612a1.htm): To reduce the risk for illness or death from salmonellosis, persons should be educated about the risks of contact with baby poultry, avoid contact with bird feces, wash their hands after handling baby poultry or anything in contact, children aged less than five years should not handle baby chicks or other baby birds, hatcheries should provide information to prevent transmission of Salmonella organisms from birds to humans to customers at agricultural feed stores, and to customers who purchase directly from hatcheries.

Pattern A outbreak continues and CDC is still investigating the situation. As of October 17, 2007, there were 60 case-patients in 23 states with stool samples yielding Salmonella montevideo with a PFGE pattern indistinguishable from 2006 outbreak strain (Pattern A). CDC staff are continuing to investigate this ongoing
outbreak, with continued surveillance, identification of additional cases of Pattern A, and a focus on tracking cases over Summer 2007. Case-patient interviews included 38 of 60 (63 percent) case-patients, females 27/59 (46 percent), median age 5 years (3 months-85 yrs), children < 6 mo 7/58 (12 percent), bloody diarrhea 14/26 (54 percent), hospitalized 8/34 (24 percent), deaths 0. Purchase information included those exposed to baby birds in the 5 days before illness 27/38 (71 percent), hatchery of origin identified 20/27 (74 percent), hatchery of origin was Hatchery A 18/20 (90 percent). Case-patients with exposure to baby birds originating from Hatchery A reside in 8 different states (California, Colorado, New Hampshire, New Mexico, Pennsylvania, Utah, Washington and Wyoming). Environmental lab samples in 2007 from Hatchery A match outbreak strain. Conference calls with CDC, NM Department of Health and Livestock Board, USDA, National Poultry Improvement Plan are part of active work to address this problem including planning a Hatchery A site visit and assessment. Hatchery A is aware of ongoing issues and has instituted vaccination of flocks and fumigation of premises. Hatchery A is in rural New Mexico; it advertises 24 types of chickens, ducks, geese, guineas, and turkeys, 300 breeds of chickens. Orders may be done by mail, internet, or phone; the hatchery distributes to other hatcheries. This is similar to other hatcheries across the United States.

There has been a second outbreak of *Salmonella montevideo* with a different PFGE pattern (pattern B) occurring in 54 cases identified in 14 states. The illness onset dates range from March 7 to September 9, 2007. Case-patient interviews were again conducted and showed that there was significant exposure to baby birds in the 5 days before illness 18/26 (69 percent), the hatchery of origin identified in 16/26 (62 percent), and the hatchery of origin was Hatchery D, Iowa, in 9/16 (56 percent). Specimens from chickens and their environment matched the outbreak strain, but no hatchery samples have been collected to date. The CDC and state health departments continue to monitor this cluster, and to share information with USDA-APHIS-VS, NPIP.

REPORT OF THE COMMITTEE


It was concluded that some *Salmonella* serotypes do not cause clinical illness in poultry. The 2007 actions included new educational efforts: Zoonoses Education Coalition created stickers and flyers available at the CDC Healthy Pets Healthy People website, and distributed through National Association of State Public Health Veterinarians (NASPHV) listserv; contacts are being made within the poultry feed industry to discuss putting health messages on feed bags; labeling shipping boxes is being considered; information about baby chicks will be sent through the School Nurses Association and other groups; and they are currently exploring other ideas.

Conclusions about *Salmonella montevideo*: Human illnesses due to *Salmonella montevideo (Pattern A)* are an ongoing and recurring problem in the U.S. Hatchery A has been implicated repeatedly. Hatchery A is attempting a vaccination program for control, though no effective intervention has been undertaken to date. CDC continues to conduct surveillance for baby bird-associated outbreaks. Human infections with multiple serotypes of *Salmonella*, particularly montevideo, are linked to baby birds. There is an ongoing outbreak of *Salmonella montevideo (Pattern B)* where several hatcheries were repeatedly implicated in outbreaks of human illness. Serious human illness has occurred including hospitalizations especially in children. Current educational efforts are insufficient. Few patients (seven percent) recalled receiving education. Despite efforts, human illnesses still occur, especially in children. No coordinated efforts exist to target this problem.

Recommendations: State agriculture and public health agencies should collaborate to address problem of human illness associated with exposures to baby birds from these hatcheries. State agriculture and public health agencies should continue to advise the public on risks associated with baby bird contact, especially to children. State agriculture agencies should continue to work directly with hatcheries to reduce the likelihood of any *Salmonella* contamination. Agricultural feed stores should provide educational material to customers concerning risk of *Salmonella* infections from baby birds. CDC’s Healthy Pets Healthy People website is available and state health agencies are available to enhance messages. Hatcheries should provide educational materials to mail order customers. CDC is exploring partnerships.
with local, state, and federal agencies. We need to more accurately define this niche of hatchery industry, and provide specific recommendations for the clean-up of hatcheries. (www.cdc.gov/mmwr/preview/mmwrhtml/00046940.htm) MMWR 56(12) March 30, 2007, MMWR 46(11) March 21, 1997).

A Multiplex Polymerase Chain Reaction (PCR) Method for the Rapid Serotyping of Common Clinical Isolates of Salmonella

This was presented by Dr. Jonathan G. Frye, Bacterial Epidemiology and Antimicrobial Resistance Research Unit, USDA, Agricultural Research Service (ARS). A description was given of work using Salmonella genomics to develop a method of serotyping Salmonella. The science of genomics was described showing what kind of information it gives us to develop an alternative to traditional serotyping methods. This includes data mining to identify genes that are serotype or clone specific and development of assays to detect them. Dr. Frye presented data from a project of serotype determination by multiplex PCR. First, some background. Salmonella enterica is composed of over 2,500 different serotypes. These can be further divided into subtypes and clones. They can differ from each other in their capability to infect specific hosts, cause disease, and become antimicrobial resistant. Some examples include: generalists like Salmonella typhimurium that can infect many different hosts, is fairly virulent in most hosts and can also be highly drug resistant. S. enteritidis is similar in its ability to cause disease, but is usually isolated from poultry and does not have high levels of antibiotic resistance. S. kentucky is also often isolated from poultry, but causes little disease and very rarely ever infects humans or becomes resistant to drugs. S. newport on the other hand is isolated mostly from cattle, also causes human disease and is highly drug resistant. The reasons for these differences are reflected in the genetic variation between these serotypes, which is not very well understood. They are studying Salmonella genomics to improve our ability to understand these genetic differences responsible for so many serotypes.

What is causing this variation in Salmonella and why is it important to study?

First, all Salmonella are not created equal and some can be more dangerous than others. Second, if we want to be able to trace Salmonella back to their sources and understand their epidemiology, we must be able to identify different serotypes,
REPORT OF THE COMMITTEE

subtypes and clones. This must be done with rapid, high-throughput assays. To do this we must investigate the genetic differences that are responsible for the wide range of serotypes and their varying phenotypes. This will pay off two-fold: we will begin to understand the genes that cause these differences and can target their function with intervention strategies and use them to identify and trace clones and determine their epidemiology.

The technology used to investigate this is genomics. What is genomics? The science of genomics began with the sequencing of whole genomes. This gave us data about every gene in an organisms genome and assigned many of them functions. By looking at the genetic map of the *Salmonella* genome we have learned that once several genomes had been sequenced the next step, comparative genomics can be done. This is where the gene content and arrangement of genes in one genome can be compared to others. This allows us to find common conserved genes that make strains related to each other via a common ancestor and can also tell us things about common phenotypes they may possess. For example, *E.coli* and *Salmonella* have about 80 percent identical genes and they have the common phenotype of being enteric bacteria that live in the gut of animals. This also allows us to do the converse which is finding genes that are different between strains that can also be responsible for the different phenotypic abilities they have. This is exemplified by *Salmonella typhi* and *typhimurium*, who only differ by about 13 percent of their genes. They both are enteric pathogens, but typhimurium usually causes gastroenteritis and is a host generalist, while the typhi causes enteric fever and only infects humans. The several hundred genes that differ between these two serotypes will likely explain these phenotypic differences. To construct the *Salmonella* DNA microarray the whole sequence of the *Salmonella typhimurium* LT genome was determined and all of its 4600 genes identified. Then they designed primers to amplify the whole open reading frame for every gene in the genome, amplified these, scored them for quality and then arrayed them with a robot onto glass slides for hybridizations. There are two basic kinds of analysis that you do with microarrays. The first is the well known application of mRNA analysis. To do this you label mRNA by reverse transcription into labeled cDNA which you hybridize to the microarray. You then scan the microarray and detect the hybridization of the samples to each gene. If you compare mRNA from a control and experimental
condition, then the ratio of hybridization correlates with differences in gene expression. The second kind of analysis, which is what I’m going to describe today, looks at the presence of genes. Here genomic DNA from a control strain and a test, or unknown, strain is labeled with different colors and then hybridized simultaneously to the microarray. The ratio of hybridization signals determine the presence or absence of genes in the test strain as compared to the control strain.

So what can you do with that kind of data? First you can do phylogeny. Previously the phylogeny of Salmonella was determined by Multi-Locus Enzyme electrophoresis and gene sequencing by Fidelma Boyd and co-workers. This data split the Salmonella into two species and S. enterica into seven subspecies and 2,500 serotypes. With analysis of DNA through comparative genomic hybridization you can do things like study the gene content differences between the subspecies and serotypes of Salmonella. To determine the gene content that could give useful phylogenetic data, they did comparative genomic hybridizations of the Salmonella Reference Collection C using LT as the control strain.

This is a one way look and can only detect the genes that strains lack as compared to LT. All the genes are in gene order on the chromosome from 1 through to 4600.

As test strains get more closely related to LT2 there are fewer deletions as they are compared along the backbone of the genome. When this data is used to draw a phylogenetic tree using Phylogenetic Analysis Using Parsimony (PAUP) software with neighbor joining or maximum parsimony with 100 boot straps, we get a very similar tree to that found with Multi Locus Enzyme Electrophoresis. But what we also get are the identity of genes that are specific for the subspecies of Salmonella. For example: if we look at the major evolutionary junctions we can see that where Salmonella splits from the other enterobacteriaceae about 513 genes are acquired including those in Salmonella pathogenicity Island 1. Where enterica splits from the other Salmonella we see an acquisition of 111 genes including Salmonella pathogenicity Island 2. When diphasic Salmonella came along, 105 genes were acquired including the extra flagella genes. There are about 216 genes that appear to be specific for subspecies I, which are the Salmonella responsible for most warm blooded animal infections. Finally the typhimurium have about 144 unique genes, many of which are phage specific. With this sort of information the first
thing we can do is improve on serotyping. Serotyping relies on reaction of antigens on the cell surface reacting with specific antibody. This is to the O and the H antigens and is scored by the Kaufmann-White scheme. Why replace serotyping by serum? It is difficult, slow, often fails and is expensive. This project’s goal was to use genomics to develop a molecular assay for the rapid identification of serotype. To do this we had to: first collect the genomic data by sequence analysis and DNA microarray analysis of serotypes and mine this data for genes that are specific for serotypes or clones. Second develop detection methods, in this case a multiplex PCR, and third evaluate these and adapt them to high-throughput techniques. From that data, we selected genes that could differentiate between the 15 most prevalent serotypes of human isolates. We then used PCR to detect these genes in test strains and then combined them into multiplex reactions. The typhimurium, STM, set is one multiplex and the typhi, STY, is the other multiplex. There are individual PCR reactions used to detect each of these ten genes, some are multiplexed together. The technique worked very well and has been recently published (Journal of Clinical Microbiology, Oct. 2006, Vol. 44, No. 10, p. 3608–3615). We are continuing this work to develop it into a high-throughput technique (real-time detection, automated capillary analysis, Luminex, etc.) are being developed. Future projects include expanding multiplex PCR to identify the top animal isolates and specific clones.

National Anti-Microbial Resistance Monitoring System (NARMS) Update

Dr. Jonathan Frye and Dr. Paula Cray of the Bacterial Epidemiology and Antimicrobial Resistance Research Unit, USDA-ARS, gave a brief update on work with the NARMS. The full report is included in these proceedings.

Understanding the Interaction of Salmonella with its Animal Hosts: The Practical Implications of Pathogenesis Research

Dr. Craig Altier, Department of Population Medicine and Diagnostic Sciences, Bacteriology Laboratory, Animal Health Diagnostic Center, College of Veterinary Medicine, Cornell University presented this report.

In the present era when antimicrobial therapy is losing the battle in treating salmonellosis, we need to understand the
complex environment in the intestinal tract where bacteria reside and interact with the host. This may allow other treatments to be successfully developed for salmonellosis.

*Salmonella* invades epithelial cells as a first step in virulence. Invasion is controlled in complex ways, i.e., the needle complex that is part of the type III secretion system encoded on *Salmonella* pathogenicity island I. Bacteria need to sense their environment and in doing so they turn genes on and off. Short chain fatty acids are produced by the intestinal microbiota and affect *Salmonella* invasion. Some fatty acids turn invasion genes on such as acetic and formic acids, while propionic and butyric turn invasion genes off. We wondered whether this had any in vivo application? For example, dietary microencapsulated butyric acid supplementation in chickens results in a reduction of both fecal shedding and cecal colonization with *Salmonella*. Dr. Altier’s laboratory is studying how the fatty acids actually work in the gut environment. Dietary supplementation with fatty acids may control *Salmonella* infection of animals. We need to also understand how prebiotics and probiotics work, i.e., their specific factors, since it is likely that these bacteria do not just occupy a niche that blocks invasion by other bacteria.

**Multi-Drug Resistant (MDR) *Salmonella dublin* in New York State Cattle Populations**

Dr. Belinda Thompson, Department of Population Medicine and Diagnostic Sciences, Veterinary Support Services, Animal Health Diagnostic Center, College of Veterinary Medicine, Cornell University presented this report. Dr. Thompson discussed a recent cluster of *Salmonella dublin* outbreaks which the Animal Health Diagnostic Center had been involved in providing diagnostic testing and consultation. *Salmonella dublin* was isolated for the first time in 1988 and continued to see it through the middle of the 1990’s. Patrick L. McDonough, David Fogelman, Sang J. Shin, Michael A. Brunner, and Donald H. Lein published a paper summarizing the descriptive epidemiology of a cluster of 26 outbreaks in the northeast between 1988 & 1995 (J Clin Micro 1999;37(8):2418-2427). Interesting parts of that summary included the fact that the age range tended to be just 7-16 weeks of age, in calves presenting with pneumonia and not diarrhea. Outside of that age range, just 2 adult cases were identified. Since that time there were no isolates between 1996 and 2006, until the first clinical isolate in the current cluster on September
REPORT OF THE COMMITTEE

1, 2006. Since that time, we have had confirmed cases on 3 additional New York dairies, and one veal facility outside of New York but close to the New York border.

Salmonella dublin Farm 1. Farm 1 was a 500 milking cow dairy that raises all their own replacement heifers. The first case presented to us following a report of increased calf morbidity and mortality in the previous two weeks, with a loss of 6/20 calves in the 3-4 month age range, from a barn of ~100 weaned calves. When questioned, there were no reported morbidity or mortality issues of significance in any other age or management group on the farm, including fresh cows and the hutch calves about to enter the weaned calf barn. In the previous year, there had been a single isolate of Salmonella thompson in a sick animal, and also a viral isolation of bovine viral diarrhea (BVD). The illness was described by the producer and referring veterinarian as beginning with a weak calf which continued eating, and then on about day four or five, developed dyspnea, had a body temperature of 104° to 105°F, was dull with dropped ears, became recumbent and died. The first case which presented was sick for one week, presented with difficulty breathing and was recumbent with a temp of 105°F, and also had loose feces with mucus. A blood culture was collected ante-mortem, and the calf was euthanized in extremis. Salmonella dublin was grown on the blood culture and also from the lung and gastrointestinal tract. A second case presented 1 week later. A fecal sample was positive for Salmonella dublin. The isolates were equally MDR, and alarmingly so. They were only sensitive to gentamycin, enrofloxacin and trimethoprim/sulfamethoxazole. In addition to consulting with the referring veterinarian, we reported the findings to the New York State veterinarian and jointly issued and animal health alert (www.diaglab.vet.cornell.edu/pdf/Salmonella dublin.pdf: this report is included in these proceedings). As far as the necropsy findings, all the calves had pneumonia, but they also had fibronecrotic enteritis and hepatitis. One calf also had necrosis and inflammation of the spleen. We were able to culture the S. dublin from both lungs and jejunum tissues. The control measures on the farm included not letting any more calves to enter this building, and renting a vacant building as a weaned calf barn. They also improved many aspects of calf care, including hygiene and ventilation. It was unknown if they had fed unpasteurized whole milk to the calves. They also employed the Salmonella
newport Bacterial Extract SRP vaccine, using 2 doses three weeks apart. Some surveillance testing on the farm was done to try to determine that the outbreak had ended; milk filter socks were negative on Salmonella culture 2 weeks, 1 month and 6 months following the initial case. Five months later 35 calves between 10 days and 15 weeks of age were culture negative, and 10 environmental samples from farm also negative; they did not sample the weaned calf barn.

Farm 2. Farm 2 presented approximately 1 month after Farm 1. They reported a total of 8 dead calves in two management age groups, 1 euthanized bred heifer, 1 sick cow 60 days in milk, and 10 abortions in the previous 2 months. This is a dairy milking 500 cows and raising its own replacements. Our bacteriology section cultured Salmonella dublin from a fecal sample of an 8 day old sick calf. Little information was given about the clinical illness or means of control employed. Surveillance sampling 1 month later found Salmonella dublin in an environmental swab taken from a calf hutch that had housed a sick calf. 12 adult cow fecal samples considered “high risk” and 19 other environmental samples were all negative.

Farm 3. We have little information about Farm 3, a veal grower in Pennsylvania near the New York border. If it was operated like many veal operations, it could conceivable have acquired bull calves from either of the other two farm Ideally, most operate on an all in all out basis with thorough cleaning and disinfection between batches.

Farm 4. Farm 4 presented to us in December of 2006. The clinical presentation was described as diarrhea and death in calves. No herd size or morbidity/mortality information were given. However, the veterinarian indicated that the herd bought baby heifer calf replacements from only a single source. That source turned out to be Farm 1. Prior to the positive clinical sample submitted in December, two other Salmonella fecal cultures were submitted, during the previous 2 months, that were negative. No clinical information was provided for those cases, either.

Farm 5. Farm 5 presented to us more recently, in August, 2007. This is a farm with about 200 milking cows. It has been a closed herd for 7 years. Of 30 calves in the weaned calf group, 10 were affected with a respiratory illness with high fevers. The majority of the calves fully recovered with Tulathromycin and Flunixin meglumine. Several calves developed severe dyspnea and were also treated with dexamethazone, and made remarkable.
REPORT OF THE COMMITTEE

recoveries, according to the herd veterinarian. The tenth calf was selected for euthanasia for diagnostic purposes. There had been an unrelated *Salmonella* serogroup C3 surveillance isolate in an environmental sample and a milk filter. The lung culture from the euthanized calf was positive for *Salmonella dublin*. A nasal swab taken ante-mortem did not grow *Salmonella dublin*. This calf had a fibrinous-histiocytic pneumonia and a hepatitis. No intestinal samples were submitted from this calf. At the time of the diagnosis, the herd veterinarian and producer thought the outbreak was coming to a close. The herd veterinarian reported generally exceptional calf management. Because this herd is not trying to expand, and tends to have an aggressive voluntary cull program, the herd veterinarian expressed some interest in testing heifer calves for carriers, and also using the *Salmonella newport* SRP vaccine. One month later, lung from a 7 day old dead calf was positive for *Salmonella dublin*. A milk filter sock was *Salmonella* culture negative. The main biosecurity concerns voiced by the producer and herd veterinarian were rendering trucks and veterinarians visiting the farm.

In 1980, in fact, there was a paper which described cases of *Salmonella dublin* dermatitis in 3 bovine veterinarians (Br Med J. 1980 March 22; 280(6217): 815–818). One of the individuals was apparently infected twice, 3 years apart, the first time delivering a stillborn calf, and the second time attending a cow for a retained placenta. The other two veterinarians were apparently infected delivering stillborn calves. At the time, the article speculated in the role of bovine veterinarians as vectors, rather than just fomites.

In summary, we are trying to learn about this emerging disease presentation in our geographical location. We are very concerned about the public health risks of this potentially dangerous, multi-drug resistant *Salmonella dublin*. We are seeing less consistent age ranges just in this small group of farm outbreaks, and a more varied clinical picture, than was seen in the 1988-1995 group of outbreaks. Necropsy findings include pneumonia, enteritis and hepatitis. We have identified an epidemiological link between two of the five far. There is also a difference between farms in the morbidity and mortality reported.

The full Animal Health Advisory follows this Committee report.
Emergence of Type 035/187 MDR *Salmonella typhimurium* Clone; 60 Farm Dairy Study

Dr. Thomas E. Besser, Department of Veterinary Microbiology and Pathology, College of Veterinary Medicine, Washington State University, presented an update on this study.

Studies were funded through a National Institutes of Health (NIH) Food and Waterborne Diseases Integrated Research Network (FWD-IRN) contract; beginning January 2004, Washington human- and animal-source isolates were compared by serovar, antimicrobial resistance and PFGE type. Since 2004 we analyzed 510 avian, 18 65 bovine, 2347 human, and 750 other *Salmonella* isolates. When we compare serotype and resistance patterns across species, it does seem as though bovine source isolates share these phenotypes with human source isolates more frequently than other species.

*Salmonella typhimurium* TYP035 and TYP187: A newly emerging *S. typhimurium* was detected that was distinct from DT104 by PFGE, was variably resistant (2 – 9 antimicrobials), and had Washington PulseNet PFGE profiles TYP035 and TYP187. The features of TYP035 and TYP187 were as follows: Plasmid Profiles - 15/38 ~ 120 kb plasmid, 23/38 had variable plasmid profiles, and there was no correlation with resistance phenotype or PFGE banding variations. Phage Typing – (Dr. Rafiq Ahmed at the National Microbiology Laboratory, Winnipeg, Manitoba, Canada) all 31 TYP035 isolates were phage type ‘untypable’ with the Colindale phage panel. The percent of S. Typhimurium that are TYP035 and TYP187 have been steadily increasing since 2000 to a greater extent from cattle versus human sources.

In summary TYP035/TYP187 is a newly emerged epidemic clone of MDR *Salmonella typhimurium*; it is apparently regional (Pacific Northwest), primarily from a bovine reservoir(?)

Longitudinal study of *Salmonella* introductions into Washington: For Sixty farms that had a previous history of diagnostic laboratory submissions resulting in *Salmonella* were reviewed. These farms had seven visits over 2.5 years, with various samples taken for *Salmonella* culture including fecal pools, slurry, milk filters, feeds. We characterized all *Salmonella* isolates to identify new strain types. The seventh sampling now underway, and the introduction rate of *Salmonella* strains is so far higher than study design assumption; on-farm and in-commerce feeds *Salmonella* isolation rates are similar. Our goal is to estimate the percentage of new *Salmonella* introductions due to animal
REPORT OF THE COMMITTEE

movement and feeds. We are currently analyzing the completed data set.

Update from the National Pork Board was given by Dr. Paul Sundberg, National Pork Board. *Salmonella* background information: there are an estimated 1.4 million cases per year in United States. There is no declining trend in human cases, in spite of declines seen in Food Safety Inspection Service (FSIS) in-plant pork carcass testing. There are more than 2,500 serotypes, and there is some disconnect seen between common serotypes found in pigs versus humans. *Salmonella typhimurium* is common in both. Confirmed food-borne outbreaks with known etiology 1990-1997 showed that four percent were from pork, 64 percent from a vehicle other than pork and 32 percent had no known etiology. Industry objective is to lower the incidence of salmonellosis in a Farm to Fork Team approach using pre-harvest on-farm interventions, and dealing with the issues of transportation, lairage, harvest, and post-harvest. Feed/water interventions have provided mixed results that are inconsistent at best. On-farm interventions are perhaps not the best location, re-infections occur at lairage. The Pork Quality Assurance Program (PQA PlusTM) was launched in June 2007 as a hazard analysis critical control points (HACCP)-based approach dealing with physical, chemical and biological hazards.

There have been opportunities for on-farm *Salmonella* testing: the National Animal Health Monitoring System (NAHMS) 2000 study tested 5420 samples (6.2 percent positive); Collaboration for Animal Health, Food Safety an Epidemiology (CAHFSE) program tested a total 26/39 sites positive (67 percent), 155/596 pens positive (26 percent), 371/3654 individual samples positive (10.1 percent). Cleaning and disinfection may reduce or eliminate exposure, and limiting exposure may be achieved by limiting transportation times. Stress from transportation is not fully understood, and either may increase shedding and exposure, or may not have an effect on shedding and infection. Lairage (holding pens at a packing plant) may have an impact on carcass contamination. One should reduce or limit exposure in pens because infection can occur within 30 minutes; two hours is the limit of holding and no holding actually decreased *Salmonella* in sows. This approach is not practical for market hogs. Moisture in pens correlates to increased *Salmonella* infections. Cleaning and disinfection of pens has had variable success; perhaps there is too
large a fecal load to deal with successfully.

Salmonella Performance Standards: FSIS issued the Pathogen Reduction Act, Final Rule on July 25, 1996. Plants must develop Standard Operating Procedures, develop a Hazard Analysis and Critical Control Point (HACCP) System, implement testing for E. coli and Salmonella. HACCP is based on prevention and not detection. The Pathogen Reduction Act sets Salmonella performance standards (the maximum allowable prevalence of Salmonella) for slaughter establishments. In the packing plant the combination of scalding and de-hairing, and carcass wash does a good job at reducing Salmonella; pork carcasses are well below the performance standard. FSIS has new Performance Standards Sample, i.e., set data will be recorded in 3 categories: Category I - low exposure of Salmonella to public, Category II - elevated exposure of Salmonella to public, and Category III – greatest exposure of Salmonella to public. FSIS expects to conduct Food Safety Assessments (FSA) in establishments in Category III and may conduct FSA’s in establishments in Category II. FSIS will monitor the change in control from Category III as well as from Category II to Category I for a determined timeframe, and is considering more aggressive steps to ensure increased control of Salmonella

Negative incentive, i.e., publishing the names of establishments and their performance status within each category. The positive incentive, however, is allowing establishments to increase slaughter volume based on consistent control of low exposure to Salmonella and other performance indicators.

Summary: Raw pork had only a 0.9 percent Salmonella incident rate in 2004 on the NARMS national retail meat survey. Pork carcasses testing positive for Salmonella are 75 percent below the Salmonella standard set by the USDA and going down each year; only four percent of foodborne illness outbreaks with a known cause were due to pork or pork-containing foods.

National Veterinary Services Laboratory (NVSL) National Salmonella serotype Report July 2006- June 2007 was presented by Brenda R. Morningstar, Diagnostic Bacteriology Laboratory, NVSL-VS-APHIS-USDA. Details of this report are included in these proceedings.

Update from the National Poultry Improvement Plan (NPIP) was presented by Dr. C. Stephen Roney, NPIP-VS-APHIS-USDA.
REPORT OF THE COMMITTEE

Dr. Roney provided a historic look at Pullorum reactors in the NPIP from 1921 to today, as well as at the Pullorum/Typhoid NPIP from 1975 to 2007. Details of this report are included in these proceedings.

There was not a report from the Subcommittee on Salmonella Diagnostics, but Dr. Gingerich provided a brief update for the Subcommittee to monitor the Salmonella enteritidis (SE) Food and Drug Administration (FDA) Proposed standard. Basically the Subcommittee had been on hold after finishing its initial charge by former Chair Dr. David Castellan, and had been waiting for a declaration from FDA. Dr. Gingerich agreed to re-activate the Subcommittee to determine the status of the SE Layer Flock Program.

The Chair reported on the following topics that were discussed at the Committee on Program meeting, Saturday, October 20, 2007:

1. Conference calls with Executive Committee (EC);
2. USAHA recommendation and resolution process;
3. Value of Committee reports;
4. Dr. Breitmeyer will be the EC member liaison to the Committee;
5. Importance of year-round communication for Committees; and
6. USAHA developing policy on recording and videoing of meetings.

Committee activities and projects for the coming year should be:

1. Promote the availability and ease of use of fingerprinting strategies such as phage typing (S. typhimurium, S. enteritidis), pulse-field gel electrophoresis (PFGE), Multi Locus Sequence Typing (MLST), microarray, other that would facilitate (a.) the sharing of fingerprint data between agencies (USDA, FDA, CDC, state departments of health and state departments of agriculture), and (b.) microbial source tracking (MST) in order to detect the emergence and spread (in real time) of (new/reemerging) Salmonella strains or perhaps clones.
2. The Committee needs to develop a resolution
regarding the fingerprinting strategies for consideration at next year's Annual Meeting. Our plan of action may involve letter writing to various agencies' discussions with Dr. Paula Cray at NARMS and USDA VetNet, NVSL in order to determine the best course of action to promote re-funding for Veterinary Sentinel sites for detecting trends in antimicrobial resistance, to promote creation and funding for a Veterinary PulseNet (now termed USDA VetNet) as a counterpart to FoodNet/PulseNet.

a. Members were urged to have a look at Med-Vet-Net site and WHO Salm Surv web pages www.medvetnet.org/cms/ and www.who.int.salmsurv/en for examples of national reports that are routinely disseminated from Canada, the United Kingdom, and other countries. It was thought that the United States agencies at USDA and CDC need to provide for quicker reporting of *Salmonella* serotypes in some sort of web-based format to members of the U.S. *Salmonella* research, regulatory, other government constituencies.

3. The Committee identified a need to better assess *Salmonella* detection methods and fingerprint methodology by reviving and enlarging the scope of Subcommittee on Diagnostics; Donald Munroe from the University of Pennsylvania School of Veterinary Medicine was interested in assisting in this important effort. Plan a mini-symposium for next year (to be held during the general meeting) and seek help from the Executive Committee in the planning of this mini-symposium.

4. The Committee wants to consolidate and update the nation/states' SE activities. What is the status of the FDA layer flock program?; what is the current real time prevalence in flocks and human disease incidence? Dr. Gingerich from the University of Pennsylvania agreed to revive/activate the Subcommittee on FDA Proposed SE Rule and to start to gather information on the various state's SE plans, just in case the FDA's SE Layer Flock program is not implemented, i.e., what is plan “B” for the nation?
REPORT OF THE COMMITTEE

5. The Committee wants to review information and trends in antibiotic resistance, and in doing so promote the re-funding for Veterinary Sentinel sites for detecting trends in antimicrobial resistance (see point 1 above about a Resolution that needs to be brought forth). A comprehensive review of mechanisms of antimicrobial resistance that are being detected, e.g., *S. typhimurium*, versus *S. newport*, etc. This might be another topic for a mini-symposium, if not next year, then the meeting after that.

6. What is the status of the animal industries with alternatives to antimicrobial treatment, e.g., vaccination strategies and probiotics? This is a very important area of investigation in light of the fact that we are losing the battle with antimicrobial therapies. Might this be another mini symposium topic?

7. The Committee needs to revive our work on Best Management Practices (BMP), HACCP, the New York State Cattle Health Assurance Program (NYSCHAP)-like programs; have these strategies been compiled and validated? (see Dr. Scott Wells comments from last year’s meeting in which he stated that while we need BMP type practices as a means to prevent and control salmonellosis, they also need to be validated measures). Past USAHA *Salmonella* Subcommittees have attempted to compile these and promote both their development and use/dissemination.

8. There is real concern for veterinary clinics and hospitals with historical and ongoing MDR *Salmonella* infections, for a review of Infection Control (IC) Programs that may or may not be available for such premises, for frequent nosocomial infections and ensuing spread to the community and to non-source farms/flocks. It was thought that we should initiate collaborations with such groups as the Veterinary Infection Control Society (VIC-S, vics-l@colostate.edu), with the Association for Professionals in Infection Control and Epidemiology (APIC, www.apic.org/am/template.cfm?section=home), or the American College of Veterinary Internal Medicine (ACVIM, www.acvim.org/) to promote IC programs in clinics, hospitals, and veterinary clinics. Perhaps we should aim to write
a position paper on this very important topic, which often involves food-fiber type animals, horses, and on occasion companion animal patients in our private and university veterinary clinics/hospitals.

We also wanted to collate or create the resources to monitor and detect resistance that may be developing to antiseptics commonly used in veterinary facilities. Several members volunteered to share information on protocols to do such testing.

**SALMONELLA**
The Bacterial Epidemiology and Antimicrobial Resistance Research Unit is the animal arm of the National Antimicrobial Monitoring System (NARMS), while the Food and Drug Administration (FDA) works on food isolates, and the Centers for Disease Control and Prevention (CDC) works on human isolates. There are over 2500 serotypes of *Salmonella* and serotype is important when discussing resistance.

Since 1997 the animal arm of NARMS has tested over 52,000 isolates, all of which are stored at the Russel Research Center. These isolates come from a variety of sources including on-farm, diagnostic and slaughter/processing plants. For the purposes of this talk, the majority of isolates originate from slaughter/processing. Serotypes appear to vary overtime for reasons unknown. They also vary by source, particularly animal source and may be affected by host adaptation and/or environmental adaptations. Information on the top 5 serotypes recovered from human and animals since 2000 was provided (Table 1). Note that data for human isolates beyond 2004 is currently unavailable.

For the human serotypes it is interesting to note that the top 5 serotypes did not change over the years, they only changed in frequency of isolation. More variability is noted for the animal isolates, particularly the emergence of newport from 2001 to 2004 at which time it dropped out of the top 5 [but did remain in the top 10]. Note also that we differentiate between typhimurium and typhimurium 5- and believe there are important differences regarding acquisition of resistance between the two. Overall, regardless of serotype, approximately 50 percent of the isolates are pan-susceptible. In contrast, approximately 79 percent of human isolates are pan-susceptible.

We see important differences when we look at pan-susceptible levels by animal source. Isolates originating from swine and turkey are least susceptible, although in part, this is driven by serotype. With regard to multidrug resistance it was noted that resistance to 5 or more antimicrobials has been
declining over the last 2 years (Table 2). With regard to cattle isolates in 2006, S. newport, S. reading and S. dublin are the serotypes which exhibit more resistance than the others (Table 3). If we look at swine isolates we can see similar differences. We can also see differences within serotypes as shown by typhimurium 5 which has high levels of resistance (Table 4). If we look at chicken isolates, again there are differences. S. kentucky is the most often isolated serotype and is only moderately resistant. If we compare S. typhimurium to S. typhimurium 5- we can see some differences in resistance levels (Table 5a, 5b). Turkey isolates are also different from chicken isolates. S. hadar is the most often isolated serotype, while S. kentucky is rather rare. But we do see high levels of resistance in S. heidelberg, S. agona and S. st. paul.

Percentage of Salmonella resistant to nalidixic acid and/or with decreased susceptibility to ciprofloxacin, 1997-2006* (Slaughter isolates) differ from human versus animals; human data show a slight increase since 2002, conversely, a decrease among animal isolates has been observed.

From 1997 to 2006 isolates representing S. typhimurium DT104 were noted that 48 percent of the isolates are from swine while 43 are from cattle and dairy cattle. Among slaughter isolates of DT104, it is interesting to note that in 2005 more isolates were from the combination of the total chicken and swine, than from cattle, and in 2006, chicken is the primary source of isolates. Regardless, the overall number of DT104 isolates has been declining each year.

The majority of S. newport isolates are recovered from diagnostic sources. Since reaching a high of 9 percent in 2003, the percentage of newports per year has declined. In contrast, for available data, a similar decline has not been observed among human isolates (Table 6).

In conclusion, in general, multidrug resistance (MDR) appears to be declining, this includes S. newport; there is a lag observed in isolates from humans; many other serotypes have an MDR phenotype and the implications remain unknown. Can we predict what the next MDR serotype of clinical importance will be?
<table>
<thead>
<tr>
<th></th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Humans</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enteritidis</td>
<td>Typhimurium</td>
<td>Typhimurium</td>
<td>Typhimurium</td>
<td>Typhimurium</td>
<td>Typhimurium</td>
<td>ND</td>
<td>ND</td>
</tr>
<tr>
<td>Typhimurium</td>
<td>Enteritidis</td>
<td>Enteritidis</td>
<td>Enteritidis</td>
<td>Enteritidis</td>
<td>Enteritidis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Newport</td>
<td>Newport</td>
<td>Newport</td>
<td>Newport</td>
<td>Newport</td>
<td>Newport</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heidelberg</td>
<td>Heidelberg</td>
<td>Javiana</td>
<td>Heidelberg</td>
<td>Javiana</td>
<td>Javiana</td>
<td>Heidelberg</td>
<td></td>
</tr>
<tr>
<td>Javiana</td>
<td>Javiana</td>
<td>Heidelberg</td>
<td>Javiana</td>
<td>Heidelberg</td>
<td>Heidelberg</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Animals</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Typh 5- Montevideo</td>
<td>Heidelberg</td>
<td>Heidelberg</td>
<td>Kentucky</td>
<td>Kentucky</td>
<td>Kentucky</td>
<td>Kentucky</td>
<td>Kentucky</td>
</tr>
<tr>
<td>Typhimurium</td>
<td>Typh 5-</td>
<td>Newport</td>
<td>New 5-</td>
<td>Typhimurium</td>
<td>Typh 5-</td>
<td>Heidelberg</td>
<td>Heidelberg</td>
</tr>
<tr>
<td>Kentucky</td>
<td>Newport</td>
<td>Typh 5-</td>
<td>Heidelberg</td>
<td>Heidelberg</td>
<td>Typhimurium</td>
<td>Typh 5-</td>
<td>Enteritidis</td>
</tr>
<tr>
<td>Heidelberg</td>
<td>Typhimurium</td>
<td>Typhimurium</td>
<td>Typhimurium</td>
<td>Newport</td>
<td>Enteritidis</td>
<td>Typhimurium</td>
<td></td>
</tr>
<tr>
<td>Year</td>
<td>Animal Tot. Tested</td>
<td>Salmonella # Tested</td>
<td>Total # Pan Susc. (%)</td>
<td>Total # R = 1 (%)</td>
<td>Total # R &gt; 5 (%)</td>
<td>Total # R &gt; 10 (%)</td>
<td></td>
</tr>
<tr>
<td>------</td>
<td>-------------------</td>
<td>---------------------</td>
<td>----------------------</td>
<td>------------------</td>
<td>------------------</td>
<td>-------------------</td>
<td></td>
</tr>
<tr>
<td>1997</td>
<td>2391</td>
<td>65.8</td>
<td>9.4</td>
<td>0.8</td>
<td>11.1</td>
<td>0.8</td>
<td></td>
</tr>
<tr>
<td>1998</td>
<td>3318</td>
<td>51.9</td>
<td>8.1</td>
<td>2.0</td>
<td>17.9</td>
<td>1.3</td>
<td></td>
</tr>
<tr>
<td>1999</td>
<td>8508</td>
<td>55.7</td>
<td>8.8</td>
<td>1.3</td>
<td>14.8</td>
<td>5.5</td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td>7834</td>
<td>52.9</td>
<td>9.8</td>
<td>1.3</td>
<td>19.4</td>
<td>5.5</td>
<td></td>
</tr>
<tr>
<td>2001</td>
<td>5739</td>
<td>48.4</td>
<td>7.5</td>
<td>2.0</td>
<td>22.2</td>
<td>5.4</td>
<td></td>
</tr>
<tr>
<td>2002</td>
<td>6977</td>
<td>48.7</td>
<td>8.0</td>
<td>3.2</td>
<td>25.1</td>
<td>7.3</td>
<td></td>
</tr>
<tr>
<td>2003</td>
<td>5353</td>
<td>51.9</td>
<td>7.5</td>
<td>7.0</td>
<td>24.2</td>
<td>7.0</td>
<td></td>
</tr>
<tr>
<td>2004</td>
<td>4873</td>
<td>51.9</td>
<td>7.5</td>
<td>7.0</td>
<td>24.2</td>
<td>7.0</td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td>4412</td>
<td>50.6</td>
<td>12.4</td>
<td>2.8</td>
<td>18.6</td>
<td>3.6</td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td>4112</td>
<td>50.6</td>
<td>12.4</td>
<td>2.8</td>
<td>18.6</td>
<td>3.6</td>
<td></td>
</tr>
</tbody>
</table>
Table 3. Percent Resistance - Top Serotypes Cattle Isolates, Slaughter, 2006

<table>
<thead>
<tr>
<th></th>
<th>Montevideo N=63</th>
<th>Muenster N=38</th>
<th>Newport N=30</th>
<th>Cerro N=24</th>
<th>Anatum N=23</th>
<th>Reading N=21</th>
<th>Dublin N=19</th>
<th>Typh N=15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amox/Clav Acid</td>
<td>0.0</td>
<td>0.0</td>
<td>76.7</td>
<td>0.0</td>
<td>4.3</td>
<td>76.2</td>
<td>31.6</td>
<td>26.7</td>
</tr>
<tr>
<td>Ampicillin</td>
<td>0.0</td>
<td>0.0</td>
<td>80.0</td>
<td>0.0</td>
<td>4.3</td>
<td>81.0</td>
<td>57.9</td>
<td>53.3</td>
</tr>
<tr>
<td>Ceftriaxone</td>
<td>1.6</td>
<td>0.0</td>
<td>76.7</td>
<td>0.0</td>
<td>4.3</td>
<td>76.2</td>
<td>31.6</td>
<td>26.7</td>
</tr>
<tr>
<td>Chloramphenicol</td>
<td>0.0</td>
<td>0.0</td>
<td>66.7</td>
<td>0.0</td>
<td>4.3</td>
<td>76.2</td>
<td>57.9</td>
<td>53.3</td>
</tr>
<tr>
<td>Gentamicin</td>
<td>0.0</td>
<td>0.0</td>
<td>3.3</td>
<td>0.0</td>
<td>0.0</td>
<td>38.1</td>
<td>10.5</td>
<td>0.0</td>
</tr>
<tr>
<td>Kanamycin</td>
<td>0.0</td>
<td>0.0</td>
<td>13.3</td>
<td>0.0</td>
<td>0.0</td>
<td>42.9</td>
<td>47.4</td>
<td>6.7</td>
</tr>
<tr>
<td>Streptomycin</td>
<td>1.6</td>
<td>2.6</td>
<td>83.3</td>
<td>0.0</td>
<td>8.7</td>
<td>76.2</td>
<td>68.4</td>
<td>53.3</td>
</tr>
<tr>
<td>Sulfadoxazole</td>
<td>1.6</td>
<td>2.6</td>
<td>83.3</td>
<td>0.0</td>
<td>4.3</td>
<td>76.2</td>
<td>73.7</td>
<td>53.3</td>
</tr>
<tr>
<td>Tetracycline</td>
<td>4.8</td>
<td>2.6</td>
<td>83.3</td>
<td>4.2</td>
<td>26.1</td>
<td>100.0</td>
<td>68.4</td>
<td>53.3</td>
</tr>
</tbody>
</table>
Table 4. Percent Resistance - Top Serotypes Swine Isolates, Slaughter, 2006

<table>
<thead>
<tr>
<th></th>
<th>Derby N=56</th>
<th>Anatum N=33</th>
<th>Johannesburg N=29</th>
<th>Anatum var. 15+ N=28</th>
<th>Typh var. 5- N=21</th>
<th>Infantis N=16</th>
<th>Saintpaul N=16</th>
<th>Heidelberg N=13</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amox/Clav Acid</td>
<td>0.0</td>
<td>0.0</td>
<td>6.9</td>
<td>0.0</td>
<td>0.0</td>
<td>6.2</td>
<td>0.0</td>
<td>7.7</td>
</tr>
<tr>
<td>Ampicillin</td>
<td>1.8</td>
<td>0.0</td>
<td>10.3</td>
<td>0.0</td>
<td>81.0</td>
<td>6.2</td>
<td>6.2</td>
<td>7.7</td>
</tr>
<tr>
<td>Cefoxitin</td>
<td>0.0</td>
<td>0.0</td>
<td>6.9</td>
<td>0.0</td>
<td>0.0</td>
<td>6.2</td>
<td>0.0</td>
<td>7.7</td>
</tr>
<tr>
<td>Ceftiofur</td>
<td>0.0</td>
<td>0.0</td>
<td>6.9</td>
<td>0.0</td>
<td>0.0</td>
<td>6.2</td>
<td>0.0</td>
<td>7.7</td>
</tr>
<tr>
<td>Chloramphenicol</td>
<td>0.0</td>
<td>0.0</td>
<td>3.4</td>
<td>0.0</td>
<td>71.4</td>
<td>12.5</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Gentamicin</td>
<td>1.8</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>9.5</td>
<td>6.2</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Kanamycin</td>
<td>3.6</td>
<td>0.0</td>
<td>3.4</td>
<td>0.0</td>
<td>14.3</td>
<td>6.2</td>
<td>0.0</td>
<td>84.6</td>
</tr>
<tr>
<td>Streptomycin</td>
<td>55.4</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>66.7</td>
<td>12.5</td>
<td>0.0</td>
<td>69.2</td>
</tr>
<tr>
<td>Sulfizoxazole</td>
<td>48.2</td>
<td>0.0</td>
<td>3.4</td>
<td>3.6</td>
<td>95.2</td>
<td>18.8</td>
<td>6.2</td>
<td>0.0</td>
</tr>
<tr>
<td>Tetracycline</td>
<td>67.9</td>
<td>90.9</td>
<td>37.9</td>
<td>92.9</td>
<td>100.0</td>
<td>12.5</td>
<td>6.2</td>
<td>92.3</td>
</tr>
</tbody>
</table>
# Table 5a. Percent Resistance - Top Serotypes Chicken Isolates, Slaughter, 2006

<table>
<thead>
<tr>
<th></th>
<th>Kentucky N=674</th>
<th>Enteritidis N=188</th>
<th>Heidelberg N=164</th>
<th>Typh var 5- N=62</th>
<th>4,[5],12,:i:- N=62</th>
<th>Typh N=56</th>
<th>Montevideo N=21</th>
<th>Schwarzengrund N=18</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Amox/Clav Acid</strong></td>
<td>15.4 0.0</td>
<td>15.9</td>
<td>33.9</td>
<td>8.9</td>
<td>25.6 0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td><strong>Ampicillin</strong></td>
<td>16.2 1.6</td>
<td>16.5</td>
<td>50.0</td>
<td>10.7</td>
<td>32.6 0.0</td>
<td>0.0</td>
<td>5.6</td>
<td>0.0</td>
</tr>
<tr>
<td><strong>Cefoxitin</strong></td>
<td>15.1 0.0</td>
<td>15.2</td>
<td>33.9</td>
<td>8.9</td>
<td>23.3 4.8</td>
<td>4.8</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td><strong>Ceftiofur</strong></td>
<td>15.3 0.0</td>
<td>15.9</td>
<td>33.9</td>
<td>8.9</td>
<td>25.6 0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td><strong>Chloramphenicol</strong></td>
<td>1.8 0.0</td>
<td>2.4</td>
<td>9.7</td>
<td>4.7</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td><strong>Gentamicin</strong></td>
<td>5.5 0.0</td>
<td>9.8</td>
<td>4.8</td>
<td>16.1</td>
<td>9.3 9.5</td>
<td>9.5</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td><strong>Kanamycin</strong></td>
<td>2.1 0.0</td>
<td>7.3</td>
<td>16.1</td>
<td>0.0</td>
<td>20.9 4.8</td>
<td>4.8</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td><strong>Streptomycin</strong></td>
<td>34.9 0.0</td>
<td>10.4</td>
<td>21.0</td>
<td>8.9</td>
<td>11.6 9.5</td>
<td>9.5</td>
<td>11.1</td>
<td>0.0</td>
</tr>
<tr>
<td><strong>Sulfizoxazole</strong></td>
<td>6.2 0.0</td>
<td>7.9</td>
<td>71.0</td>
<td>17.9</td>
<td>58.1 14.3</td>
<td>14.3</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td><strong>Tetracycline</strong></td>
<td>47.2 1.6</td>
<td>12.2</td>
<td>66.1</td>
<td>3.6</td>
<td>53.5 9.5</td>
<td>9.5</td>
<td>11.1</td>
<td>0.0</td>
</tr>
</tbody>
</table>
## Table 5b. Percent Resistance- Top Serotypes Chicken Isolates, Slaughter, 2006

<table>
<thead>
<tr>
<th></th>
<th>Hadar N=98</th>
<th>Heidelberg N=43</th>
<th>Saintpaul N=18</th>
<th>Schwarzen- grund N=15</th>
<th>Reading N=14</th>
<th>Agona N=13</th>
<th>Senften- berg N=12</th>
<th>Kentucky N=8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amox/Clav Acid</td>
<td>2.0</td>
<td>9.3</td>
<td>5.6</td>
<td>6.7</td>
<td>0.0</td>
<td>38.5</td>
<td>8.3</td>
<td>0.0</td>
</tr>
<tr>
<td>Ampicillin</td>
<td>19.4</td>
<td>37.2</td>
<td>55.6</td>
<td>6.7</td>
<td>21.4</td>
<td>38.5</td>
<td>25.0</td>
<td>12.5</td>
</tr>
<tr>
<td>Cefoxitin</td>
<td>1.0</td>
<td>9.3</td>
<td>5.6</td>
<td>6.7</td>
<td>0.0</td>
<td>38.5</td>
<td>8.3</td>
<td>0.0</td>
</tr>
<tr>
<td>Ceftiofur</td>
<td>1.0</td>
<td>9.3</td>
<td>5.6</td>
<td>6.7</td>
<td>0.0</td>
<td>38.5</td>
<td>8.3</td>
<td>0.0</td>
</tr>
<tr>
<td>Chloramphenicol</td>
<td>1.0</td>
<td>4.7</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>23.1</td>
<td>8.3</td>
<td>0.0</td>
</tr>
<tr>
<td>Gentamicin</td>
<td>12.2</td>
<td>32.6</td>
<td>27.8</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>25.0</td>
<td>37.5</td>
</tr>
<tr>
<td>Kanamycin</td>
<td>2.0</td>
<td>27.9</td>
<td>27.8</td>
<td>0.0</td>
<td>0.0</td>
<td>7.7</td>
<td>0.0</td>
<td>12.5</td>
</tr>
<tr>
<td>Streptomycin</td>
<td>40.8</td>
<td>34.9</td>
<td>38.9</td>
<td>6.7</td>
<td>7.1</td>
<td>23.1</td>
<td>16.7</td>
<td>25.0</td>
</tr>
<tr>
<td>Sulfizoxazole</td>
<td>15.3</td>
<td>30.2</td>
<td>61.1</td>
<td>6.7</td>
<td>7.1</td>
<td>61.5</td>
<td>8.3</td>
<td>87.5</td>
</tr>
<tr>
<td>Tetracycline</td>
<td>89.8</td>
<td>62.8</td>
<td>55.6</td>
<td>20.0</td>
<td>21.4</td>
<td>84.6</td>
<td>8.3</td>
<td>87.5</td>
</tr>
</tbody>
</table>
Table 6. Animal versus Human *Salmonella newport* 1997-2006

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ANIMAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total No.</td>
<td>18</td>
<td>42</td>
<td>134</td>
<td>282</td>
<td>455</td>
<td>574</td>
<td>483</td>
<td>299</td>
<td>161</td>
<td>109</td>
</tr>
<tr>
<td>of Newport</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total No.</td>
<td>2391</td>
<td>3318</td>
<td>8508</td>
<td>7834</td>
<td>5739</td>
<td>6977</td>
<td>5353</td>
<td>4873</td>
<td>4412</td>
<td>3110</td>
</tr>
<tr>
<td>of Salmonella</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Newport for</td>
<td>0.8/</td>
<td>1.3/</td>
<td>1.6/</td>
<td>3.6/</td>
<td>7.9/</td>
<td>8.2/</td>
<td>9.0/</td>
<td>6.1/</td>
<td>3.6/</td>
<td>3.5/</td>
</tr>
<tr>
<td>year/AmpC</td>
<td>0</td>
<td>5</td>
<td>27</td>
<td>190</td>
<td>309</td>
<td>393</td>
<td>287</td>
<td>200</td>
<td>98</td>
<td>56</td>
</tr>
<tr>
<td><strong>HUMAN</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total No.</td>
<td>46</td>
<td>77</td>
<td>99</td>
<td>121</td>
<td>124</td>
<td>239</td>
<td>221</td>
<td>190</td>
<td>ND</td>
<td>ND</td>
</tr>
<tr>
<td>of Newport</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total No.</td>
<td>1301</td>
<td>1460</td>
<td>1498</td>
<td>1377</td>
<td>1419</td>
<td>2008</td>
<td>1865</td>
<td>1793</td>
<td>ND</td>
<td>ND</td>
</tr>
<tr>
<td>of Salmonella</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Newport for</td>
<td>3.5/</td>
<td>5.3</td>
<td>6.6/</td>
<td>8.8/</td>
<td>8.7/</td>
<td>11.9/</td>
<td>11.9/</td>
<td>10.6/</td>
<td>ND</td>
<td>ND</td>
</tr>
<tr>
<td>year/AmpC</td>
<td>0</td>
<td>1</td>
<td>18</td>
<td>27</td>
<td>31</td>
<td>53</td>
<td>46</td>
<td>28</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
MULTI-DRUG RESISTANT SALMONELLA DUBLIN IN NEW YORK STATE CATTLE POPULATIONS

Belinda Thompson
College of Veterinary Medicine, Cornell University

www.diaglab.vet.cornell.edu/pdf/Salmonella dublin.pdf
Animal Health Advisory

Multi-drug Resistant _Salmonella dublin_ in Cattle

The Animal Health Diagnostic Center at Cornell University has isolated _Salmonella dublin_ (Group D) from diagnostic samples submitted from multiple animals of four different cattle premises in either New York or Pennsylvania in the last two months. They have all shown the same antimicrobial susceptibility profile, being resistant to most antibiotics.

The United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), National Veterinary Services Laboratories (NVSL), Ames, Iowa have confirmed that there have been over 287 cases of _S. dublin_ disease reported in the United States from September of 2005 until September of 2006. Of those, 39 occurred in cattle in Ohio, New York, and Pennsylvania. It is unknown how and when multi-drug resistant _Salmonella dublin_ strains emerged in the northeastern bovine industry, or how widespread they are. Selective pressure applied through non-therapeutic use of antibiotics is one factor suggested for the emergence of resistance in bacteria. Resistance attributes may also be shared between bacteria. At this point, the recent positive isolations at this laboratory have all been from sick calves with a clinical history of pneumonia. The age range of clinical illnesses reported with sample submissions has been from seven days of age to about four months of age, in dairy or veal calves.

It is advised that cattle operations take steps to prevent the introduction and transmission of _Salmonella dublin_ and other enteric pathogens. Illness associated with _Salmonella dublin_ can be difficult to treat, may be fatal, and the environment, once contaminated, may be difficult to clean up. People, other livestock and companion animal species are also susceptible to infection and could suffer serious illness. Carrier animals can maintain the infection within a herd and may continue to shed organisms contributing to repeat exposure of healthy and sick animals.
Cattle owners and caretakers should be especially alert to cattle illnesses involving fever, diarrhea, abortions, and respiratory signs (especially in calves) including coughing and labored breathing. While pneumonia is not considered to be an unusual illness in cattle populations, all pneumonia associated with a high incidence or mortality rate should be investigated promptly by a veterinarian. Blood cultures, nasal swabs, transtracheal washes, fecal cultures and other samples from sick animals can be submitted to the Animal Health Diagnostic Center at Cornell for Salmonella diagnostic testing and other infectious diseases.

Finally, Salmonella spp. have the potential to infect people and can cause illness and death. Notify a physician or the local Health Department if any animal caretakers show signs of serious illness, such as fever, delirium, vomiting, diarrhea with or without blood, and abdominal cramping. Individuals with weakened or suppressed immune systems, pregnant women, and the very young and very old are most susceptible to infection and illness with Salmonella spp. Consumption of raw milk is a high risk practice, especially from herds experiencing a suspected or confirmed outbreak of Salmonella.

The Animal Health Diagnostic Center at Cornell’s College of Veterinary Medicine is currently monitoring New York Salmonella dublin outbreaks. Veterinarians may consult with our microbiology and extension staff for diagnostic and surveillance advice. Physicians involved with bovine-associated human cases of salmonellosis are also encouraged to speak with our bacteriologists.

Background Information

Salmonellosis is generally a disorder of the gastrointestinal tract. Salmonella dublin however, is a cattle host-adapted strain that usually presents as a respiratory illness, primarily in young stock less than 2 months of age (range 1 week to 6 months), although any age animal can be infected. Alternate clinical presentations include septicemia, abortions in pregnant mature cows, and/or diarrhea, especially terminally. As a host-adapted strain, infected, subclinical carriers are important in maintaining infection in a herd with shedding into feces and milk. Some animals may remain lifetime carriers of this infection. Stress resulting from overcrowding, poor air quality, co infections with other pathogens, poor hygiene, transportation, or dietary
inadequacies can result in clinical signs in infected carrier animals or recrudescence of shedding in latently infected animals. Recent introduction of *Salmonella dublin* into a population with no prior exposure might, under the right conditions, result in an explosive outbreak. In the face of an outbreak of *Salmonella dublin* infection, exceptional calf management procedures must be instituted. These practices include maintaining clean maternity pens, prompt removal of calves from dams, fastidious colostrum management, milk and feed utensil sanitation, promotion of good air quality, and reduction of stress by providing clean, comfortable housing and proper nutrition. Feeding of raw milk should be avoided. Outbreaks of clinical illness in calves, in herds where the infection is apparently endemic, are reported to occur when there are breakdowns in management. Adult cattle susceptibility to clinical salmonellosis may be reduced by maximizing health and immune status. Excellent nutrition and management, especially surrounding the dry cow/fresh cow transition period, are essential to minimize the occurrence of all periparturient health problems.

Disinfection and other biosecurity practices must be utilized in order to prevent the introduction or the spread of this disease. Isolation of all introduced cattle, whether newly purchased or returning to the farm from other premises, allows for the detection of clinical illness prior to commingling with other cattle. In addition, co-mingling into a limited group may detect illness in the newly exposed animals if there is a carrier in the new arrivals, but may also limit the magnitude of spread on the farm. Cattle trailers should be thoroughly cleaned, disinfected and re-bedded prior to transport of healthy animals from different herds. Avoid contact with manure when visiting other facilities, and do not wear the same clothing and shoes while visiting other facilities that you wear when caring for animals at your home facility. More information regarding salmonellosis and best management practices are outlined in the New York State Cattle Health Assurance Program (NYSCHAP), a program designed to promote herd health, care, and welfare. For more information regarding this program see the contact information listed at the end of this article.

Environmental cleanup involves the removal of all organic material (bedding, contaminated feed, manure), complete washing down of all surfaces including feed troughs, water buckets/tanks, and equipment with water and a detergent cleaner to remove remaining organic residues, and the application of an appropriate
disinfectant for the proper contact time. Disinfectants used to combat *Salmonella* include halogens like dilute chlorine bleach, phenols, quaternary ammonium compounds, and oxidizing agents like Virkon-S. Scrapers, brooms, shovels and manure forks can spread the organism from contaminated areas to previously uncontaminated ones. Cleaned areas should be dried quickly by using fans and exposing the area to sunlight. Pressure washers should be avoided, unless all animals have been removed and the operator wears OSHA-approved respirator protection, as *Salmonella* organisms can be aerosolized and transmitted in this manner. Environmental sampling may be employed to determine the effectiveness of cleaning a contaminated environment.

Few well designed vaccine studies have been published evaluating *Salmonella* vaccines in adult cattle or calves. Published studies involving vaccines on the market in the United States are equivocal. Some inactivated *Salmonella dublin* vaccines are available, as well as a newer vaccine which uses a technology that involves the incorporation of purified *Salmonella newport* siderophore receptor and porin proteins. Clinical and field trials have not been performed to evaluate the efficacy of protection in commercial cattle herds with endemic infection or recent introduction of *Salmonella dublin*.

For further information about the (NYSCHAP) administered by the New York State Department of Agriculture and Markets/Division of Animal Industry, visit the website: http://nyschap.vet.cornell.edu/ or contact program coordinator Kathy Finnerty: KDF2@CORNELL.EDU or 607-253-3910.
Concerning *Salmonella* nomenclature and standardization, we changed our nomenclature so it is in agreement with World Health Organization and the Centers for Disease Control and Prevention. Subspecies I *Salmonella* will be the only named serotypes. Other subspecies are reported with the antigenic formula preceded by the subspecies designation. We are not using the IIIa or IIIb designation for subspecies III- rather we are reporting all with just a III. The Group E2 and E3 isolates are now all reported by the E1 name followed by variant 15+ or 15+, 34+. You will note a difference between the number of listed isolates. National Veterinary Services Laboratory (NVSL) received 1157 isolates that had clinical roles that were left blank, and were therefore not included in the presented data. Submitting laboratories are urged to provide this information when submitting isolates in the future. Laboratories submitted 18,246 isolates, which resulted in 253 serotypes from 42 States and the District of Columbia. The 10 most common serotyped accounted for 54 percent of the total, and there were, 10114 monitor isolates (62 percent), and 6975 clinical isolates (38 percent). The 5 most frequent serotypes isolated at the NVSL from monitor and clinical cases are: *typhimurium*, *kentucky*, *heidelberg*, *enteritidis*, and *senftenberg*. The top 5 serotypes were broken down into clinical versus monitor cases (Table 1). Also, the numbers of isolates from different species (monitor isolates versus clinical) were described; the majority of isolates from chickens and turkeys are monitor samples, while the majority of those from cattle, swine, and horses are of clinical origin. The 3 most common serotypes over the last 5 years were *S. typhimurium*, *S. heidelberg*, and *S. kentucky*; *S. kentucky* was identified more times this year than in the past decade. It should be noted that although *S. typhimurium* is still the most common serotype isolated, the serotypes in the top ten group make up for 54 percent of all isolated this year, a decrease of approximately 7 percent from last year. The majority of *S. newport* are isolated from cattle and horses. For the past few years, we had been reporting the increase in *S. typhimurium* var. Copenhagen isolates in relation
to those identified as *S. typhimurium*. This year 48 percent were *S. typhimurium*, compared to 43 percent last year, and an overall decrease in Typhimurium was noted. An untypable *Salmonella* that has increased both in numbers and significance, is 4,5,12:i: monophasic; this is probably a Typhimurium, however, NVSL will continue to report out only the phases that we are able to obtain.

The most common serotypes for chickens, turkeys, cattle, swine, horses, dog/cats are listed in the appendix. *Salmonella enteritidis* Phage Typing of 520 isolates resulted in the detection of 13 phage types, Phage type 8 most common (55 percent), and Phage type 13 (25 percent). *S. typhimurium* Phage Typing results were 124 isolates were phage typed, 25 phage types were identified, with DT104 (46 percent), U302 (11 percent), and Untypable (10 percent), that is there was no lysis by any of the 35 phages tested.

### TABLE 1

#### Most Common Serotypes

<table>
<thead>
<tr>
<th>Clinical</th>
<th>Monitor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typhimurium</td>
<td>Kentucky</td>
</tr>
<tr>
<td>Newport</td>
<td>Heidelberg</td>
</tr>
<tr>
<td>Dublin</td>
<td>Typhimurium</td>
</tr>
<tr>
<td>Agona</td>
<td>Enteritidis</td>
</tr>
<tr>
<td>Derby</td>
<td>Senftenberg</td>
</tr>
</tbody>
</table>

#### Most Common Serotypes Chickens

<table>
<thead>
<tr>
<th>Clinical</th>
<th>Monitor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enteritidis</td>
<td>Kentucky</td>
</tr>
<tr>
<td>Kentucky</td>
<td>Heidelberg</td>
</tr>
<tr>
<td>Typhimurium</td>
<td>Enteritidis</td>
</tr>
<tr>
<td>Heidelberg</td>
<td>Senftenberg</td>
</tr>
<tr>
<td>Senftenberg</td>
<td>Typhimurium</td>
</tr>
</tbody>
</table>

#### Most Common Serotypes Turkeys

<table>
<thead>
<tr>
<th>Clinical</th>
<th>Monitor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senftenberg</td>
<td>Hadar</td>
</tr>
<tr>
<td>Anatum</td>
<td>Schwarzengrund</td>
</tr>
<tr>
<td>Hadar</td>
<td>London</td>
</tr>
<tr>
<td>Montevideo</td>
<td>Heidelberg</td>
</tr>
<tr>
<td>Agona</td>
<td>Saintpaul</td>
</tr>
</tbody>
</table>
# SALMONELLA

## Most Common Serotypes Cattle

<table>
<thead>
<tr>
<th>Clinical</th>
<th>Monitor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typhimurium</td>
<td>Anatum</td>
</tr>
<tr>
<td>Dublin</td>
<td>Kentucky</td>
</tr>
<tr>
<td>Newport</td>
<td>Senftenberg</td>
</tr>
<tr>
<td>Cerro</td>
<td>Cerro</td>
</tr>
<tr>
<td>Montevideo</td>
<td>Orion var 15+34+</td>
</tr>
</tbody>
</table>

## Most Common Serotypes Swine

<table>
<thead>
<tr>
<th>Clinical</th>
<th>Monitor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typhimurium</td>
<td>Typhimurium</td>
</tr>
<tr>
<td>Derby</td>
<td>Derby</td>
</tr>
<tr>
<td>Choleraesuis (kunzendorf)</td>
<td>Agona</td>
</tr>
<tr>
<td>Heidelberg</td>
<td>Anatum</td>
</tr>
<tr>
<td>Agona</td>
<td>Johannesburg/Worthington</td>
</tr>
</tbody>
</table>

## Most Common Serotypes Horses

<table>
<thead>
<tr>
<th>Clinical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typhimurium</td>
</tr>
<tr>
<td>Newport</td>
</tr>
<tr>
<td>Javiana</td>
</tr>
<tr>
<td>Anatum</td>
</tr>
<tr>
<td>4,5,12:i:-</td>
</tr>
</tbody>
</table>

## Most Common Serotypes Dog/Cat

All sources

<table>
<thead>
<tr>
<th>Clinical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newport</td>
</tr>
<tr>
<td>Typhimurium</td>
</tr>
<tr>
<td>Montevideo</td>
</tr>
<tr>
<td>Enteriditis</td>
</tr>
</tbody>
</table>
REPORT OF THE COMMITTEE

UPDATE FROM THE NATIONAL POULTRY IMPROVEMENT PLAN (NPIP)

C. Stephen Roney
Andrew R. Rhorer
National Poultry Improvement Plan

The *Salmonella pullorum* and *Salmonella gallinarum* eradication program began in 1935; there has been no isolation of *Salmonella gallinarum* in the United States since 1987, and no isolation of *Salmonella pullorum* in 2006 and 2007 in backyard poultry in the US. *Salmonella enteritidis* isolations in Egg-Type chickens were outlined for the time period 1989-2007 and have shown a decline in prevalence with 4 reports of positive flocks in 2007. *Salmonella enteritidis* positive Egg-Type Breeding Flocks for the time period 1990-2007 were presented by state location. Also, the *S. enteritidis* Phage types were detailed from Egg-Type Breeding Positive Flocks for 1990-2006 with the most common types being 8, 13, 13A, and 28. The same lists were provided for Phage types from Egg-Type chickens with the most common types 8, 13, 13A, Untypable, and 28.

*Salmonella* related services provided through NPIP include an Annual Hands-on *Salmonella* Isolation and Identification Workshop for authorized laboratories sponsored by the Georgia Poultry Improvement Association (1994-2007), a series of three videos sponsored by the U.S. Poultry and Egg Assoc on *Salmonella*: Isolation and Identification, Sampling and Collection, and Serology. The National Veterinary Services Laboratories (NVSL) issues a group D *Salmonella* check test annually for authorized laboratories of the NPIP. NVSL issues a avian influenza check test for the Agar Gel Immunodiffusion Test annually for the authorized laboratories of the NPIP.

Participating Breeding flocks and birds in NPIP (Table 1) include Egg-Type Chickens (225 flocks with 3,906,189 birds), Meat-Type Chickens (5928 flocks with 93,334,497 birds), Turkeys (559 flocks with 4,817,104 birds), Waterfowl, Exhibition Poultry and Game Birds (3,631 Flocks with 1,470,287 birds). Moreover, 49 Official State Agencies and 135 Authorized Laboratories participate under the Provisions found in the Code of Federal Regulations 9CFR 145, 9 CFR 146,
The General Conference Committee of NPIP is composed of the Secretary of Agriculture’s Official Advisory Committee on Poultry Health-Steering Committee. There are participating Egg and Meat Type Hatcheries (284), Turkey Hatcheries (50), and Waterfowl, Exhibition Poultry and Game Birds Hatcheries (784).

### Table 1

**Hatchery Participation in the National Poultry Improvement Plan Testing Year 2006**

<table>
<thead>
<tr>
<th>Category</th>
<th>Count</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Egg and meat-type chickens participating</td>
<td>283</td>
<td>689,974,826</td>
</tr>
<tr>
<td>Turkeys participating</td>
<td>49</td>
<td>33,285,723</td>
</tr>
<tr>
<td>Waterfowl, exhibition poultry, and game</td>
<td>721</td>
<td>26,321,162</td>
</tr>
<tr>
<td>birds participating</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
REPORT OF THE COMMITTEE ON SCRAPIE

Chair: Jim R. Logan, Cheyenne, WY
Vice Chair: Charles Palmer, Redding, CA

Deborah L. Brennan, MS; Shane A. Brookshire, GA; Beth W. Carlson, ND; John R. Clifford, DC; Thomas F. Conner, OH; Walter E. Cook, WY; Linda A. Detwiler, NJ; Anita J. Edmondson, CA; Dee Ellis, TX; Keith R. Forbes, NV; Michael J. Gilsdorf, DC; Craig T. Hanson, SD; William L. Hartmann, MN; Carolyn Inch, CAN; Susan J. Keller, ND; James W. Leafstedt, SD; Thomas F. Linfield, WY; Mary J. Lis, CT; Michael R. Marshall, UT; Cheryl A. Miller, In; Brian V. Noland, CO; Edwin M. Odor, DE; Kristine R. Petrini, MN; Jewell G. Plumley, WV; Michael R. Pruitt, OK; Nancy J. Roberts, OK; Paul E. Rodgers, CO; Joe D. Ross, TX; Ben Smith, WA; Diane L. Sutton, MD; Lynn Anne Tesar, SD; Delwin D. Wilmot, NE; Nora E. Wineland, CO; Cindy B. Wolf, MN.

The Committee met on October 3, 2007, from 1:30 until 5:30 p.m. at John Ascuaga’s Nugget Hotel, Reno, Nevada. The meeting was called to order by Jim Logan, Chair, with Vice Chair Chuck Palmer attending. There were 57 people in attendance, including 19 Committee members. Committee members were welcomed and each introduced themselves.

Diane Sutton, Veterinary Services (VS), Animal and Plant Health Inspection Service, Veterinary Services (APHIS), United States Department of Agriculture (USDA) presented the general Scrapie Program Update, including Nor98-like Scrapie. This report in its entirety is included in these proceedings.

Drs. Diane Norden, Center for Epidemiology and Animal Health (CEAH), VS-APHIS-USDA and Chuck Gaiser, VS-APHIS-USDA, presented the Epidemiology Update. This information is included in full at the end of this report.

A report entitled The Rectal Biopsy as a Diagnostic Aid for Scrapie was given by Marie Bulgin, Caine Veterinary Teaching Center. It is summarized as follows: The scrapie prion usually accumulates in lymphoid tissue (the nictitating membrane) prior to accumulating in brain tissue and prior to the onset of clinical signs. Third eyelid biopsies using scrapie specific immunohistochemistry
(IHC) stain have been validated as a live animal test for scrapie. Specificity of this test is excellent, but sensitivity is poor.

A viable alternative to the third eyelid biopsy is biopsy of rectal lymphoid tissue. This test is relatively simple (sample collection), and apparently relatively painless to the animal. Two hundred ten (210) animals from a naturally infected experimental flock were tested finding 83 positive animals.

The rectal lymphoid biopsy test appears to be slightly superior to the 3rd eyelid biopsy. Utilization of both rectal and 3rd eyelid biopsy sites (as opposed to only the rectal biopsy) increased the number of positive diagnoses by 28 percent. Lack of adequate lymphoid follicles is a limiting factor for both sampling methods, and lymphatic tissue availability appears to decrease as an animal ages.”

Bruce Thomsen, VS-APHIS-USDA, presented Evaluation of Ovine Rectal Biopsy Tissue for use in the IHC Prion Protein Test Protocol. Preliminary results of this presentation is as follows: This study was designed to evaluate the feasibility of a new live animal scrapie test using rectal mucosal biopsies collected under field conditions and tested by IHC. The rectal biopsy test results were compared to a gold standard IHC test results from obex, lymph node and tonsil in parallel and to the existing live animal test biopsy of the third eyelid. Additional objectives in the study included determining the biopsy site complication rate, optimal biopsy site location, how much lymphoid tissue is required for an appropriate sample, and other minor objectives. The study began in November 2006 and will conclude November 2007. Animals selected for this study were at high risk for having scrapie and most frequently came from infected or exposed flocks. Rectal and third eyelid biopsies were sampled live and post-mortem, with a total of 13 different tissue samples collected from each animal. Seventy-seven percent of the sheep had at least one rectal biopsy collected ante-mortem. There have been 729 sheep, from 103 flocks, in 22 different states, enrolled in the study thus far. One hundred ten of the sheep have been scrapie positive. The test sensitivity (95% CI) of biopsies by site location, as compared to the gold standard of obex, lymph node and tonsil test results in parallel, are: rectal biopsy from the right ventral rectum 0.87 (0.79, 0.94), rectal biopsy from the left ventral rectum 0.85 (0.77, 0.92), left and right third eyelid biopsies in parallel 0.82 (0.73, 0.92). There were no statistically significant differences in test sensitivity between a single rectal biopsy sample and both left and right third eyelid samples combined. Samples with inadequate lymphoid
REPORT OF THE COMMITTEE

tissue varied by biopsy site, ranging from 15 percent to 32 percent for the three rectal biopsy sites and 25 percent to 48 percent for the two eyelid biopsy samples.

Katherine Marshall, VS-APHIS-USDA, presented the Goat Scrapie Prevalence Study (CSPS) Update. It is summarized as follows: The CSPS study began in May 2007, and will continue into early 2008 with the goal of sampling 3000 goats. The objective of this study is to determine whether the prevalence of scrapie in goats is <.1 percent. Goats slaughtered in plants targeted for sampling are randomly selected regardless of whether they are clinical or tagged (unlike those sampled as part of the Regulatory Scrapie Slaughter Surveillance). To date, 1938 goats between the ages of 2-5 have been sampled at state, federal and custom slaughter plants in the United States. All have been negative.

Drs. Emi Saito and Alecia Naugle, VS-APHIS-USDA, presented the Scrapie Surveillance Plan Update. Currently, efforts are underway to enhance the nationwide scrapie surveillance system and integrate it with the overall VS surveillance plan. The National Surveillance Unit (NSU), State and VS national, regional, and field staff are collaborating to develop a comprehensive, written scrapie surveillance plan. This presentation highlighted recent enhancements to scrapie surveillance which includes revisions to the sampling criteria for ongoing Regulatory Scrapie Slaughter Surveillance (RSSS), efforts to expand RSSS to additional collection sites, and the initiation of a prevalence study in the U.S. goat population. Additionally, the approach to developing and the factors influencing the comprehensive scrapie surveillance plan were discussed.

Katherine O’Rourke, Agricultural Research Services (ARS), USDA, presented an ARS research update. The report from ARS, Animal Disease Research Unit (ADRU) Pullman is summarized as follows: ADRU reported on their research on the minor scrapie forms, in particular Nor98 in sheep and classical scrapie in goats. Nor98 affects sheep of all genotypes; the etiology and transmissibility of Nor98 is unknown. Experimental infection of sheep highly resistant to classical scrapie (RR171) with a brain homogenate from an RR171 sheep with Nor98 is underway; blood, peripheral lymphoid tissues, and placenta will
SCRAPIE

be monitored to determine whether an infectious agent is present outside the central nervous system. Sheep with the 141FL genotype appear to be especially predisposed to Nor98. ADRU would like to acquire aged 141FL sheep from flocks without classical scrapie but that work will depend on clarification of the regulatory status of Nor98 sheep. Experimental and natural scrapie in goats is being addressed through assay of blood, placenta, and peripheral nodes to gather data on incubation time, optimal age for diagnosis, and role of prion genotype. The 2 goat genotypes reported to be associated with low susceptibility in European studies are of particular interest. The scrapie-free goat herd maintained at Washington State University will be diversified to include dairy and meat goats of those genotypes to produce kids for experimental studies. ADRU will request live goats exposed to sheep or goat scrapie for DNA analysis, live animal testing, and incubation time determination. In addition, ADRU will request tissues from goats collected in regulatory and slaughter surveillance and DNA from goats sampled in the upcoming goat NAHMS study. Requests for DNA from healthy herds will be made to the various dairy and meat goat industry groups.

Linda Detwiler, presented information on new scrapie research, titled Scrapie: An Update on the Science. Information regarding scrapie has increased significantly over the years. While additional knowledge is always helpful, many of the new findings have actually increased the number of questions about the disease.

It is well documented that the agent which causes classical scrapie is shed via the placenta. New research has confirmed the finding of PrP\textsuperscript{sc} in salivary gland and kidneys. Limited research has not definitively identified infectivity or PrP\textsuperscript{sc} in saliva or urine of sheep with scrapie. Yet we should ask ourselves why shedding couldn’t occur through these types of secretions and excretions given the distribution of the agent. In late 2006, Foster and colleagues published a paper which demonstrated lateral transmission of scrapie in an infected flock devoid of lambing. A case control study done in France, found that the feeding of concentrates and certain milk replacers to be strongly correlated with the occurrence of scrapie. Additionally there have been recent papers re-examining and re-enforcing the lengthy persistence of the agent in the environment. These current studies should be
taken into consideration when developing or adjusting policies for the control of classical scrapie.

Genetics have been a powerful tool in reducing the level of scrapie in the US. There is emerging information that indicates no genotype is completely resistant to scrapie. Scientists in Germany have reported two confirmed cases of classical scrapie in ARR/ARR sheep. In addition, numerous cases of atypical scrapie have been identified in European sheep heterozygous or homozygous for ARR.

Nor98, which is classified as an atypical form of scrapie, was first identified in 1998 and published in 2003. Since this time, over 500 cases of atypical scrapie have been identified in many countries of Europe. There have been a few additional cases detected in the Falkland Islands and the United States. Over the last three years more cases are being detected in Europe but this does not necessarily indicate that the disease is increasing. Diagnostic techniques have improved, surveillance rates have increased and a specific classification scheme has been developed.

In Europe, atypical scrapie has primarily been found in sheep presented for normal slaughter and those classified as fallen stock. Clinical signs are described as progressive ataxia, behavioral changes, and tremor. It appears that these sheep do not demonstrate pruritis. Lesions and deposition of PrP\textsuperscript{Sc} are absent or limited in the brainstem. Cerebellum and cerebrum seem to be the primary target areas however it must be pointed out that there is variation between these locations. To date, atypical scrapie has been shown to be transmissible but only by experimental routes. There is ongoing research to examine the possibility of lateral transmission. At present most flocks infected with atypical scrapie have had only a single case. A limited number of countries have reported a few flocks with two to three cases. This has lead to speculation that atypical scrapie may be a spontaneous disease.

The detection of atypical scrapie is a recent occurrence. Data about the disease is extremely limited. Research needs to be done to determine the origin, agent distribution in the sheep, modes of natural transmission (if any), and susceptibility of other species, etc.

Penny Greenwood, Canadian Food Inspection Agency (CFIA), presented the Canadian Scrapie Eradication Program
SCRAPIE

Report. It is included, in its entirety in these proceedings at the end of this Committee Report.

The business portion of the meeting consisted primarily of discussion of the scrapie uniform methods and rules (UM&R). No action was taken.

This committee also considered 5 Resolutions. Four Resolutions were approved by the Committee and forwarded to the Committee on Nominations and Resolutions.
In Fiscal Year 2007 the Scrapie Eradication Program focused on: (1) cleaning up infected and source flocks utilizing a genetic based approach; (2) tracing and testing exposed animals and animals in exposed flocks; (3) expansion of regulatory slaughter surveillance (RSSS); (4) conducting consistent state reviews, (5) producer education and identification compliance; (6) evaluation of Nor98-like scrapie cases, (7) development of a comprehensive scrapie surveillance plan, (8) evaluation of the rectal biopsy test for ante-mortem scrapie testing, (9) initiation of the Caprine Scrapie Prevalence Study and (10) upgrading of the Scrapie National Database to allow electronic transmission of test charts and results using data collected electronically in the field or entered through a web application.

Consistent State Reviews
States must meet the consistent state requirements in 9 CFR 79.6 in order to move sheep and goats in interstate commerce with minimal restrictions. All states have been reviewed by United States Department of Agriculture (USDA) and have either enacted the required identification rules or have interim measures in place.

Scrapie Flock Certification Program
As of September 30, 2007, there were 2,042 flocks participating in the Scrapie Flock Certification Program (SFCP). Of these flocks 404 were certified flocks, 1,630 were complete monitored flocks, four were export monitored and four were selective monitored.

Infected and Source Flocks
As of September 30, 2007, there were 37 scrapie infected and source flocks, a decrease of 56 percent from September 30, 2006. There were a total of 72 new infected and source flocks reported for fiscal year (FY) 2007, a decrease of 38 percent from FY 2006. Chart 1 shows the number of new infected and source flocks by year. The total infected and source flock
SCRAPIE

statuses that were released in FY 2007 was 83. Three hundred, thirty-one positive scrapie cases were confirmed and reported by the National Veterinary Services Laboratories (NVSL) for FY 2007. Of these, 59 were RSSS cases, collected in FY 2007, 253 positive field cases, six test validation necropsies, and 13 third eyelids tests. One of the field cases was a goat. Five cases were consistent with Nor98 scrapie (Figure 1).

Approximately 3,622 animals were indemnified comprised of 61 percent non-registered sheep, 35 percent registered sheep, 2.3 percent non-registered goats and 1.7 percent registered goats.

Regulatory Scrapie Slaughter Surveillance (RSSS)

RSSS was designed based on the findings of the Center for Epidemiology and Animal Health (CEAH) Scrapie: Ovine Slaughter Surveillance (SOSS) study. The results of SOSS can be found at www.aphis.usda.gov/vs/ceah/cahm/sheep/sheep.htm. RSSS started April 1, 2003. It is a targeted slaughter surveillance program which is designed to identify infected flocks for clean-up. During FY 2007, collections increased by 11 percent overall and by 16 percent for black and mottled faced sheep compared to FY 2006. Improvement in the overall program effectiveness and efficiency is demonstrated by the 34 percent decrease in percent positive black faced sheep compared to FY 2006 (.44 to .29 percent, based on test results posted before October 1, 2007). During FY 2007, 41,244 samples were collected (Figure 2). There have been 59 NVSL confirmed positive cases collected in FY 2007. Face colors of these positives were 46 black, 11 mottled, one white and one unknown. The percent positive by face color is shown in Figure 3 below.

Caprine Scrapie Prevalence Study (CSPS)

CSPS was initiated in May 2007, to estimate the national prevalence of scrapie in adult goats at slaughter. If no scrapie is found we will be able to conclude that the prevalence is less than 0.1 percent. As of September 30, 2007, 1,515 goats were sampled for scrapie testing. None had tested positive for scrapie.

Scrapie Testing

As of September 30, 2007, 47,697 animals have been sampled for scrapie testing: 41,244 RSSS, 1,515 goats for the CSPS, 3,557 regulatory field cases, 139 necropsy validations, and 1,242 regulatory third eyelid biopsies.
REPORT OF THE COMMITTEE

Animal ID

As of October 10, 134,595 sheep and goat premises had been assigned identification numbers in the Scrapie National Generic Database and 99,903 premises had received official eartags (Figure 4).

Note: report based on data available as of October 12, 2007

Figure 1.
Infected and Source Flocks - New Statuses by Year
FY 1997-2007*

*Through September 30, 2007
Figure 2.
RSSS - Number of samples collected - FY 2007 - By state of tag origination - Report compiled on October 10, 2007

*Note: State of tag origination is where the tag was applied and may not be the state where the animal originated.

Figure 3.
Percent of Samples that Tested Positive of Each Face Color During Each Fiscal Year - FY 2003-2007*

*Through September 30, 2007
Figure 4.
Premises that have been assigned premises numbers in SNGD as of 10/10/2007 as a percentage of premises reported by NASS*

*Based on 2002 NASS Census Data
In fiscal year (FY) 2007, 679 flock investigations were initiated and closed, resulting in the identification of 58 newly discovered Infected or source flocks. In addition, another 175 flock investigations were initiated in FY ’07 and are still ongoing. Of these 679 Flock Investigations: 10 were initiated to investigate scrapie-suspect or test inconclusive animals, resulting in four new Infected or source flocks; five were initiated for investigation of a positive detected from on-farm surveillance, resulting in four new Infected or source flocks; 46 were initiated for trace-back of a positive animal from slaughter, resulting in 42 new Infected or source flocks; and 443 were initiated for tracing forward high risk animals, resulting in eight new Infected or source flocks.

The 443 flock investigations initiated for tracing forward high risk animals were closed for the following reasons:

- 179 – exposed animal(s) was missing but was male or did not lamb
- 132 – traced animals were either genetically susceptible with negative test results, were not genetically susceptible and/or were male.
- 46 – missing ewe investigation conducted with negative test results
- 20 – exposed animal(s) tested with negative results
- 5 – exposed animal(s) tested with positive results – flock designated as Infected
- 3 – missing Ewe investigation conducted with positive test results.
- 3 – exposed animal(s) genetically susceptible, lid tested negative and retained
- 2 – exposed animal(s) were restricted genetically less susceptible and retained
- 1 – exposed animal(s) tested positive, but didn’t lamb in the recipient flock
- 32 – closed for other reasons

There were 252 scrapie-positive sheep submitted from the field in FY ’07 (through August 2007), two of which were Nor-98-like cases. Excluding the Nor-98-like positives, of the remaining
REPORT OF THE COMMITTEE

250 positives, there were 228 with genotype information available. All 228 were QQ at codon 171, 214 of which were AA at codon 136, and 14 of which were AV at codon 136. These 250 positive sheep represented 68 flocks for an average of 3.6 positive animals per flock tested. Most of these positive sheep (228) were euthanized in 58 Infected or source flocks as part of a flock clean-up plan, with an average of 3.9 positive animals identified per Infected or Source flock. The average flock size of these Infected or source flocks was 109 animals (minimum four, maximum 470).

Most (86%) of these 250 scrapie-positive sheep were necropsied because they were designated as exposed animals, and their ages varied from yearlings to 11 years, with the most frequent age reported as three years. Breeds or face color of these positive sheep included: 70 Suffolk or Suffolk Cross, 52 black-faced or black-faced Cross, 22 Hampshire or Hampshire Cross, nine mottle-faced, one Oxford, one Shopshire, one natural colored, 63 white-faced or white-faced cross, 24 Southdown, one Corredale, one Dorper, and one Targhee. There were four animals for which no breed or face color was listed. There were 248 animals for which there was both obex and lymph node test results available. Almost 70 percent of these animals were positive on both obex and lymph node, nearly 24 percent had positive lymph nodes, but negative on obex, and nearly 6 percent were positive on obex and negative on lymph node. There was one animal with inconclusive test results on obex, but positive on lymph node and one animal that was both negative on obex and lymph node, but was positive on tonsil.

One scrapie-positive goat was identified in FY '07. This goat was from a herd that is under permanent quarantine. Fifty nine scrapie-positive sheep were identified through Regulatory Scrapie Slaughter Surveillance (RSSS). Of these 53 had state tag identification, six had no tags. Face color of these 59 positives were: 46 black-faced, 11 mottle-faced, one white-faced, and one with no face color listed. Of the RSSS positives 53 were QQ at codon 171 (none were QR), 51 were AA at codon 136 and two were AV. Three are pending genotype and three genotype could not be obtained.

About 63 percent of RSSS scrapie-positive animals had positive test results on both obex and lymph node, almost 12 percent were positive on lymph node, but negative on obex, and 25 percent were positive on obex, but negative on lymph node. The most frequent age reported for these RSSS positives was four.
years with a minimum of two years. The maximum age is difficult
to determine by dentition, however 14 were reported to be five
years of age or older, and six were noted as being broken mouth.
The objective of the Canadian Food Inspection Agency’s (CFIA) scrapie program is to eradicate scrapie from Canada. This objective will become increasingly possible as active surveillance identifies as many sites of scrapie infection in Canada as possible, and better tools become available to distinguish animals carrying infection on infected premises and to screen flocks to determine the original source of the infection. As the goal is eradication, it is imperative to exhaust all epidemiological links. In Canada, active surveillance for scrapie started at the end of 2005 and the program continues to evolve.

Economics, normal production practices and the historical position of the Canadian rendering industry to refuse ovine/caprine deadstock make it difficult to access the high risk ovine and caprine populations that are appropriate for scrapie surveillance. However, recent changes to the infrastructure of the deadstock and rendering industry associated with the enhanced feed ban regulations and associated new specified risk material (SRM) stream may make some new sources of ovine/caprine deadstock available for testing.

While there are no tests to definitively diagnose scrapie in the live animal, there are a number of tools that can be used to evaluate the risk of scrapie present in a sheep flock. These tools have not been established in goats thus the only approach available for use in exposed goats is destruction and post-mortem testing.

In recognition that genetics play some role in the spread of scrapie, the CFIA uses genetics as a tool to triage animals for risk categorization and make decisions regarding ordering destruction of animals in all sheep flocks identified as infected with scrapie as well as trace out and trace in premises. Goats at high risk of exposure to scrapie are still subject to complete depopulation. All infected premises are subject to ongoing CFIA requirements (surveillance or flock certification programs) once the initial disease control actions have been carried out.
The Scrapie Flock Certification Program (SFCP)

The SFCP National Standards were developed by the CFIA, in collaboration with the sheep industry, as the basis for Canada’s on-farm, voluntary scrapie control program. It is intended to be a long-term, internationally recognized flock/herd scrapie control program for the sheep and goat industries. This program is unique as a CFIA approved disease control strategy. The CFIA only provides a guiding hand in ensuring that the program retains key requirements to meet international standards. The day-to-day management and verification is placed in the hands of industry.

Requirements for all pathways include:

- surveillance for the disease is made by submitting brain samples from all adult sheep and goats that die on-farm. If no animals die on farm during a 12-month period, a sample from at least one cull animal over 24 months must be submitted.
- producers must work with a veterinarian accredited with CFIA to deliver the SFCP.
- producers must make an annual, vet supervised inventory their flocks/herds and maintain documentation throughout the year on animals entering and leaving the premises.

For details regarding the program rules see 'SFCP National Standards/Rules'.

See www.scrapie.canada.ca

Canada’s Policy and Conditions for the Importation of Small Ruminants

Canada’s previous Bovine Spongiform Encephalopathy (BSE) import policy for small ruminants, which was established in 1997, prescribes conditions for commodities considered to present a risk for BSE and for which the CFIA has legislative responsibility. Those commodities included in the previous policy were: live ruminant animals, embryos from sheep and goats, edible meat and meat products derived from ruminant animals, inedible rendered protein and products containing such protein from all regulated animal species, inedible tallow, animal blood, livestock feed, products and by-products containing specified risk materials, cell lines originating from bovine tissues, and, veterinary biologics.

As the scientific understanding of the transmissible spongiform encephalopathies (TSE) have evolved, significant differences in the pathogenesis and associated risks of these diseases within
the different species have been clarified. In order to appropriately address these differences, Canada's import policies, conditions and procedures pertaining to bovines, small ruminants and cervids were separated. New policies, conditions and procedures that are meant to address TSE risks of both BSE and scrapie specifically in imports of small ruminants (sheep and goats) and associated products were developed and recently implemented.

Canada's draft revised TSE import policy for small ruminants can be summarized into 4 major categories of importations:

- importation from a country recognized free or negligible risk for TSEs in small ruminants;
- importation from a premises free from TSEs in small ruminants;
- animals that will be slaughtered prior to an age where they would pose a significant disease risk;
- products harvested from animals in the above described categories.

An additional category:

- Importation of genetically resistant breeding sheep or embryos was originally proposed but due to the recent discoveries of atypical TSE's, it has been decided that it is premature to add this category at this time.

The term small ruminant applies to sheep, goats and their exotic relatives. Following preliminary consultation with small ruminant industry associations, the following conditions have been prepared as a draft for use in a broader consultation process with both Canadians, via posting on the CFIA website, and with the international community (via a World Trade Organisation (WTO) notification. Once all comments have been received and evaluated, these conditions will be finalised and approved for use.

1. Commodities prohibited from importation into Canada

   Ruminant derived meat-and-bone meal or greaves, or any commodities containing such products are specifically prohibited from importation into Canada unless a risk assessment has been undertaken and the country is classified, in accordance with the Bovine Spongiform Encephalopathy (BSE) import policy as Category 1 (negligible BSE-risk).

   An exemption from this prohibition may be considered on a case-by-case basis if the materials used in the production
of ruminant derived meat-and-bone meal or greaves, or any commodities containing such products have undergone a treatment or process to eliminate the BSE-agent equivalent to that applied in Canada. Details of the treatment or process deemed to be equivalent together with supporting data and references as appropriate should be provided to CFIA for approval.

2. Commodities allowed importation into Canada

Animals for immediate slaughter (will be licensed to abattoir) must:
- bear identification traceable to flock of origin;
- be licensed to abattoir in Canada; and
- be less than 12 months of age

Animals for feeding for slaughter (will be under permit) must:
- bear identification traceable to flock of origin; and
- be slaughtered by 12 months of age; confirmation of slaughter must be submitted to CFIA within one week of the date of slaughter

Live ovines imported for breeding purposes:
Males:
- must bear identification traceable to flock of origin
Females:
- must bear identification traceable to flock of origin; and
- must be imported with certification that they originate from a country recognized by the CFIA as negligible risk for TSEs in small ruminants; or
- must be imported with certification that they originate from a TSE free establishment

An establishment may be considered eligible for recognition as a TSE free establishment if:
- in the country or zone where the establishment is situated, the following conditions are fulfilled:
- the disease is compulsorily notifiable;
- affected sheep and goats are slaughtered and completely destroyed;
- the feeding to sheep and goats of meat-and-bone meal or...
REPORT OF THE COMMITTEE

greaves potentially contaminated with an animal TSE has been banned and effectively enforced in the whole country;

- national standards for recognition of scrapie free establishments have been developed or endorsed by the National Veterinary authority

- in the establishment the following conditions have been complied with for at least 5 years:
  - sheep and goats must be permanently identified and records maintained, to enable trace back to their establishment of birth;
  - records of movements of sheep and goats in and out of the establishment are established and maintained;
  - introductions of females and embryos are allowed only from establishments of an equal or higher stage in the process of accreditation;
  - sheep and goats of the establishment should have no direct or indirect contact with sheep or goats from establishments of a lower status;
  - an Official Veterinarian inspects sheep and goats in the establishment and audits the records at least once a year;
  - all animals over 18 months of age that have died or have been killed for reasons other than routine slaughter on the establishment itself must be tested (including 'fallen' stock and emergency slaughter).

- Establishments in Canada that are actively participating in a scrapie flock certification program may import breeding females from flocks/herds which have complied with these conditions for less than 5 years by importing animals from flocks/herds that are of equivalent status in an equivalent scrapie flock certification program in the exporting country.

Live ovines/caprines for temporary stay

- sexually intact female animals that do not meet the import requirements for breeding animals must be certified by ultrasound examination not be pregnant for the time that they will be in Canada.
SCRAPIE

- male animals have no conditions specific for TSEs.

Transhipment
- no conditions specific to TSE unless the animals were known to be infected.

Embryos
- embryos (ovine/caprine) have to be collected from donors eligible (could meet) import requirements for breeding animals and were collected in accordance with IETS standards.

Semen
- no conditions specific to TSE.

Meat
- Not harvested from known test positive animals; or harvested from animals less than 12 months of age.
REPORT OF THE COMMITTEE ON SHEEP AND GOATS

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

Derek J. Belton, NZ; Deborah L. Brennan, MS; Marie S. Bulgin, ID; John R. Clifford, DC; Max E. Coats, Jr., TX; Thomas F. Conner, OH; Linda A. Detwiler, NJ; Anthony M. Gallina, Fl; Chester A. Gipson, MD; Jeffrey J. Hamer, NJ; Craig T. Hanson, SD; Steven G. Hennager, IA; David W. Hertha, AL; Joseph N. Huff, CO; Cleon V. Kimberling, CO; James W. Leafstedt, SD; Howard D. Lehmkuhl, IA; Mary J. Lis, CT; Jim R. Logan, WY; Linda L. Logan, APO; Mr. Gordon ‘Cobbie’ Magness, SD; David T. Marshall, NC; Michael R. Marshall, UT; Cheryl A. Miller, IN; Ron C. Miller, PA; Charles Palmer, CA; Kristine R. Petrini, MN; Michael R. Pruitt, OK; Suelee Robbe-Austerman, SD; Paul E. Rodgers, CO; Joe D. Ross, TX; Mo D. Salman, CO; William P. Shulaw, OH; Ben Smith, WA; Susan M. Stehman, NY; Diane L. Sutton, MD; Cleve Tedford, TN; David Thain, NV; George O. Winegar, MI; Nora E. Wineland, CO; David W. Winters, TX.

The Committee met from 8:00 a.m. to 12:00 p.m. on Wednesday, October 4, 007 at John Ascuaga’s Nugget Hotel, Reno, Nevada. Attendance varied throughout the meeting; from 30 to 60 attendees, with 56 signing the attendance sheets collected at the end of the meeting. Wolf and Knowles presided and conducted the meeting.

Jeffrey Nelson, presented Brucella ovis testing progress, issues and plan. National Veterinary Services Laboratories (NVSL) continues to make progress on refining the B. ovis enzyme linked immuno sorbent assay (ELISA). They plan to circulate a new protocol and set up an inter laboratory comparison beginning February 008. NVSL is also seeking additional serum samples from culture positive animals as well as from indeterminate samples.

Jim Logan presented Brucella ovis on-going testing issues. Information on how they have handled indeterminate samples of as these continue to be a low level occurrence.

Sharon Hietala discussed Corynebacterium pseudotuberculosis antibody detection using the synergistic hemolysin inhibition (SHI) test. Caseous lymphadenitis (CL) due to
the bacterium *Corynebacterium pseudotuberculosis* is a life-long disease associated primarily with recurring external abscesses involving the skin and regional lymph nodes. Internal abscesses due to spread of the infection via blood or the lymphatic system result in ill thrift, weight loss, and wasting that may be clinically indistinguishable from unrelated diseases in a herd or flock, such as Scrapie or Johne’s disease. The synergistic hemolysin inhibition (SHI) test is an assay used to detect antibody in sheep and goats exposed to *C. pseudotuberculosis*. The test is designed to detect antibody to exotoxins, including phospholipase D, produced by the replicating bacterium. Typically, an antibody response to *C. pseudotuberculosis* is detectable with 14 to 21 days of exposure, and persists for several months after active abscesses have resolved. Once infected, it is believed that an animal never completely eliminates the bacterium from walled-off abscess or regional lymph nodes, and the animal remains at very high risk for recurrence of external and/or internal abscesses. Antibody responses due to vaccination typically are of shorter duration than titers produced by natural infection, however the SHI test is not able to distinguish vaccine-induced antibody from those produced by natural infection. The SHI test can be effectively used for pre-purchase screening, in herd health and management programs, and for differential diagnosis of CL. At a titer cut-off of 1:8, the SHI test has a reported sensitivity of 95 percent (ability to detect true positives) and a specificity of 98 percent (ability to identify animals that are true negatives for CL). At a titer cut-off of 1:256 or greater the SHI assay has a 95 percent correlation with the presence of internal abscesses due to *C. pseudotuberculosis*.

The role of *Mycoplasma ovipneumoniae* in respiratory disease of bighorn sheep (*Ovis canadensis*) was presented by Thomas Besser and Don Knowles. Utilizing 16S clone library analysis, conventional bacteriology, polymerase chain reaction (PCR), DNA sequencing and serology a hypothesis was tested that primary infection with one or more currently unidentified agents precede *Mannheimia* or *Pasteurella* spp. infections associated with bronchopneumonia in bighorn sheep. Data from testing this hypothesis demonstrated that *Mycoplasma ovipneumoniae* was a major component of the bacterial flora of pneumonic lungs from bighorn sheep lambs.

Lynn Herrmann-Hoesing, Stephen White and Don Knowles presented Host Genetics and Control of Ovine Progressive Pneumonia Virus. Utilizing real time PCR to measure levels of virus in blood cells of sheep infected with ovine progressive pneumonia virus, the hypothesis that virus load correlates with
certain Major Histocompatibility Complex (MHC) class II alleles was tested. Peripheral proviral load as measured by real time PCR was shown to be a good predictor of pathology, *Ovar-DRB1*1101 may be a good predictor in Polypay sheep that will develop detectable proviral loads and Polypay sheep may have another genetic marker of OPPV disease that is linked to *Ovar-DRB1*.

Katherine Marshall presented the National Animal Health Monitoring System (NAHMS) Goat Study 2009. NAHMS is currently in the needs assessment phase of the national goat study which will take place in 2009. In this phase, NAHMS seeks input from veterinarians, researchers, goat producers and others representing the goat industry as to the important issues currently facing the industry. This input can be provided via Survey Monkey by visiting the web site: www.cvmbs.colostate.edu/aphi/index.html. It will be accepted until the end of January 2008. Objectives developed based on this input will be finalized for the NAHMS Goat 2009 study by summer 2008. USDA will work with it.

Committee business included six Resolutions that were presented, passed and referred to the Committee on Nominations and Resolutions.

The Committee discussed selection of members for the Subcommittee on Big Horn Pneumonia. The Committee suggested that the Chair and Vice Chair of the Committee on Wildlife Diseases and Sheep and Goats work collaboratively to identify and select Subcommittee members. Subcommittee members should be selected within the month and the subcommittee should have the freedom to select non-voting specialty resource members.
REPORT OF THE COMMITTEE ON TRANSMISSIBLE DISEASES OF POULTRY AND OTHER AVIAN SPECIES

Chair: John A. Smith, Baldwin, GA
Vice Chair: Julie D. Helm, Columbia, SC

Bruce L. Akey, NY; Alex A. Ardans, CA; John K. Atwell, NC; George P. Badley, AR; Marilyn F. Balmer, MD; Sue K. Billings, KY; Richard E. Breitmeyer, CA; Deborah L. Brennan, MS; Paul Brennan, IN; Max Brugh, GA; Karen E. Burns-Grogan, Ga; Tony A. Caver, SC; Steven R. Clark, NC; Max E. Coats, Jr., TX; Stephen R. Collett, GA; Debra C. Cox, MD; Sherrill Davison -Yeakel, PA; Robert J. Eckroade, PA; Aly M. Fadly, MI; Steven Finch, MD; Tony M. Forshey, OH; Rose Foster, MO; Hashim M. Ghor, AR; Eric N. Gingerich, PA; Robert Ross Graham, VA; Randy R. Green, DC; James C. Grimm, TX; Scott J. Gustin, AR; Nancy E. Halpern, NJ; Jeffrey J. Hamer, NJ; William L. Hartmann, MN; Chris S. Hayhow, KS; Carl J. Heeder, MN; Fidelis N. Hegngi, MD; Ruud Hein, DE; Michael E. Herrin, OK; David W. Hertha, AL; Bill W. Hewat, AR; Donald E. Hoenig, ME; Frederic J. Hoerr, AL; Guy S. Hohenhaus, MD; Tom Holder, MD; John P. Huntley, NY; Mark W. Jackwood, GA; Eric L. Jensen, AL; Hailu Kinde, CA; Daniel J. King, GA; Patrice N. Klein, MD; Stanley H. Kleven, GA; Spangler Klopp, DE; Paul E. Knepley, PA; Kyle Kohlhagen, IN; Michael D. Kopp, IN; Shannon M. Kozlowicz, NC; David C. Kradel, PA; Ulysses J. Lane, NC; Hiram N. Lasher, DE; Dale C. Lauer, MM; Chang-Won Lee, OH; Randall L. Levings, IA; David J. Ligda, IN; Jose A. Linares, TX; Mary J. Lis, CT; Martha A. Littlefield, LA; Howard M. Magwire, MD; Jerry D. Maiers, NC; Edward T. Mallinson, MD; Sarah J. Mason, NC; MaryAnn T. McBride, NC; Andy McRee, NC; Hugo Medina, MN; Thomas R. Mickle, GA; Andrea Mikolon, CA; Andrea M. Miles, NC; Ricardo A. Munoz, ME; Donald S. Munro, PA; Lee M. Myers, GA; Thomas J. Myers, DC; Jill A. Nezworski, MN; Steven H. Olson, MN; Robert L. Owen, PA; Kristy L. Pabilonia, CO; Richard E. Pacer, MD; Mary J. Pantin-Jackwood, GA; James E. Pearson, IA; Jewell G. Plumley, WV; Kelly R. Preston, TX; James T. Rankin, Jr., PA; Willie M. Reed, IN; George D. Ritter, DE; Charles S. Roney, GA; A. Gregorio Rosales, AL; Michael L. Rybolt, DC; Y. M. Saif, OH; John P. Sanders, WV; David D. Schmitt, IA; Jack A. Shere, NC; H. L. Shivaprasad, CA; Marilyn M. Simunich, ID; Richard D. Slemons, OH; Joe Starcher, WV; Philip Stayer, MS; Bruce N. Stewart-Brown, MD; David L. Suarez, GA; David E. Swayne, GA; Hilary S. Thesmar, DC; H. Wesley Towers, DE; Deoki N. Tripathy, IL; Susan C. Trock,
REPORT OF THE COMMITTEE

NY; Don W. Waldrip, GA; Doug Waltman, GA; Gary L. Waters, MT; James A. Watson, MS; Michael J. Wood, VT; Ching-Ching Wu, IN; Ernest W. Zirkle, NJ.

The Committee met on October 22, 2007 from 1:00 to 6:00 p.m. and October 23, 2007 from 12:30 to 5:30 p.m. at John Ascuaga’s Nugget Hotel, Reno, Nevada. There were 64 Committee members and 68 guests in attendance, for a total of 132 attendees. Chair John A. Smith presided, assisted by Vice Chair Julie D. Helm. The Chair welcomed the Committee, summarized the 2006 meeting, and reported on the responses to the 2006 Resolutions and Recommendations.

2006 Resolution 44, Water-Based Foam for Mass Depopulation of Poultry was approved as amended. Resolution 44 requested that the American Veterinary Medical Association (AVMA) fully endorse water-based foam as an acceptable option for mass depopulation of poultry when there is a need to limit human exposure or risk of human injury, or a requirement to accomplish the task quickly due to epizootic considerations. The AVMA Executive Board has approved a policy on the use of water-based foam for depopulation of poultry that supports such use in accordance with the conditions and performance standards outlined by the United States Department of Agriculture (USDA) Animal and Plant Health Inspection Service (APHIS) Veterinary Services (VS).

Frederic J. Hoerr, Alabama Department of Agriculture Veterinary Diagnostic Laboratory and Chair of the Mycoplasma Subcommittee, gave the Subcommittee Report. The report was approved by the Committee and is included in these proceedings.

Sherrill Davison, University of Pennsylvania and Chair of the Subcommittee on Infectious Laryngotracheitis, gave the Subcommittee Report. The report was approved by the Committee and is included in these proceedings.

Scott Westall, Pilgrim’s Pride Corporation, and President of the Association of Veterinarians in Broiler Production presented the annual disease status report for the broiler industry. The
Eric N. Gingerich, University of Pennsylvania, delivered the annual disease status report for the table egg industry. The report was approved by the Committee and is included in these proceedings.

Charles Corsiglia, Foster Farms, California, gave the annual disease status report for the turkey industry on behalf of Steven Clark, Alpharma Animal Health. The report was approved by the Committee and is included in these proceedings.

Charles S. Roney, United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), presented the annual status report for the National Poultry Improvement Plan (NPIP) on behalf of the NPIP Senior Coordinator, Andrew H. Rhorer, USDA-APHIS-VS. The report was approved by the Committee and is included in these proceedings.

Brenda Morningstar, National Veterinary Services Laboratory (NVSL), VS-APHIS-USDA delivered the annual NVSL Diagnostic Bacteriology, Mycoplasma, Pasteurella, and Salmonella report. The report was approved by the Committee and is included in these proceedings.

Dennis Senne, NVSL-VS-APHIS-USDA, gave the annual NVSL Avian Import Activities, Avian Influenza, and Newcastle Disease diagnostic report. The report was approved by the Committee and is included in these proceedings.

Dr Bruce Stewart-Brown, Perdue Farms, Inc., presented a report on the National Animal Health Laboratory Network. After five years of existence, a committee was convened to evaluate progress. Stewart-Brown has participated in phase one of the evaluation to identify the five or six key areas of the NAHLN to examine further in subsequent phases of the evaluation. Over 60 professionals from government, academia and industry were identified as contributors to the evaluation process. Key areas identified for further examination included program leadership,
REPORT OF THE COMMITTEE

management, and organization; laboratory network structure; information technology; communication; priority agents; and laboratory quality.

Aaron Scott, Center for Epidemiology and Animal Health (CEAH), VS-APHIS-USDA, delivered a report on the National Surveillance Unit (NSU), National Animal Health Surveillance System (NAHSS), the NAHSS Steering Committee, and the National Animal Health Reporting System (NAHRS). The report was approved by the Committee and is included in these proceedings.

Kim Forde-Folle, CEAH-VS-APHIS-USDA, announced the National Animal Health Monitoring System (NAHMS) Small Enterprise Chicken Study for 2007-2008, designed to examine the bio-security practices of small poultry operations with fewer than 20,000 birds.

Dr Bruce Stewart-Brown, Perdue Farms, Inc., presented a discussion about harmonization of reportable disease requirements at the state and federal levels. The Chair will appoint a Subcommittee, chaired by Stewart-Brown, to examine this issue and report back to the Committee at next year’s meeting. The Committee approved the report.

David Swayne, USDA, Agricultural Research Service (ARS), Southeastern Poultry Research Laboratory (SEPRL), and chair of the Subcommittee on Avian Influenza and Newcastle Disease, gave the Subcommittee report. The report was approved by the Committee and is included in these proceedings.

David Castellan, Saskatchewan, Canada summarized the Avian Influenza outbreak in that province. The report was approved by the Committee and is included in these proceedings.

Drs. David Swayne and Mary Pantin-Jackwood, USDA-ARS, Southeast Poultry Research Laboratory (SEPRL), gave an update on avian influenza and other emerging and exotic disease research at SEPRL. Their report was accepted by the Committee and is included in these proceedings.
Daniel Perez, University of Maryland, reported on the Avian Influenza Coordinated Agricultural Program (AICAP). The AICAP is a multi-institutional cooperative project whose objectives are to develop knowledge-based integrated approaches to detect, control, and prevent the emergence of avian influenza viruses. Eight major objectives include: molecular aspects of interspecies transmission and pathogenesis of avian influenza in terrestrial poultry; risk factors in live bird markets (LBM) and supply flocks; AI surveillance in LBMs, supply flocks and wild waterfowl; education on biosecurity; and composting; diagnostics; and vaccines. Perez provided examples of a number of the ongoing projects within the program.

The Monday session adjourned at this point, at approximately 5:40 p.m. The meeting reconvened at 12:30 PM on Tuesday, October 23, 2006.

Michael David, Director of Sanitary International Standards, National Center for Import and Export, VS-APHIS-USDA, presented the annual update on the World Organization for Animal Health (OIE) poultry activities. His comments were approved by the committee and are included in these proceedings.

Charles S. Roney, NPIP, delivered an update on the status of the National Poultry Improvement Plan low pathogenic Avian Influenza control program for the Senior Coordinator, Andrew H. Rhorer. Forty-four state plans have been received, of which 28 have been approved and the remaining 16 are under review. The six states not submitted include Arizona, Connecticut, Montana, Nevada, Rhode Island and Wyoming. Connecticut has an existing plan that is functional and is being submitted. In 2006-07, 2,005,121 total tests for AI have been performed. The following table gives the distribution of tests by Subparts: (next page)
REPORT OF THE COMMITTEE

<table>
<thead>
<tr>
<th>Subpart</th>
<th>Number of Tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subpart B—Egg Type Chicken Breeders</td>
<td>13,689</td>
</tr>
<tr>
<td>Subpart B—Commercial Table Egg Layers</td>
<td>50,093</td>
</tr>
<tr>
<td>Subpart C—Meat-Type Chicken Breeders</td>
<td>364,207</td>
</tr>
<tr>
<td>Subpart C—Commercial Meat-Type Chickens</td>
<td>1,413,362</td>
</tr>
<tr>
<td>Subpart D—Turkey Breeders</td>
<td>37,219</td>
</tr>
<tr>
<td>Subpart D—Commercial Turkeys</td>
<td>155,623</td>
</tr>
<tr>
<td>Subpart E—Waterfowl, Exhibition, Game Bird</td>
<td>16,747</td>
</tr>
</tbody>
</table>

Jonathan Zack, VS-APHIS-USDA, gave an update on the USDA response plans for highly pathogenic Avian Influenza. The report was approved by the Committee and is included in these proceedings.

Eric Gonder, Goldsboro Milling, presented a report on the responses to low pathogenic avian influenza in the recent West Virginia and Virginia cases in turkeys on behalf of Steven Clark, Alpharma Animal Health. The report was approved by the Committee and is included in these proceedings.

Seth Swafford, Wildlife Services (WS), APHIS-USDA, delivered an update on the USDA migratory waterfowl Avian Influenza surveillance program. His presentation was approved by the committee and is included in these proceedings.

Christopher J. Brand, United States Geological Survey, National Wildlife Health Center, United States Department of the Interior (DOI), gave an update on the DOI migratory waterfowl Avian Influenza surveillance program. His presentation was approved by the committee and is included in these proceedings.

Susan Trock, New York State Department of Agriculture and Markets, presented an update on the progress in controlling avian influenza in the Live Bird Marketing System (LBMS) in New York. The report was approved by the committee and is included in these proceedings. Trock also presented information supporting a Resolution from the Northeast United States Animal Health Association regarding allocation of funding for these avian influenza control efforts in the LBMS. A resolution on this issue was approved as amended by the Committee and submitted to the Committee on Nominations and Resolutions.
Andrea M. Miles, Poultry Health Consulting, presented background information on a proposal requesting additional research on methods of depopulation and disposal for poultry. A Resolution on this issue was approved as amended by the Committee and submitted to the Committee on Nominations and Resolutions.

Hugo Medina, Sparboe Companies, presented background information on a proposal for handling table eggs and egg products during an outbreak of highly pathogenic Avian Influenza. A Resolution on this issue was approved as amended by the Committee and submitted to the Committee on Nominations and Resolutions.

John Smith, Fieldale Farms Corporation, presented background information on behalf of Spangler Klopp, Townsends, Inc., on a Resolution requesting elimination of the requirement in the USDA Agricultural Marketing Service’s National Organic Program for access of organic birds to the outdoors. A Resolution on this issue was approved as amended by the Committee and submitted to the Committee on Nominations and Resolutions.

Gregory Gray, University of Iowa, presented a paper on the need to include swine and poultry industry workers in pandemic influenza planning. The Committee approved his paper and an abstract of his presentation is included in these proceedings. A Resolution on this issue was approved by the Committee and submitted to the Committee on Nominations and Resolutions.

Francois Elvinger, USAHA Committee on Animal Health Information Systems, presented a Resolution regarding funding and planning of integrated and comprehensive animal health surveillance. This Resolution was moved and seconded by the Committee but failed to pass.

Joe Garvin, Virginia Department of Agriculture and Consumer Services, presented a Resolution regarding regional initial state response and containment plans for the National Poultry Improvement Plan (NPIP) control program for low pathogenic H5/H7 Avian Influenza. This Resolution was moved and seconded by the Committee but failed to pass.
REPORT OF THE COMMITTEE

REPORT OF THE SUBCOMMITTEE ON MYCOPLASMA

Frederick J. Hoerr, Chair
Auburn University

The subcommittee met on October 20, 2007 at the John Ascuaga's Nugget Hotel in Reno, Nevada with 22 attendees.

Frederic Hoerr, Chair, presented the report of the Subcommittee on Mycoplasma. C. Stephen Roney reported an increase in Mycoplasma gallisepticum (MG) in broiler chickens in the preceding year. Problems with MG continue in back yard and noncommercial chickens. Utilization of mycoplasma check test sera from Stanley Kleven, University of Georgia, is increasing. Hoerr reported on weak positive polymerase chain reaction (PCR) tests using Lauerman primers for MG in male broiler breeders, first detected at 24 weeks of age. Repeated testing at 2-week intervals showed no seroconversion and cultures were negative through 33 weeks of age. The use of three additional primer sets failed to yield a positive PCR for MG or other mycoplasmas. The flock and its progeny remained asymptomatic for MG. At 33 weeks of age, the flock was declared MG negative with continued surveillance advised, but other indicators of MG never emerged during the lifetime of the flock.
TRANSMISSIBLE DISEASES OF POULTRY AND OTHER AVIAN SPECIES

REPORT OF THE SUBCOMMITTEE ON VACCINAL LARYNGOTRACHEITIS

Sherrill Davison, Chair
University of Pennsylvania

Subcommittee Members: Louise Dufour-Zavala, Georgia Poultry Laboratory, Oakwood, GA; Maricarmen Garcia, University of Georgia, Athens, GA; Hashim M. Ghorie, Arkansas Livestock and Poultry Commission, Little Rock, AR; Frederic J. Hoerr, Alabama Department of Agriculture, Auburn, AL; Brett Hopkins, Biomune Company, Lenexa, KS; John A. Smith, Fieldale Farms Corporation, Baldwin, GA; Donald Waldrip, Wayne Farms, Oakwood, GA.

Introduction

Vaccinal Laryngotracheitis (VLT) is an acute viral respiratory disease primarily of chickens. Economic losses attributable to VLT have been important in many poultry producing areas throughout the United States and the world. Despite efforts to control the disease through vaccination and implementation of biosecurity measures, outbreaks of VLT are still a threat to the poultry industry.

Prior suggested action items - 2006

The Committee believes that additional tools are needed for the prevention and control of VLT and suggests the following:

· Studies of currently available vector vaccines by the in ovo route should be continued.
· Research should be conducted to develop newer molecular vaccines to control and prevent VLT.
· Vaccine manufacturers should determine if an adequate supply of Chick Embryo Origin (CEO) vaccine is available if its use is required in an outbreak situation.
· States should institute the use of a Geographic Information System as an integral part of control and prevention measures.

Update - vaccination trials

Over the past year, additional field evaluations of the
Fowl Pox-Laryngotracheitis (FP-LT) vaccine in broilers by the in ovo route of vaccination have been conducted. Some reported that the in ovo dose has been reduced to lessen the effect of the vaccine on hatchability and 7-day mortality. In the field, the FP-LT vaccine did stop the spread of VLT between flocks in some locations. However, it has been reported that in “hot areas” in ovo vaccinated broiler flocks did break with VLT. Clinical signs and mortality was reduced but not prevented. FP-LT has also been used in ovo in combination with the CEO field boost at 2 - 2.5 weeks of age. It was noted that the in ovo vaccination FP-LT appears to “buffer” the reaction to the CEO vaccination.

It was previously reported that laboratory challenge in layer pullets vaccinated at one day of age subcutaneously with the HVT-LT vaccine demonstrated 100 percent protection at 3, 7, 10 and 15 weeks post-vaccination and 80 percent and 70 percent protection at 20 weeks and 25 weeks post-vaccination respectively. Recently, the recombinant HVT-LT vaccine has been used in the field in broilers and layer pullets. Results from the field evaluations will be reported at a later date when additional data is available.

Current suggested action items - 2007

The Committee believes that:

- Studies of currently available vector vaccines by the in ovo route should be continued.
- Research should be conducted to develop newer molecular vaccines to control and prevent VLT.
- States should adopt the Model State Program –VLT (USAHA – 2005).
- Procedures of proper administration of CEO and TCO vaccines must be reviewed.
- Field evaluations must be conducted in conjunction with laboratory research to evaluate the efficacy of control procedures.

References

Based on yearly Agristats data for field condemnations, 7-day mortality, and total mortality, US broiler flock health has seen a slight decline over the past year. The decline was seen across all three parameters and is most likely due to continued issues with Infectious Laryngotracheitis (ILT) and running stunting syndrome (RSS). A poll of broiler production veterinarians ranks ILT and RSS as the top two challenges facing the poultry industry.

ILT and mycoplasma are the two highest-ranking respiratory diseases. New vaccines and vaccination techniques are currently being implemented to control ILT. Mycoplasma was an issue earlier in the year but recently its spread has been limited. Infectious bronchitis (IBV) and Newcastle disease (ND) have been minor issues so far.

RSS, gangrenous dermatitis (GD), and infectious bursal disease (IBD) are the three top ranking immunosuppressive diseases. A consensus on the causative agent or agents of RSS has not been reached. However, there is no doubt that RSS related immunosuppression has impacted flock uniformity and processability and increased the incidence of secondary infections with GD and inclusion body hepatitis (IBH). IBD is also frequently implicated in these secondary infections.

Coccidiosis and necrotic enteritis (NE) are the top ranking enteric diseases. These issues are probably related and may take a more prominent role as feed costs increase.

Avian influenza (AI) has not directly impacted US broiler flocks although two outbreaks in commercial turkey flocks led to increased surveillance for broiler flocks in close proximity to the breaks. Broiler veterinarians indicate that a lot of time is still being devoted to AI education and contingency planning.

Antibiotic usage and Nutrition will play a more prominent role in broiler health in the coming year. Lack of effective antibiotics to treat diseases and increasing demand for “antibiotic free” production will increase the need for creative disease control and prevention strategies to maintain our current high level of health, welfare, and productivity. Nutritional strategies are also changing due to high input costs. Veterinarians will be
challenged to make sure the nutritional needs of the birds are met. Failure to do so could result in classical deficiency diseases and immunosuppression.

Ranking of Disease Concerns among 17 Broiler Production Veterinarians

<table>
<thead>
<tr>
<th>Disease</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infectious Laryngotracheitis</td>
<td>12</td>
</tr>
<tr>
<td>Runting Stunting Syndrome</td>
<td>8</td>
</tr>
<tr>
<td>Gangrenous Dermatitis</td>
<td>6</td>
</tr>
<tr>
<td>Mycoplasmosis</td>
<td>5</td>
</tr>
<tr>
<td>Chick Quality</td>
<td>3</td>
</tr>
<tr>
<td>Infectious Bursal Disease</td>
<td>3</td>
</tr>
<tr>
<td>Mycoplasmosis</td>
<td>5</td>
</tr>
<tr>
<td>Chick Quality</td>
<td>3</td>
</tr>
<tr>
<td>Infectious Bursal Disease</td>
<td>3</td>
</tr>
<tr>
<td>Mycoplasmosis</td>
<td>5</td>
</tr>
<tr>
<td>Chick Quality</td>
<td>3</td>
</tr>
<tr>
<td>Infectious Bursal Disease</td>
<td>3</td>
</tr>
<tr>
<td>Mycoplasmosis</td>
<td>5</td>
</tr>
</tbody>
</table>

Ranking of Non-Disease Concerns among 17 Broiler Production Veterinarians

<table>
<thead>
<tr>
<th>Concern</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antibiotic Issues</td>
<td>6</td>
</tr>
<tr>
<td>Management</td>
<td>3</td>
</tr>
<tr>
<td>Welfare</td>
<td>3</td>
</tr>
<tr>
<td>Avian Influenza (education and planning)</td>
<td>2</td>
</tr>
<tr>
<td>Feed/Nutrition</td>
<td>2</td>
</tr>
<tr>
<td>Food Safety</td>
<td>1</td>
</tr>
<tr>
<td>Dead Bird Disposal</td>
<td>1</td>
</tr>
<tr>
<td>Litter Beetles</td>
<td>1</td>
</tr>
<tr>
<td>Litter Supply</td>
<td>1</td>
</tr>
</tbody>
</table>
Overall health of the national table egg layer flock is very good. This is due to the continued availability of high quality vaccines, flock supervision from professional, well-trained flock supervisors, readily available veterinary technical assistance from primary breeder, vaccine company, diagnostic laboratory, and consulting veterinarians, high quality nutrition provided by professional nutritionists, housing in environmentally controlled facilities in cages off litter, and the use of sound biosecurity practices.

A poll of the Association of Veterinarians in Egg Production (AVEP) was conducted and 14 of 65 members responded. The survey revealed the following diseases of concern occurring in U.S. layer flocks: 1.) E. coli/peritonitis, 2.) a 3-way tie – coccidiosis/necrotic enteritis, Mycoplasma gallisepticum (Mg), and calcium depletion/tetany, and 5.) a 2-way tie – respiratory viruses (IB) and cannibalism. Other diseases of concern for diseases threatening the industry are avian influenza (AI) and Salmonella enteritidis (SE).

Colibacillosis is a problem mainly of young flocks with mortality rates of 0.5 to 4 percent 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. The overall incidence of early onset colibacillosis is down from recent years. A post-molt colibacillosis syndrome is also seen in some flocks due to declining immune system function, an ascending infection of the reproductive tract, upper respiratory infections, etc.

Mg continues as 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
REPORT OF THE COMMITTEE

appears to be useful in low challenge situations but still continues to be evaluated in high challenge facilities. Vaccine failures are somewhat common and the unit must resort to medication programs using tylosin or tetracycline antibiotics.

Coccidiosis and necrotic enteritis has been increasing in incidence in caged layers especially on the east coast and in one strain of layer. Vaccination of pullets is being used successfully as control.

Calcium depletion is normally associated with low intake of calcium, phosphorus, and/or vitamin D3 especially early in production with low feed intakes. Calcium tetany is seen when young flocks that are slow to mature are placed on calcium rich feeds too early. A post-molt problem with calcium tetany is also being found due to excessive calcium intake during the molt resulting in a shutdown on normal hormonal action to pull calcium from the medullary bone.

Cannibalism continues to be seen especially in high light intensity situations in both caged and cage-free systems. In these cases, the 10-day rule for beak trimming results in longer beaks than desired compared to a beak trim at 4 to 8 weeks and results in an increase in incidence and severity of cannibalism.

AI continues to be a very high concern across the country. Active and passive surveillance programs are increasing across the US in response to the threat of highly pathogenic H5N1 AI (HPAI) from Asia. There is great concern in the layer industry as to the effect of the response to an AI outbreak on movement of eggs and birds from negative flocks in or near the control zones. Discussion and research as to the best ways of bird euthanasia and disposal from large cage layer houses and complexes continues. The threat of low pathogenic AI (LPAI) for layer flocks on the East coast is much reduced due to the efforts by New York and New Jersey Departments of Agriculture and USDA to reduce the positivity of the live bird markets from 60 percent positive markets in 2004 to near zero since. No significant AI isolations have been made in layer flocks in the U.S. in the last year. A majority of egg operations are complying with the National Poultry Improvement Plan (NPIP) low pathogenic AI (LPAI) program for commercial layers.

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 (FDA) was proposing a program “Prevention of SE in Shell Eggs during Production”. FDA received over 200 written comments. Issues discussed were 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 between 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 excessively low requirement for 45 F egg storage prior to processing, etc. Comments were reopened in May of 2005 to ask questions about pullets. The initiation of this program is in doubt as it is stalled in the Office of Management and Budget (OMB), which has been studying it for over a year. The incidence of egg-related SE outbreaks continues steady apparently due to areas of egg production where SE risk reduction programs are either not effective or totally embraced.

Diseases under control and of low incidence are as follows: infectious laryngotracheitis (ILT), IB, fowl coryza, and urolithiasis/gout. These diseases tend to be localized to a region or a farm. The recombinant pox-vectored ILT vaccine has been determined not to be a suitable replacement for chick embryo origin (CEO) vaccines in high challenge areas but a good reduction of ILT losses in a region of high ILT incidence has been seen. The new HVT-vectored ILT vaccine is showing great promise and if effective will reduce the amount of CEO vaccine used in layer flocks that may spread to broilers.

Diseases that are very rarely a problem for table egg layers are pox, Marek’s, Newcastle, infectious bursal disease, chick anemia virus, and fowl cholera.

Poultry welfare concerns are increasing as activist groups increase their activities in portraying the caged egg industry as not humane. Activists are promoting laws against caged egg production in several states including a major egg producing state, California. The United Egg Producers (UEP) Certified Animal Care Program now requires the use of full feed molting. Full feed molting programs have been proven to be fully workable in most operations. There continues to be concern that some producers will discontinue the UEP program due to competition with non-
compliant producers in markets that are not requiring these cost-increasing welfare practices. Many producers of egg breaking stocks are now joining the UEP welfare program due to pressure from their customers.

The egg industry has experienced record egg prices and profits since the first of 2007 to present in spite of increased corn and feed prices. Reduced numbers of layers due the UEP required reduction in layers per cage and increased exports to Europe and Asia are felt to be the reasons.
In preparation for this report Clark and turkey industry colleagues Drs. Blakley and Mills, contacted several U.S. turkey industry professionals and veterinarians to inquire about the health status of turkeys produced in August 2006 through August 2007. 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 lists in Table 1 the challenges by disease and issues.

The lack of approved efficacious drugs continues to be the top disease issue. The withdrawal of the NADA for enrofloxacin use in poultry in 2005 leaves the industry with no adequate therapeutic response to colibacillosis (ranked 2), or fowl cholera (ranked 9). The turkey industry supports the scientific examination of the evidence in the cases against the use of antibiotics in agriculture, and supports the continued judicious use of antibiotics in animal agriculture.

Late mortality (3) and leg problems (4) are among the top concerns of the turkey industry. Late Mortality may be defined as mortality in excess of 1.5 percent per week in toms (males) 17 weeks and older; mortality is not diagnosed to a specific disease or cause. Excess cumulative mortality of 5 to 10 percent in toms prior to slaughter has been reported. Late mortality may be associated with physiologic or biomechanical deficiencies following early rapid growth in heavy toms achieving genetic potential; aggressive behavior noted in mature toms; cannibalism; leg problems; and/or hypertension. Leg problems are a common complaint, such as spiral fractures of the tibia or femur. Leg Problems may be defined as lameness, particularly in toms, several weeks prior to slaughter. Leg problems are attributed to
REPORT OF THE COMMITTEE

various conditions, including pododermatitis, fractured femurs, fractured tibia, osteomyelitis (OM), tibial dyschondroplasia (TDC), spondylolisthesis, “Shaky Leg”, etc.

Blackhead, also known as Histomoniasis, (ranked 22) is one disease with no efficacious drug approved for use in turkeys. There were 68 reported cases of blackhead (Table 3). Losses to blackhead have been severe and sporadic cases are occurring in North America. The disease can be devastating in the individual flocks affected. Dimetridazole was extremely efficacious and previously approved for use in turkeys for the prevention and treatment of blackhead; it was banned in 1987. The lack of any legal treatment for histomoniasis is of concern, especially in the case of valuable turkey breeder candidate flocks. It seems unconscionable that the industry is unable to prevent the suffering and death in flocks affected by histomoniasis when effective, yet unapproved, treatments exist. The industry recommends FDA consideration to allow limited use of such product(s) in valuable breeder stock.

Cellulitis (Table 2) remains a major disease issue across all geographic regions although the survey average decreased to a score of 3.1 and ranked 5th, from 3.5 and 3rd, respectively, the prior year. Analysis indicates a range of levels of concern; 26 percent of respondents score cellulitis at 5 (severe) and 22 percent at 1. Cellulitis is most commonly seen in, but not limited to, commercial male turkeys nearing market age. The prevalence and severity of cellulitis continues to increase. Veterinarians indicate that the occurrence is now confirmed at younger ages and in both toms and hens. Clostridium septicum, C. perfringens type A, or C. sordelli is isolated from fluid or affected tissue samples of affected or dead birds. Affected turkeys present with two or more of the following signs: subcutaneous emphysema (crepitas); serous or serosanguinous subcutaneous fluid; vesicles on the skin, especially on the breast/inguinal area; moist, dark, wrinkled skin, especially breast/inguinal area; cellular necrosis (microscopic); organ involvement (spleen/liver); vesicles on the skin and/or moist dark wrinkled skin on the tail area. Affected flocks have mortality greater than or equal to 0.5 dead per 1,000 birds for two consecutive 24-hour periods. Research on the pathogenesis and control is ongoing. Opinions vary as to risk factors and potential causes of the problem (Table 2).

Poulteritis of unknown etiologies (7) and heat stress
(6) rank high on the list. Ornithobacterium rhinotracheale (ORT, ranked 17 versus 8 previously), Poult Enteritis Mortality Syndrome (PEMS ranked 31 versus 29 previously), and protozoal enteritis (22 versus 19) all decreased in ranking on this year’s survey. Avian Metapneumovirus (AmPV ranked 33 compared to 30) decreased in importance in the latest survey, as the incidence in geographical areas decreased.

Mycoplasma synoviae (MS) infections (infectious synovitis) are one cause of synovitis. It may be present in flocks 10-12 weeks of age with typically low mortality and low morbidity. There were 51 cases of MS reported (Table 3). The primary breeders have remained free of

Highly pathogenic avian influenza (H5N1) continues to infect poultry in Southeast Asia, with sporadic introductions in Europe and Africa. Poultry in the U.S. have continued to remain negative for Highly Pathogenic Avian Influenza (H5N1). The possibility of the spread of this virus to the U.S. through the illegal transport of infected birds or migration of infected wild birds remains a concern. The NPIP Commercial Poultry H5/H7 LPAI surveillance program provides for 100 percent indemnity for commercial plan participants. In many geographic areas where flock isolation is practical, controlled marketing may be the preferred method of eradication since consumption of meat from LPAI flocks does not pose a risk to the public health. If flock destruction is necessary in the eradication of H5/H7 LPAI, then 100 percent indemnity is appropriate, as it is already provided for in the eradication of HPAI.

The federal regulations governing the use of autogenous veterinary biologicals are antiquated and inhibitory toward effective preventive applications in the poultry industry. The main issues include the narrow time limits on the use of a microbiological isolate and the restrictions requiring use only in the herd of origin. The industry urges the Veterinary Services (VS), Center for Veterinary Biologics (CVB) to revise these regulations in favor of a more effective and user-friendly approach.

While the consumer and industry both desire safe food, public health officials and veterinarians must realize that the most effective interventions to prevent food-borne illness remain proper food preparation and handling. Proper food handling and appropriate processing technologies are the best way forward. Attempting to control food-borne disease by selectively eliminating
REPORT OF THE COMMITTEE

normal intestinal inhabitants of domestic animals, as with the recent USDA Food Safety and Inspection Service (FSIS) focus on pre-harvest salmonella control, essentially represents a national certified raw meat program similar to the hazardous certified raw milk program. Such an effort is distracting to the main food preparation issues, and represents a major policy development failure. While significant progress has been made in E. coli 0157 control in beef, it must be pointed out that the improvements resulted from improved processing technology, not on-farm interventions. Pre-harvest interventions were not a factor.

National Animal Identification System (NAIS) is a modern, streamlined information system that helps producers and animal health officials respond quickly and effectively to animal health events in the US. The commercial, integrated poultry industry has the ability to do detailed trace backs within 48 hours. The industry has been tracking flocks for many years, and continues to update programs that streamline the ability to do epidemiological trace backs. We urge the USDA to consider developing criteria required to conduct adequate trace backs for the poultry industry rather than mandating a specific national program. A new national program would be costly and redundant because the industry would be required to overlay this on existing programs that are already more than adequate.

Over the past decade, the industry has adapted its production systems from multi-age facilities to single-age operations. The current survey reports that 55 percent (Table 3) on average, of the respondent’s turkey operations are single-age production (all-in/all-out, brood-n-move). Single-age production systems have shown benefits to control/minimize disease challenges specific to different geographical areas.

Turkey Production in 2006 increased from 7206.56 to 7417.84 million pounds (live weight). Overall domestic per capita consumption for turkey products increased slightly from 16.654 to 16.874 pounds. Exports decreased slightly from 570 to 546 million pounds from 2005 to 2006. Production increased to 261.96 million head slaughtered with an average live weight of 28.32 pounds, compared to prior year figures of 252.053 million head and 28.15 pounds average weight, respectively (reference: Turkey Sourcebook, National Turkey Federation).
### Table 1. Turkey health survey (September 2007) of US veterinarians in turkey production ranking current disease issues (1= no issue to 5 = severe problem). Survey response (reply) is 100% (n=23).

<table>
<thead>
<tr>
<th>Issue</th>
<th>Score Average (1-5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of approved, efficacious drugs</td>
<td>4.7</td>
</tr>
<tr>
<td>Colibacillosis</td>
<td>3.4</td>
</tr>
<tr>
<td>Late Mortality</td>
<td>3.4</td>
</tr>
<tr>
<td>Leg Problems</td>
<td>3.3</td>
</tr>
<tr>
<td>Cellulitis</td>
<td>3.1</td>
</tr>
<tr>
<td>Heat stress</td>
<td>3.1</td>
</tr>
<tr>
<td>Poult Enteritis of unknown etiologies</td>
<td>3.0</td>
</tr>
<tr>
<td>Bordetella avium</td>
<td>2.7</td>
</tr>
<tr>
<td>Cholera</td>
<td>2.7</td>
</tr>
<tr>
<td>Breast Blisters and Breast Buttons</td>
<td>2.7</td>
</tr>
<tr>
<td>Osteomyelitis (OM)</td>
<td>2.6</td>
</tr>
<tr>
<td>Fractures</td>
<td>2.5</td>
</tr>
<tr>
<td>Cannibalism</td>
<td>2.5</td>
</tr>
<tr>
<td>H3N2 Swine influenza</td>
<td>2.4</td>
</tr>
<tr>
<td>Salmonella</td>
<td>2.4</td>
</tr>
<tr>
<td>Tibial Dyschondroplasia (TDC, Osteochondrosis)</td>
<td>2.4</td>
</tr>
<tr>
<td>Ornithobacterium rhinotracheale (ORT)</td>
<td>2.4</td>
</tr>
<tr>
<td>Newcastle Disease Virus (NDV)</td>
<td>2.2</td>
</tr>
<tr>
<td>Blackhead (Histomoniasis)</td>
<td>2.1</td>
</tr>
<tr>
<td>Coccidiosis</td>
<td>2.0</td>
</tr>
<tr>
<td>Round Worms (Ascaridia dissimilis)</td>
<td>2.0</td>
</tr>
<tr>
<td>Protozoal Enteritis</td>
<td>2.0</td>
</tr>
<tr>
<td>Shaky Leg Syndrome</td>
<td>2.0</td>
</tr>
<tr>
<td>Mycoplasma iowae (MI)</td>
<td>1.9</td>
</tr>
<tr>
<td>Erysipelas</td>
<td>1.7</td>
</tr>
<tr>
<td>Avian Influenza</td>
<td>1.6</td>
</tr>
<tr>
<td>Mycoplasma gallisepticum (MG)</td>
<td>1.6</td>
</tr>
<tr>
<td>Mycoplasma synoviae (MS)</td>
<td>1.6</td>
</tr>
<tr>
<td>Necrotic enteritis</td>
<td>1.4</td>
</tr>
<tr>
<td>Turkey Coronavirus</td>
<td>1.4</td>
</tr>
<tr>
<td>PEMS (Poult Enteritis Mortality Syndrome)</td>
<td>1.3</td>
</tr>
<tr>
<td>Mycoplasma meleagrisid (MM)</td>
<td>1.2</td>
</tr>
<tr>
<td>Avian Metapneumovirus</td>
<td>1.2</td>
</tr>
<tr>
<td>Spondylolisthesis (Kinky-Back)</td>
<td>1.2</td>
</tr>
</tbody>
</table>
Table 2. Cellulitis survey (September 2007) of US veterinarians in turkey production ranking current disease issues (1 = NO to 2 = YES, mild to 5 = YES, severe). Survey response (reply) is 100% (n=23).

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Bubble tail?</td>
<td>1.9</td>
<td>1.9</td>
</tr>
<tr>
<td>Abdominal subcutaneous fluid and crepitus?</td>
<td>3.3</td>
<td>3.5</td>
</tr>
<tr>
<td>Problem is less (1) - more (5) severe compared to prior year?</td>
<td>2.4</td>
<td>-</td>
</tr>
<tr>
<td>Composter for dead bird disposal?</td>
<td>1.7</td>
<td>1.2</td>
</tr>
<tr>
<td>[Clostridium] contaminated meat-bone meal?</td>
<td>1.5</td>
<td>2.1</td>
</tr>
<tr>
<td>Meat-bone meal possibly “feeds” the gut clostridium?</td>
<td>1.7</td>
<td>1.8</td>
</tr>
<tr>
<td>Increased amount of unabsorbed protein in lower gut?</td>
<td>1.5</td>
<td>-</td>
</tr>
<tr>
<td>Decreased incidence associated with formaldehyde feed treatment?</td>
<td>1.2</td>
<td>1.5</td>
</tr>
<tr>
<td>Decreased mortality/severity associated with formaldehyde feed treatment?</td>
<td>1.3</td>
<td>-</td>
</tr>
<tr>
<td>Decreased incidence associated with intense water sanitation program?</td>
<td>1.5</td>
<td>1.6</td>
</tr>
<tr>
<td>Multi-age farm sites?</td>
<td>1.9</td>
<td>1.8</td>
</tr>
<tr>
<td>In hens?</td>
<td>1.8</td>
<td>1.8</td>
</tr>
<tr>
<td>In toms?</td>
<td>3.2</td>
<td>3.3</td>
</tr>
<tr>
<td>Mash feed?</td>
<td>1.4</td>
<td>1.4</td>
</tr>
<tr>
<td>Pelleted feed?</td>
<td>1.6</td>
<td>2.0</td>
</tr>
<tr>
<td>Expanded feed (expander milling process)?</td>
<td>1.3</td>
<td>1.2</td>
</tr>
<tr>
<td>Reused litter?</td>
<td>2.6</td>
<td>2.9</td>
</tr>
</tbody>
</table>

Table 3. Turkey health survey (September 2007) of US veterinarians in turkey production. Survey response (reply) is 100% (n=23).

Cases (##) of Blackhead: 68
Cases (##) of Mycoplasma synoviae (MS): 52
Average of turkey operation utilize the Brooder Hub (off-site/single-age) system: 56%
Pullorum-Typhoid Status

In calendar year 2006, there were no isolations / outbreaks of Salmonella pullorum reported to the National Poultry Improvement Staff. There were no isolations/outbreaks of Salmonella pullorum reported during calendar year 2007 from January to October 1, 2007. There have been no isolations of Salmonella gallinarum since 1988 in any type poultry.

Hatchery Participation in the National Poultry Improvement Plan Testing Year 2006

Egg and Meat-Type Chickens:
- Participating: 283
- Capacity: 698,974,826

Turkeys:
- Participating: 49
- Capacity: 33,285,723

Waterfowl, Exhibition Poultry and Game Birds:
- Participating: 721
- Capacity: 26,321,162

Egg-Type Chicken Breeding Flocks in the National Poultry Improvement Plan Participation and Testing Summary Testing Year 2006

U.S. Pullorum-Typhoid Clean:
- Participating-Number: 184
- Birds in Flocks-Number: 3,914,294
- Average per Flock: 21,273

Primary Breeding Flocks:
- Flocks – Proportion of Total: 21.7
- Birds- Proportion of Total: 12.2
REPORT OF THE COMMITTEE

Meat-Type Chicken Breeding Flocks in the National Poultry Improvement Plan Participation and Testing Summary Testing Year 2006

U.S. Pullorum-Typhoid Clean:
- Participating- Number 4,866
- Birds in Flocks-Number 76,744,870
- Average per Flock 15,772

Primary Breeding Flocks:
- Flocks-Proportion of Total 9.7
- Birds-Proportion of Total 6.5

Turkey Breeding Flocks in the National Poultry Improvement Plan Participation and Testing Summary Testing Year 2006

U.S. Pullorum-Typhoid Clean:
- Participating –Number 525
- Birds in Flocks-Number 4,009,155
- Average per Flock 7,636

Primary Breeding Flocks:
- Flocks-Proportion of Total 20.6
- Birds-Proportion of Total 7.1

Waterfowl, Exhibition Poultry, and Game Birds Breeding Flocks In the National Poultry Improvement Plan Participation and Testing Summary Testing Year 2006

U.S. Pullorum-Typhoid Clean
- Participating 3,826
- Birds in Flocks 1,470,287

Primary Breeding Flocks:
- Flocks-Proportion of Total 32.6
- Birds- Proportion of Total 48.2

Mycoplasma gallisepticum, Mycoplasma synoviae, and Mycoplasma meleagridis positive breeding flocks National Poultry Improvement Plan 2006/7

WEGBY Egg-type Chickens Meat-Type Chickens

<table>
<thead>
<tr>
<th></th>
<th>WEGBY</th>
<th>Meat-Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turkeys</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mycoplasma gallisepticum</td>
<td>17</td>
<td>0</td>
</tr>
<tr>
<td>Mycoplasma synoviae</td>
<td>17</td>
<td>4</td>
</tr>
<tr>
<td>Mycoplasma meleagridis</td>
<td>0</td>
<td>2</td>
</tr>
</tbody>
</table>

684
### U.S. Salmonella enteritidis Clean-Egg-Type Chickens No. of flocks and birds in flocks by State with Salmonella enteritidis isolates, 1990-2006

<table>
<thead>
<tr>
<th>State</th>
<th>Flocks</th>
<th>Birds in Flocks</th>
<th>Environmental</th>
<th>Dead Germ</th>
<th>Bird</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arkansas</td>
<td>1</td>
<td>6000</td>
<td>-</td>
<td>2</td>
<td>15000</td>
</tr>
<tr>
<td>Georgia</td>
<td>1</td>
<td>400</td>
<td>2</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Illinois</td>
<td>3</td>
<td>3900</td>
<td>2</td>
<td>1</td>
<td>1200</td>
</tr>
<tr>
<td>Indiana</td>
<td>15</td>
<td>158345</td>
<td>2</td>
<td>15092</td>
<td></td>
</tr>
<tr>
<td>Kentucky</td>
<td>1</td>
<td>6625</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Ohio</td>
<td>14</td>
<td>183700</td>
<td>-</td>
<td>9</td>
<td>91600</td>
</tr>
<tr>
<td>Oregon</td>
<td>2</td>
<td>19516</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>14</td>
<td>166385</td>
<td>-</td>
<td>6</td>
<td>78450</td>
</tr>
<tr>
<td>Texas</td>
<td>1</td>
<td>10000</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
REPORT OF THE COMMITTEE

Egg-type Chicken breeding flocks with isolates of Salmonella enteritidis by phage type and by year 1989-2006

<table>
<thead>
<tr>
<th>Year</th>
<th>No. Flocks</th>
<th>Phage Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1989</td>
<td>1</td>
<td>13A</td>
</tr>
<tr>
<td>1990</td>
<td>11</td>
<td>13A, 13, 8, 28</td>
</tr>
<tr>
<td>1991</td>
<td>12</td>
<td>13A, 13, 8</td>
</tr>
<tr>
<td>1992</td>
<td>10</td>
<td>Untypable, 13A, 8,28,34</td>
</tr>
<tr>
<td>1993</td>
<td>5</td>
<td>Untypable, 8, 2</td>
</tr>
<tr>
<td>1994</td>
<td>3</td>
<td>13A, 8</td>
</tr>
<tr>
<td>1995</td>
<td>2</td>
<td>13A, 28</td>
</tr>
<tr>
<td>1996</td>
<td>5</td>
<td>Untypable, RNDC, 13A, 8,2</td>
</tr>
<tr>
<td>1997</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>1998</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>1999</td>
<td>1</td>
<td>13</td>
</tr>
<tr>
<td>2000</td>
<td>4</td>
<td>13, 8</td>
</tr>
<tr>
<td>2001</td>
<td>1</td>
<td>13</td>
</tr>
<tr>
<td>2002</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>2003</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>2004</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td>1</td>
<td>13</td>
</tr>
<tr>
<td>2006</td>
<td>1</td>
<td>34</td>
</tr>
<tr>
<td>2007</td>
<td>4</td>
<td>13, 8</td>
</tr>
</tbody>
</table>

U.S. Salmonella enteritidis Clean Egg-Type Chickens
Number of flocks and birds in the flocks with Salmonella enteritidis isolates, 1990-2007

<table>
<thead>
<tr>
<th></th>
<th>Environmental</th>
<th>Dead Germ</th>
<th>Bird</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flocks</td>
<td>60</td>
<td>6</td>
<td>19</td>
</tr>
<tr>
<td>Birds in Flocks</td>
<td>599,871</td>
<td>77,179</td>
<td>201,342</td>
</tr>
</tbody>
</table>
Pasteurella

During the period of August 1, 2006 through July 31, 2007, the National Veterinary Services Laboratories (NVSL) received 297 Pasteurella multocida isolates for characterization. Of these, 58.5 percent were submitted for somatic type analysis, 13.6 percent were submitted for DNA fingerprint analysis, and 27.7 percent of isolates were submitted for both tests. Results indicated that 18.2 percent were type 3, 4; 12.5 percent were type 1; 11.4 percent were type 3; and five percent were type 4. A total of 45.4 percent of the isolates were identified as other somatic types. The somatic type of 7.4 percent of the isolates could not be identified.

Salmonella

During the period of July 1, 2006 through June 30, 2007, the NVSL serotyped 18,246 Salmonella isolates recovered from animals, their environment, or feed. Of the 4979 poultry isolates (27 percent of total isolates), 3162 were recovered from chickens or their environment and 1817 were recovered from turkeys or their environment. The most common serotypes found in poultry this year are listed in Tables 1 and 2.

Table 1: Most Frequently Identified Serotypes from Chickens

<table>
<thead>
<tr>
<th>Clinical</th>
<th>Monitor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enteritidis</td>
<td>Kentucky</td>
</tr>
<tr>
<td>Kentucky</td>
<td>Heidelberg</td>
</tr>
<tr>
<td>Typhimurium</td>
<td>Enteritidis</td>
</tr>
<tr>
<td>Heidelberg</td>
<td>Senftenberg</td>
</tr>
<tr>
<td>Senftenberg</td>
<td>Typhimurium</td>
</tr>
</tbody>
</table>
Table 2: Most Frequently Identified Serotypes from Turkeys

<table>
<thead>
<tr>
<th>Clinical</th>
<th>Monitor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senftenberg</td>
<td>Hadar</td>
</tr>
<tr>
<td>Anatum</td>
<td>Schwarzengrund</td>
</tr>
<tr>
<td>Hadar</td>
<td>London</td>
</tr>
<tr>
<td>Montevideo</td>
<td>Heidelberg</td>
</tr>
<tr>
<td>Agona</td>
<td>Saintpaul</td>
</tr>
</tbody>
</table>

Mycoplasma

During the period of August 15, 2006 through August 15, 2007, the NVSL performed 285 avian Mycoplasma hemagglutination inhibition tests; a 35 percent increase in testing from last year. During this same period, 1245 ml of hemagglutination antigen and 946 ml of control sera were provided to other diagnostic laboratories.
Poultry and Hatching Eggs: During fiscal year (FY) 2007, 12,220,533 poultry including day old chicks, and 21,643,687 poultry hatching eggs were 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 2007, 452,188 commercial birds were released from USDA-supervised private bird quarantine facilities.

Pet Bird Program: There were 8,448 pet birds imported into the United States and quarantined at a USDA-operated animal import centers during FY 2007. The number of home quarantined birds was 538.

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.

Smuggled/confiscated birds: There were 266 birds confiscated by U.S. Customs during FY 2007.
AVIAN INFLUENZA

Live Bird Marketing System (LBMS): In FY 2007 the National Veterinary Services Laboratories (NVSL) tested 4,666 specimens in 859 submissions from 13 states (Connecticut, Florida, Kansas, Massachusetts, Maine, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Vermont, and Wisconsin) by virus isolation in embryonating chicken eggs for presence of avian influenza virus (AIV) and avian paramyxovirus type-1 (APMV-1) as part of the ongoing LBMS surveillance. The surveillance is a collaborative effort between individual States and the U.S. Department of Agriculture; however, only specimens submitted to NVSL are included in this report.

FY 2007 marked the successful eradication of the low pathogenicity H7N2 AIV that had been circulating in the live bird market system (LBMS) in the Northeast United States since 1994. The H7N2 virus has not been detected since March 2006. AIV or APMV was isolated from 17 percent (146 of 859) of LBMS submissions and 4.7 percent (17 of 4666) of specimens tested. Low pathogenicity H5 AIV was the most common subtype found in the LBMS this year; it was isolated from 39 specimens in 35 submissions. The H5N2 subtype AIV was isolated from 36 specimens from New York, and one each from New Jersey and Pennsylvania. In addition, an H5N9 subtype was isolated from a single specimen from Pennsylvania. The H5 viruses were shown to be low pathogenicity avian influenza (LPAI) virus by the chicken pathogenicity test and deduced amino acid profile at the hemagglutinin (H) cleavage site. Genetic studies showed the H5 viruses to be most closely related to North American H5 viruses circulating in wild ducks. Other subtypes of AIV isolated and the states the specimens originated and the number of isolations were: H2N3 (Ohio, n=2), H3N6 (Pennsylvania), H4N6 (New Jersey, n=2; New York, n=4; and Pennsylvania), H6N5 (Pennsylvania), H6N8 (New Jersey), H9N2 (New York), H10N7.
TRANSMISSIBLE DISEASES OF POULTRY
AND OTHER AVIAN SPECIES

(Pennsylvania), H11N2 (Massachusetts, n=2; New Jersey, n=2; and New York), and H11N9 (Pennsylvania). The remaining 159 viruses isolated were identified as APMV; 151 were identified as APMV-1 from nine states (Connecticut, Florida, Massachusetts, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, and Wisconsin), three were APMV-4 from Connecticut (2) and Pennsylvania, one was APMV-6 from New York and four were pigeon paramyxovirus type-1 (PPMV-1) viruses from New Jersey, New York and Pennsylvania. Pathogenicity of representative APMV-1 isolates from each submission was determined by the intracerebral pathogenicity index (ICPI, n=6) test and deduced amino acid profile at the fusion protein cleavage site (n=75). All but four isolates were characterized as low virulent (lentogenic pathotype) strains; the for isolates were characterized as pigeon paramyxovirus type-1 (PPMV-1), a pigeon-adapted variant of Newcastle disease virus.

Low Pathogenicity Avian Influenza (LPAI) in Commercial Poultry and Backyard Birds. Surveillance for AIV in commercial poultry continued in FY 2007 under provisions of the National H5 and H7 Low Pathogenicity Avian Influenza Control Program implemented in September 2006. Although most of the testing is performed locally, the NVSL provides reagents for the agar gel immunodiffusion (AGID) test and confirmation testing of positive specimens. Three outbreaks of LP notifiable AI were detected in three states (West Virginia, Nebraska and Virginia) and reported to the World Organization for Animal Health (OIE) in FY 2007. The West Virgina outbreak occurred in April 2007 and involved a single flock of 25,600 turkeys. Pre-slaughter testing resulted in detection of antibodies to the H5N2 subtype AIV. Additional specimens collected from the flock were positive for H5 specific RNA by real-time reverse transcription-polymerase chain reaction (rRT-PCR) but no virus was isolated in embryonated chicken eggs. Sequencing of the RNA from the clinical specimen showed the cleavage site of the H gene to be consistent with that of LPAI H5 virus. The premises were depopulated. The outbreak of LPNAI in Nebraska occurred in June 2007 and involved a multi-age turkey operation of 145,000 birds. Antibodies to H7N9 subtype AIV were initially detected in serum samples collected at slaughter. Subsequent testing of younger birds on the premises showed presence of AI specific RNA by rRT-PCR in swab specimens; the H7N9 subtype AIV was also isolated and characterized as LPAI.
The flock was disposed of by controlled marketing. Additional surveillance in surrounding flocks did not detect further spread of the virus. The third outbreak of LPNAI occurred in a flock of 54,000 turkeys in Virginia in July 2007. Initially, H5N1 specific antibodies were detected in pre-slaughter serum samples. Subsequent testing showed H5 RNA in clinical specimens by rRT-PCR but no H5N1 virus was isolated. However, the H5N1 virus was isolated from additional specimens collected at depopulation and characterized as LPAI. Surveillance of surrounding premises did not detect additional infections.

In addition to the outbreaks of notifiable AI H5 and H7, there were two submissions where only antibodies to H5 or H7 were detected. Isolated detections of antibodies in a flock in the absence of clinical disease or epidemiologic link to an outbreak are not reportable. The first such case involved a flock of 9,500 turkeys in Minnesota. In May 2007 antibodies to H7N9 were detected in serum samples collected at slaughter. Pre-market serum samples collected two weeks prior to slaughter tested negative by the AI agar gel immunodiffusion test. Surveillance in the region did not detect additional positive flocks. The second case involved a flock of ducks and guinea fowl in Ohio in April 2007. Pre-movement testing required for interstate movement detected antibodies to H5N2 and H4N2 in serum samples. No virus was isolated from the flock, and rRT-PCR tests were negative for H5 specific RNA. Surveillance of adjacent flocks did not detect any infection.

In FY 2007, 407 submissions were received from 23 states for AIV antibody detection and subtyping. The majority of the submissions (371) were from commercial poultry (369 from turkeys and two from chickens) from 11 states (Arkansas, Iowa, Illinois, Indiana, Michigan, Minnesota, North Carolina, Ohio, South Carolina, South Dakota, and Wisconsin) that were positive for antibodies to subtypes H1 and/or H3 in combination with N1 and/or N2. Vaccination for H1 and H3 is commonly practiced in turkey breeder flocks that are raised in close proximity to swine. Therefore, the total number of positive flocks may represent multiple testing of the same breeder flocks to fulfill the quarterly testing requirements under the National Poultry Improvement Plan. Detection of AIV or AIV-specific antibodies to AIV in non-commercial poultry/birds is shown in Table 1.

AIV Surveillance in Wild Waterfowl. In 2007, funding
was appropriated for surveillance to detect the highly pathogenic Asian strain of H5N1 in waterfowl in Alaska and the lower 48 states. The waterfowl surveillance is a cooperative effort between USDA's Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS), National Wildlife Research Center, and the Department of Interior's United States Geological Survey (USGS) National Wildlife Health Center. Specimens collected from wild-caught and hunter-killed waterfowl as well as from water, environment and feces were screened by rRT-PCR for AIV specific RNA at WS, National Animal Health Laboratory Network (NAHLN) laboratories and at the USGS laboratory in Madison, WI. Presumptive H5 and H7 positive specimens from WS, NAHLN and USGS were submitted to the NVSL for confirmation and virus isolation. In addition, specimens from wild bird mortality events (>500 birds) were submitted directly to the NVSL for testing. Between October 2006 and September 2007 more than 1,500 presumptive positive specimens were received for confirmation testing. No HPAI H5N1 was detected. However, LPAI H5N1 was detected in specimens submitted from 5 states (Delaware, Illinois, New Jersey, Maryland, and Michigan). The predominant subtype isolated was H5N2 with 46 isolations from 23 states. Additional H5 viruses with various N subtypes were detected as well. All H5 and H7 AIVs were characterized as LPAI viruses of North American lineage. Other AIV subtypes isolated included H1 through H4, H6, H7, H10 and H11. Details of the wild bird surveillance will be reported separately.

General Surveillance for HPAI and vND Viruses. The NVSL routinely receives specimens from investigations of suspected cases of foreign poultry diseases (FPD). During FY 2007, 654 specimens in 91 submissions from FPD investigations in 22 states were tested at the NVSL. No HPAI or vNDV was detected.

rRT-PCR Proficiency Test Panels. NAHLN laboratories conducting surveillance testing for AI and/or ND are required to have one or more diagnosticians pass an annual proficiency test (PT) to perform official rRT-PCR tests. In FY 2007, PTs were distributed to 243 diagnosticians in 55 laboratories for AI rRT-PCR and 242 diagnosticians in 54 laboratories for APMV-1 (Newcastle disease) rRT-PCR.

AI Diagnostic Reagents Supplied by the NVSL. A total of 18,221 units of AGID reagents (antigen and enhancement serum)
were produced and shipped to 92 state, university, and private laboratories in 36 states during FY 2007. The quantity is sufficient for approximately 2,186,520 AGID tests. An additional 1,234 units (148,080 tests) were shipped to 22 foreign laboratories.

International Training. In FY 2007 the NVSL, in collaboration with Iowa State University, Southeast Poultry Research Laboratory and the Foreign Agricultural Service, conducted two one-week courses on laboratory diagnosis of AI for 47 persons in 27 countries. In addition, NVSL personnel conducted in-country training on diagnosis of AI in Brazil (16 persons, 5 countries), Mexico (7 persons,) and Tanzania (10 persons).

NEWCASTLE DISEASE

Isolations of Virulent Newcastle Disease Virus (vNDV). In FY 2007 no vNDV was isolated from domestic poultry, imported caged (pet) birds, or birds confiscated by U.S. Customs in FY 2007. However, pigeon paramyxovirus type-1 (PPMV-1), a pigeon-adapted variant of NDV, was isolated from 41 pigeons and dove specimens in 12 states (Arizona, Georgia, Florida, Iowa, Maine, Michigan, Minnesota, New York, Ohio, Pennsylvania, South Carolina, and South Dakota).

Isolations of Low Virulent Newcastle Disease Virus (Avian Paramyxovirus Type-1, APMV-1). During FY 2007, 86 isolates of APMV-1 were received for characterization at the NVSL or were isolated at the NVSL from diagnostic and wild bird submissions. All of the isolates were characterized as low virulent NDV by the intracerebral pathogenicity index (ICPI) test and/or by deduced amino acid motif at the cleavage site of the fusion protein.

Newcastle Disease Diagnostic Reagents Supplied by the NVSL. A total of 303 vials (2ml each) of inactivated LaSota antigen were shipped to 10 domestic laboratories in 9 states and to 8 foreign laboratories. In addition, 4 vials (0.6ml each) of live LaSota virus were shipped to 3 domestic laboratories and 73 vials (2ml) of ND antiserum were shipped to 6 domestic laboratories in 6 states and 9 foreign laboratories.
Table 1. Subtypes of low pathogenicity AIV or specific antibodies detected in non-commercial poultry/birds, FY 2007.

<table>
<thead>
<tr>
<th>State</th>
<th>Species</th>
<th>Subtype of AIV*</th>
<th>Antibody Subtypes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arkansas</td>
<td>Swan</td>
<td>Multiple</td>
<td></td>
</tr>
<tr>
<td>California</td>
<td>Amazon Parrot</td>
<td>H5N2**</td>
<td></td>
</tr>
<tr>
<td>Florida</td>
<td>Chicken</td>
<td>H10</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Waterfowl</td>
<td>Multiple</td>
<td></td>
</tr>
<tr>
<td>Kentucky</td>
<td>Guinea fowl</td>
<td>H10N7</td>
<td></td>
</tr>
<tr>
<td>Mass.</td>
<td>Swan</td>
<td>Multiple</td>
<td></td>
</tr>
<tr>
<td>Minnesota</td>
<td>Pheasant</td>
<td>H3N2</td>
<td></td>
</tr>
<tr>
<td>New York</td>
<td>Quail</td>
<td>H5N2***</td>
<td></td>
</tr>
<tr>
<td>Ohio</td>
<td>Duck, Guinea fowl</td>
<td>H5N2, H4N2</td>
<td></td>
</tr>
<tr>
<td>Penn.</td>
<td>Chicken</td>
<td>H5N2***, H11N2,5, H?N2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Duck</td>
<td>H1,4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pheasant</td>
<td>H9N2</td>
<td>H10N7</td>
</tr>
<tr>
<td>S.D.</td>
<td>Goose</td>
<td>Multiple</td>
<td></td>
</tr>
</tbody>
</table>

*Low pathogenicity AIV by the chicken pathogenicity test.
**Bird confiscated by U.S. Fish and Wildlife Services
***Pretesting for live bird market
During the last several months a number of changes have occurred at the Centers for Epidemiology and Animal Health (CEAH). The primary organizational changes are the creation of an office of Collaboration and International Coordination, moving the Risk Analysis Team to report to the Director of the Center for Emerging Issues, and a few new functions. The National Surveillance Unit is the fourth CEAH center and over the last couple of years has been buried with the surveillance-related work needed by VS and our industries. One significant outcome of the reorganization will be a significant increase in National Surveillance Unit (NSU) staffing and accelerated planning and development of the National Animal Health Surveillance System. The National Animal Health Surveillance System (NAHSS) began as a concept in the minds of many people thinking toward the future needs of our industries to facilitate trade, policy decisions, consumer confidence, and informed policy decisions. Some of the outcomes of the concept were recommendations of the 2001 safeguarding review, a USAHA resolution to build a comprehensive NAHSS, the NAHSS Steering committee, and finally the NSU— the first unit in VS wholly dedicated to surveillance. Way back when, McCluskey conceived the idea of “the Survey-ilator” – a machine centered in the middle of the United States that would detect any disease, anywhere, and in any animal. We laughed at him. But since he was our boss, we were determined to figure out how it could be built. As it begins to mature, we are no longer calling it the “survey-ilator” – now we are thinking of it as a comprehensive and integrated NAHSS.

The NAHSS hasn’t happened by accident or overnight. For over a hundred years, VS and our industries have built the one of the greatest disease control and eradication infrastructures in the world. Now, after successfully eliminating many of those diseases, it is time to shift our surveillance thinking. Can we rapidly find the disease in the U.S.— wherever it may arise? Can we make
TRANSMISSIBLE DISEASES OF POULTRY AND OTHER AVIAN SPECIES

statements about our National Disease Status that will convince our trading partners that our products are safe and our consumers to buy them? Can our national policy decisions be informed by information based on actual data, support our industry, and spend tax dollars wisely for the benefit of all stakeholders? The goal of a Comprehensive, Integrated National Animal Health Surveillance System will do those things. The second step after creating a surveillance infrastructure is developing standardized surveillance plans and National surveillance systems that are comprehensive, where applicable, across populations, species, and geography. These comprehensive systems are objective-based tools in that the information to be received from them directly supports the purposes of the surveillance system. Integration of the National systems is the step that looks for efficiencies in budgeting, sampling strategies, laboratory processes, database and IT management, and analytic and reporting methods. During the integration of surveillance, it is imperative that the objective based goals are not lost or diluted by the need for cost efficiency. Finally, by applying the tools of standardized and objective-based approaches to national surveillance, a comprehensive integrated NAHSS will result.

As the NAHSS develops, it is important to recognize it as a chain of partners, each with a role and contribution to the final product—information to support policy decisions, trade markets, consumer confidence, and a healthy industry. Each link is of critical importance in that if any link in the chain is broken, the system fails. The NAHSS is growing up but with a few bumps in the road—there have been those moments!

BSE is an example of how a Comprehensive National Surveillance System can work. In 2003, the beef industry in the U.S. took a hit to the tune of about 2.5 to 3 billion dollars in trade and consumer markets. A concerted effort was taken by industry, APHIS, FSIS, and States working together to develop a National Surveillance plan, collect samples, develop and use a network of electronically linked laboratories, and build data systems—all in a very short time. The data from this system were analyzed—that is translated into information to help convince consumers to buy the products and trading partners to reopen markets. As this surveillance system continues to develop, the data are continually being used for national policy and trade negotiations. The take home message is that this national system was built by many
partners with a chain of actions that resulted in the ability to confidently make statements about the status of the disease in the United States. The bottom line is that the investment in this National Surveillance system provided a very substantial return to our industry – a return that continues to grow.

National Animal Health Reporting System (NAHRS) update: Participation 2007 – 46 States: New Mexico and Iowa participating since January 2007. Non-participants are: Connecticut, Georgia, Missouri, and Rhode Island. NAHRS Steering Committee representation is expanded to include National Assembly Districts; AVICs; and NPIP. NAHRS Online Reporting Tool v.2 was released this fall with improved function and format of the system. EIA Sub-committee requested an EIA reporting module. State personnel will have the option of reporting summary level EIA data monthly through NAHRS instead of annually to Equine Program staff. It underwent a pilot test Sept 2007. Excellent feedback was received and a projected release was set for Nov 2007. NAHRS Issues include: 1. Notifiable LPAI H5 and H7 (poultry) draft requires concurrence of state and federal prior to reporting; 2. Compartment vs. ‘commercial’ reporting; 3. NAHRS Disease Reporting Criteria—relation to OIE reporting of the ‘identification of the presence of infection/infestation’.
REPORT OF THE SUBCOMMITTEE ON AVIAN INFLUENZA AND NEWCASTLE DISEASE

David E. Swayne
Southeastern Poultry Research Laboratory

There have been several major developments over the past year with avian influenza (AI) and Newcastle disease (ND). Since July 2006 to June 2007, 21 countries have reported outbreaks of H5N1 high pathogenicity avian influenza (HPAI) in poultry and/or wild birds including China (Hong Kong SAR), Ghana, Malaysia, and Togo (June 2007); Pakistan (May 2007); Afghanistan, Cambodia, and Kuwait (April 2007); China, Korea (Republic of), Russian Federation, Saudi Arabia, Thailand, and Turkey (March 2007); Lao PDR (February 2007); Hungary, Japan, and United Kingdom (January 2007); Cote d'Ivoire (November 2006); Sudan (August 2006); and Spain (July 2006) (Source: FAO). Since July 2007, H5N1 outbreaks have been reported in Bangladesh, Czech Republic, Egypt, France, Germany, India, Indonesia, Myanmar, Nigeria and Vietnam. There was no repeat of the extensive H5N1 HPAI wild bird cases in the European Union during 2007 as occurred in the winter of 2006 and only a few cases in late summer 2007. Most outbreaks are resurgence of virus already endemic in some developing countries. The source has typically been from the agricultural sector, especially maintained in domestic ducks, but some outbreaks have been linked to wild bird infections. The United Kingdom experienced a single farm outbreak in January 2007, which was most likely introduced from Hungary in uncooked turkey meat shipments. In September 2007, an outbreak of H7N3 HPAI was reported in broiler breeders in Saskatchewan, Canada. In May 2006, H5N2 HPAI was reported in ostriches of South Africa.

The major exotic poultry disease around the world is Newcastle disease (ND). For the period of July 2006 to June 2007, 60 countries reported ND cases. Many countries in the developing world have endemic ND and do not report occurrences of ND.

USDA-APHIS has two docket items for new regulations:

1. APHIS-2007-0014-0001 Importation of Table Eggs From Regions Where Exotic Newcastle Disease Exists, and
REPORT OF THE COMMITTEE

2. APHIS-2007-0033-0001 Agricultural Bioterrorism Protection Act of 2002; Biennial Review and Republication of the Select Agent and Toxin List; Proposed change to adopt World Organization for Animal Health (OIE) definition of virulent NDV so the Select Agent would be virulent Newcastle disease virus rather than Newcastle disease virus (velogenic).

The 7th International Symposium on Avian Influenza (AI) will be held at the University of Georgia, Athens, Georgia, on April 5-8, 2009. Currently, the conference is sponsored by Agricultural Research Service (ARS); Cooperative State Research, Education and Extension Service (CSREES); and Animal and Plant Health Inspection Service (APHIS), U.S. Department of Agriculture (USDA).

The proceedings of the 6th Symposium were published as a Special Issue of Avian Diseases in Vol. 51, Supplement 1, pages 157-514, 2007. The proceedings of the 1st to 6th symposia are available from the American Association of Avian Pathologists for a nominal fee (AAAP@uga.edu, http://www.aaap.info/educmat/). Proceedings of the 1st to 6th symposia are available as a CD. The 5th and 6th proceedings are available on line and as hard copies.
On September 22, 2007 a commercial broiler breeder producer from a sparsely populated poultry area in southern Saskatchewan reported a marked increase in mortality in a 24-week-old flock of spike roosters. On September 23, a consulting poultry extension veterinarian performed post-mortems and found lesions consistent with avian influenza. Federal officials were notified, the premises were quarantined and samples were submitted to the National Centre for Foreign Animal Diseases in Winnipeg. On September 25-26, virus isolation and molecular sequencing identified a highly pathogenic H7N3 subtype. Serological results and epidemiological investigation suggest that the spike males may have been infected by breeder hens in adjacent houses that may have harbored a low pathogenic strain of the virus. The World Organization for Animal Health (OIE) was notified of the laboratory findings on September 27, 2007. Depopulation of poultry at the affected premises, on-site disposal, movement controls and aggressive surveillance were implemented. Weekly surveillance in the 3km, 10 km and representative sampling in the rest of the control area have revealed no further evidence of exposure in commercial or backyard poultry thus far. Preliminary epidemiological and laboratory findings support the hypothesis of virus introduction through wild birds. This incident represents a second recent example in Canada of detecting a high pathogenicity avian influenza virus through passive surveillance very soon after it has mutated from a low pathogenicity molecular form. Although passive surveillance plays a critical role in detecting notifiable avian influenza the need for early detection systems in more densely populated poultry production regions remains.
REPORT OF THE COMMITTEE

RESEARCH UPDATE ON EXOTIC AND EMERGING POULTRY DISEASES

Mary Pantin-Jackwood, David L. Suarez, Laszlo Zsak, Erica Spackman, Darrell Kapczynski, Jack King, Claudio Afonso, Michael Day, Stephen Spatz, Qingzhong Yu, David E. Swayne
Southeast Poultry Research Laboratory

SUMMARY:
Exotic and emerging diseases of poultry continue to be a threat to U.S. poultry. Studies over the past year have demonstrated: 1) cooking poultry meat at minimum of 70°C kills avian influenza (AI) and Newcastle disease (ND) viruses in a few seconds, 2) low pathogenicity (LP) AI viruses isolated from free-living aquatic birds of North America over the past few years are distinct from the high pathogenicity avian influenza (HPAI) virus of Europe, Asia, and Africa, 3) experimental infection of waterfowl with H5N1 HPAI virus show that swans and geese are susceptible to the lethal effects of the virus but some duck species show minimal infection and no disease, 4) flies can be a source of ND virus dispersion from infected to susceptible poultry, 5) multiple genes in addition to the fusion and hemagglutinin/neuraminidase genes are involved in high virulence of velogenic ND viruses, 6) type 1 paramyxoviruses isolated from wild birds in North America are genetically diverse and have been a source of infection for poultry in the live poultry market system, 7) a polymerase gene primer set for real-time RRT-PCR test was developed that detects class 1 ND viruses, 8) real-time reverse transcriptase polymerase chain reaction (RRT-PCR) test for AI virus has been improved to eliminate PCR inhibitors in test samples and detect new H5N1 variants, 9) ducks are able to upregulate cytokine response of innate immunity and be protected from H5N1 HPAI virus as compared to chickens, 10) astroviruses, rotaviruses and reoviruses are common in intestines of turkeys and broilers in the United States, and 11) parvovirus was identified in turkeys with enteric disease.

Cooking kills highly pathogenic avian influenza (HPAI) and Newcastle disease viruses (NDV) in poultry meat. HPAI viruses can be present in the meat of infected poultry and a prior study demonstrated cooking was effective in killing an H5N1 HPAI virus. Two additional HPAI viruses (H5N2 Pennsylvania/83 and H5N2 Pennsylvania/83).
Texas/04) and two Newcastle disease viruses (avirulent Ulster and virulent California/02 strains) were tested for thermal inactivation in naturally or artificially infected meat. Cooking at 70°C or 73.9°C (165°F) was effective at killing the viruses in less than 1 minute. Therefore, proper cooking of poultry using the FSIS salmonella standards would be effective at killing both AI and Newcastle disease viruses.

Wild Bird Avian Influenza Monitoring. Wild bird monitoring continued with 4922 samples received and 6230 samples processed (including samples received in 2006) between Jan 1 and October 1 2007. Virus isolation results are pending. Several H5N1 low pathogenicity viruses from North American wild birds were characterized and found to be antigenically and genetically diverse, but distinct from Asian H5N1 viruses and no clinical disease was caused by isolates that were characterized in vivo.

HPAI viruses cause severe disease in swans and geese. Since 2002, H5N1 HPAI viruses have caused mortality in numerous species of wild aquatic birds in Asia and Europe. In collaboration with Southeastern Cooperative Wildlife Disease Study (University of Georgia), five species of wild ducks were intranasally inoculated with an Asian strain of H5N1 HPAI virus. The wood duck was from 2-4 times more susceptible to infection than chickens, a species highly susceptible to the virus. Mallards (Anas platyrhynchos), northern pintails (Anas acuta), blue-winged teals (Anas crecca), and redheads (Aythya americana) were less sensitive to infection, produced virus in low concentrations for short periods of time, and did not exhibit clinical signs. The data suggests that the wood duck would represent a sensitive indicator species for H5N1 HPAI should it enter North America.

Isolation of exotic Newcastle disease (END) virus from field-collected and experimentally infected flies. Animal operations provide an ideal breeding environment for flies and other insects that are ubiquitous in those facilities and there is concern that these insects can transmit viruses between far To assess the potential role of flies in the dispersion of END virus, virus isolation assays were conducted on flies collected on premises with END virus infected chickens and on experimentally infected flies. END virus was isolated from three of the nine fly species recovered by sweep netting at two premises with END virus infected backyard chickens during the END outbreak in California during 2003, and END virus was also recovered from house flies and little house
flies for three days after they were given END virus contaminated food. The isolation of END virus from field-collected and experimentally infected flies demonstrates their potential role for dispersion of virus from infected to susceptible birds. Biosecurity measures should include an aggressive vector control program on premises where flocks are being depopulated and on those with susceptible poultry to prevent transmission of END virus by flies.

Contribution of Genes of Newcastle Disease Virus to Pathogenicity. A major factor in the pathogenicity of Newcastle disease virus (NDV) is the amino acid sequence of the fusion protein cleavage site, but the role of other viral genes that contribute to virulence and different clinical forms of the disease remain undefined. To assess the role of other NDV genes in virus pathogenicity, a reverse genetics system was developed using the mesogenic NDV Anhinga strain to provide a backbone for generating gene mutations or gene exchanges in attempts to enhance or attenuate the virulence of that virus. Chimeras created by exchange of the Anhinga Hemagglutinin-Neuraminidase (HN) gene with HN genes of neurotropic and viscerotropic velogenic viruses produced no significant change in virus pathogenicity as assessed by conducting the mean death time and intracerebral pathogenicity index assays and by inoculation of susceptible day-old specific pathogen-free (SPF) chickens. Inclusion in the recombinant construct of homotypic F genes, obtained from the parental viruses, also failed to enhance the pathotype of the recombinant viruses to a velogenic pathotype. A HN gene exchange alone within the context of the NDV Anhinga backbone failed to increase virus virulence from mesogenic to velogenic pathotype and suggests a multigenic role for NDV pathogenicity.

Characterization of genetic diversity in U.S. endemic Newcastle disease virus (NDV). NDV is frequently recovered from wild bird species, but little is known about the distribution, genetic diversity, and the potential of those viruses to cause disease in poultry. A total of 300 NDV isolates collected during 1986 to 2005 in the U.S. from apparently healthy waterfowl and shorebirds were used to characterize the distribution of genotypes of endemic viruses and their potential for virulence. Phylogenetic analysis of the fusion protein identified 9 novel genotypes among the class I viruses and new subgroups among genotypes I and II of the class II viruses. This study is the first long term study of the diversity of NDV in North American waterfowl and the relationship
of these endemic viruses with viruses from live bird markets. The information is expected to impact surveillance and diagnostic methods.

Phylogenetic characterization and development of a real-time RT-PCR (RRT-PCR) test for Class I Hong Kong Newcastle disease viruses (NDVs). NDV can be classified into two different groups based on genetic sequence, either Class I or Class II NDV. Class I NDVs are normally present in waterfowl and in live bird markets but because of their large genetic diversity are often not detected with the U.S. validated matrix RRT-PCR diagnostic test. We sequenced the fusion protein cleavage site of 21 NDV isolates from Hong Kong live bird markets, conducted phylogenetic characterization, and developed an alternative real-time RT-PCR assay targeted to the polymerase gene, which complements the U.S. matrix gene assay. Phylogenetic analysis and preliminary RT-PCR tests suggest that the newly developed assay can detect a majority of class I isolates from the U.S. These will permit the sequencing, phylogenetic characterization, and prediction of the virulence potential for Class I viruses isolated in the United States.

Avian Influenza RRT-PCR improvements. Real time RT-PCR (RRT-PCR) is a high throughput molecular diagnostic test used for rapid detection of Avian Influenza virus (AIV) in clinical samples. However RT-PCR inhibitors present in the sample can adversely affect the performance of RRT-PCR. Several commercial RNA extraction kits were evaluated but none removed all of the RT-PCR inhibitors from cloacal swabs and tissues from clinical samples. A modified MagMAX-96 AI/ND viral RNA isolation procedure was developed (MagMAX, Ambion) for the efficient extraction of RNA from cloacal swabs and tissues. RRT-PCR was carried out in the presence of an internal positive control to detect inhibitors in the sample.

The current RRT-PCR H5 tests have been shown to miss the Fujian-like lineage of viruses because of nucleotide changes at the probe site. Two different approaches were used to solve this problem: the annealing temperature was reduced, and changes were introduced in the probe making it less specific at select nucleotide positions. Both methods improved sensitivity and specificity, but the change in the probe sequence appeared to give the best results as is being recommended.

Pathogenicity of H5N1 HPAI virus in ducks and chickens. Following infection with Asian H5N1 avian influenza (AI),
REPORT OF THE COMMITTEE

differences in pathogenicity between chickens and ducks have been observed. Chickens normally succumb to disease within 2 to 3 days after infection, while ducks, which are considered natural reservoirs for AI, have rarely displayed clinical signs of disease. In vivo innate immune responses differed between chickens and ducks. Based on the results of these studies, differences in innate immune response may play a role in understanding the pathogenesis of AI viruses in both chickens and ducks. Our studies indicate ducks are able to up-regulate cytokine expression, which correlated with protection from disease. In contrast, chickens displayed suppressed innate responses, which correlated with susceptibility to disease. Understanding the mechanisms for cytokine induction and suppression following HPAI infection will provide insights into the molecular interactions of AI within avian species.

Enteric viruses in chickens and turkeys. Enteric diseases cause substantial economic losses to the US poultry industry. In turkeys, poult enteritis complex (PEC), also known as poult enteritis mortality syndrome (PEMS) in its more severe presentation, and in chickens, runting-stunting syndrome (RSS), also called malabsorption syndrome, are the major enteric disease complexes. They are considered to be multifactorial diseases and many different viruses have been isolated from the intestinal contents of affected poultry flocks. A longitudinal survey to detect enteric viruses in intestinal contents collected from turkey commercial operations was performed using molecular detection methods. All of the commercial flocks were positive for rotavirus and astrovirus from 2 until 6 weeks of age, and most were intermittently positive until 12 weeks of age. Of the 96 samples collected from birds on the farms, 89.5 percent were positive for astrovirus, and 67.7 percent were positive for rotavirus. This report demonstrates that astroviruses and rotaviruses may be present within a turkey flock through the life of the flock.

Intestinal samples were also collected from 43 commercial broiler, and 33 commercial turkey flocks from all regions of the United States during 2005 and 2006, were examined for the presence of enteric viruses by molecular tests. Astroviruses were identified in samples from 86 percent of the chicken flocks and 100 percent of the turkey flocks. Both chicken astrovirus (CAstV) and avian nephritis virus (ANV) were identified in chicken samples and often both viruses were detected in the same sample. Turkey
astrovirus type-1 (TAstV-1) and turkey astrovirus type-2 (TAstV-2) were both found in 100 percent and 15.4 percent of the turkey flocks, respectively. In addition, 12.5 percent of turkey flocks were positive for ANV. Rotaviruses were present in 46.5 percent of the chicken, and 69.7 percent of the turkey flocks tested. Based upon the rotavirus NSP4 gene sequence, the chicken and turkey origin rotaviruses assorted in a species-specific manner. Reoviruses were identified in 62.8 percent and 45.5 percent of chicken and turkey flocks respectively. Based on the reovirus S4 gene segment the chicken and turkey origin viruses assorted separately and were distinct from all previously reported avian reoviruses. Coronaviruses were detected in the intestinal contents of chickens, but not in turkeys. Adenoviruses were not detected in any chicken or turkeys flocks. Most flocks were positive for two or more of the viruses and overall no clear pattern of virus geographic distribution was evident. This study provides updated enteric virus prevalence data for the US using new molecular methods and reinforces that enteric viruses are widespread in poultry throughout the US, although the clinical importance of most of these viruses is unknown.

The application of a molecular screening method was designed to detect novel viruses from intestinal samples of turkeys exhibiting PE Particle-associated nucleic acid was extracted from intestinal homogenate of affected poultry, and the DNA was randomly amplified using random hexamer oligonucleotides, and PCR products were cloned and sequenced. Of 146 clones studied, 19 percent showed significant similarity to viral sequences at the amino acid level. The deduced amino acid sequences significantly matched members of the Parvoviridae family.

Recent pathogenesis studies suggest that infection with turkey-origin reovirus (TRV) can lead to immune dysfunction in poults. To this end, real-time RT-PCR assays were developed for the turkey cytokines IL-2, IL-18, IL-1β, and INF-γ in order to analyze the immune system dysfunction in poults with reovirus infections. Each assay was validated using in vitro transcribed RNA specific for each turkey cytokine and using total RNA isolated from turkey spleen. These assays will be useful in quantifying the immune response of different turkey breeds and turkeys of different ages to viral infection.
Avian Influenza (AI). In May of 2005, the International Committee of the OIE adopted a new Code Chapter on Avian Influenza and established risk-based import measures for trading in poultry commodities. The Code Chapter addresses all highly pathogenic strains of AI as well as any H5 and H7 subtype of low pathogenicity. The chapter was slightly updated in May of 2007, which included adding backyard poultry and game fowl to the definition of poultry, as well as some specific language stating that countries should not place immediate trade bans on poultry commodities when a country reports detecting either low or high pathogenic AI in wild birds.

The associated appendix, which provides the recommended time and temperature parameters for the inactivation of highly pathogenic avian influenza in eggs, egg products and raw poultry meat, was also updated.

In addition, this year the OIE published two brochures (not part of the Terrestrial Animal Health Code). One brochure provides a summary of the recommendations coming out of the Verona Conference on AI Vaccination, and the other brochures provides a checklist on the practical application of compartmentalization for AI and Newcastle disease.

Newcastle disease. This year the OIE drafted a new Code Chapter on Newcastle disease. Member countries needed to comment on the proposed draft by early August, 2007. If no significant changes are made to the proposed draft chapter, it will likely be adopted during the May 2008 General Session.

Animal Welfare. No new guidelines for animal welfare were adopted this past May. However, a discussion paper addressing how any future guidelines on housing and husbandry of terrestrial animals might be addressed was shared with member countries.
HIGHLY PATHOGENIC AVIAN INFLUENZA (HPAI) APPRAISAL AND COMPENSATION

Jonathon Zack
Emergency Management and Diagnostics
National Center for Animal Health Emergency Management

HPAI Appraisal and Compensation: USDA Authority

The Animal Health Protection Act (AHPA), 7 U.S.C. 8301 et seq. enables the Secretary of Agriculture to prevent, detect, control, and eradicate diseases and pests of animals such as HPAI, in order to protect animal health, the health and welfare of people, economic interests of livestock and related industries, the environment, and interstate and foreign commerce in animals and other articles. The AHPA provides a broad range of authorities to use in the event of an outbreak of HPAI in the United States and to prevent the introduction of such a disease into the United States.

The United States Department of Agriculture (USDA) is the primary federal agency for incident management during a HPAI event. USDA coordinates incident management teams, manages incident response, manages public message, and takes measures to control and eradicate the disease. Measures used to control and eradicate HPAI include quarantine and movement controls, epidemiologic investigation, appraisal and compensation, depopulation (euthanasia) of affected birds, carcass disposal, cleaning and disinfection, surveillance, diagnostics, and, potentially, strategic vaccination.

Title 9 Part 53 of the Code of Federal Regulations (CFR) provides regulations for foot-and-mouth disease, pleuropneumonia, rinderpest, and certain other communicable diseases of livestock and poultry, including HPAI.

HPAI Appraisal and Compensation: Summary of the National HPAI Response Plan August 2007 - Part II. J.

The AHPA provides authority to the Animal and Plant Health Inspection Service (APHIS) to establish and implement an indemnification program to prevent or eradicate an AI outbreak. Indemnity is a key component of APHIS’ disease control programs in that the promise of fair compensation for losses helps to ensure the quick and full cooperation of the owners of affected livestock. Such cooperation is central to rapid disease control.
and eradication. In an HPAI outbreak, it may be necessary to order the destruction of birds on or epidemiologically linked to an infected premise – either commercial or backyard – to ensure that the disease does not spread. The Secretary has the authority to pay up to 100 percent of the fair market value of the birds and for disposal and cleaning and disinfection. But it must be made clear that compensation only will be paid in cases where State and Federal animal health authorities concur with recommendations to order the destruction of birds, whether those recommendations come from industry, State, or Federal authorities.

The best practices for containment and eradication of HPAI will in many instances require a speed of depopulation, disposal, and decontamination that is more rapid than can be achieved with a slow or deliberate appraisal processes. Appraisals will not be required to be signed prior to destruction if APHIS and the cooperating State Agency agree that the poultry must be destroyed immediately to mitigate the potential spread or potential amplification of HPAI virus during a response to a confirmed or presumptive HPAI incident. All data that are required to determine fair market value will be collected prior to depopulation, including a complete inventory of birds being destroyed.

APHIS has recently published an Interim Final Rule 1 to increase indemnity for H5/H7 low pathogenic avian influenza (LPAI) viruses, adding parts 56 and 146 to Title 9 of the CFR. Section 56 deals with indemnity payments for H5/H7 LPAI. In 9 CFR 56.8 Conditions for Payment, a formula is described for distributing indemnity between owners and growers. Indemnity distribution between owners and growers will follow the formula set out in 9 CFR 56.8 or as set forth in any forthcoming changes or revisions to the interim final rule.

Appraisal Procedures

The immediate purpose of the appraisal process is to determine the fair market value of domesticated birds and other livestock and materials to be indemnified. The goal is to provide fair market value indemnity payment to owners and contract growers of domesticated birds, other livestock, and materials requiring destruction to prevent the spread of HPAI virus. Appraisal schedule valuations developed by APHIS from market and industry information will be used in most instances
to calculate the fair market value for domesticated birds, other livestock, or materials requiring destruction. Additional appraisal methods may be offered in instances where domesticated birds and other livestock do not fit the averages on which valuations are based.

Preliminary Inventory

Once a Foreign Animal Disease Diagnostician (FADD) or designated official has determined that domesticated birds and other livestock and/or materials on a premises have been infected or contaminated by or exposed to HPAI virus, a preliminary inventory made of the domesticated birds and other livestock and materials is taken and then this information is entered into the Emergency Management Response System or other acceptable database. In this capacity, the FADD serves as a liaison with the Appraisal Unit to identify the domesticated birds and other livestock and materials to be appraised.

The Appraisal Unit Leader should check with the animal owner to determine whether any high-value (i.e., unique, special, exotic, or purebred) domesticated birds and other livestock are present before sending an Appraisal Team to the premises. If domesticated birds and other livestock are present, the Appraisal Unit Leader should contact the Emergency Management Compensation Specialist to discuss the situation, including any special documentation required from the owner. The Appraisal Unit Leader should then inform the Appraisal Team how to handle the situation and if a special expert appraiser will be part of the Appraisal Team.

Coordinating Appraisal Activities

The Appraisal Unit Leader should determine the order in which domesticated birds and other livestock and materials will be appraised. In general, domesticated birds and other livestock should be appraised first, and materials including animal products and feed should be appraised last. The goal is to perform appraisal before depopulation, unless predetermined fair market compensation has been accepted.

1.http://a257.g.akamaitech.net/7/257/2422/01jan20061800/edocket.access.gpo.gov/2006/pdf/06-8155.pdf; Section 56.8, Conditions for payment.
2. A study by the University of Delaware and the University of Maryland has shown that composting temperatures reach approximately 140°F after 2 to 3 days. Senne et al. (1994) found that HPAI virus was inactivated at the end of the first 10 days of composting.

Conducting an Appraisal

The appraisal process consists of a number of steps or tasks, each of which is essential to a successful appraisal and prompt owner compensation. Some key tasks are outlined below:

• Determine the correct name and address of the owner(s) of the domesticated birds and other livestock on the premises and record this information on VS Form 1–23.
• Make sure what is eligible for compensation before proceeding with the appraisal.

Allowable claims include:

• Domesticated birds and other livestock destroyed due to infection or exposure to HPAI virus.
• Materials destroyed due to contamination or exposure to HPAI virus.

USDA will not allow claims involving:

• A payee who has not complied with all quarantine requirements.
• Expenses for the care and feeding of domesticated birds and other livestock held for destruction.
• The destruction of domesticated birds and other livestock or materials unless these have been appraised as described in Part II, Section J, or the owner has signed the VS Form 1–23.
• The destruction of domesticated birds and other livestock or materials that have been moved or handled in violation of a law or regulation.

It should be noted that USDA-APHIS-VS will not provide indemnity for other losses associated with extended periods of downtime due to disease situations. USDA and its State partners will work expeditiously to complete necessary disease control response actions so that, to the extent possible, downtime is minimized.

• Appraisal of the fair market value of domesticated birds and other livestock is estimated using fixed rate valuation, sales
comparison approach, cost-of-production approach, or income approach. (See Appendix G for definitions of appraisal methods.)

When appraising an animal, the Appraisal Team should consider the purpose for which the animal is being reared as well as its age, conformation, physical condition, and potential production.

- Appraisal of materials such as products from domesticated birds and other livestock (e.g., eggs), housing units, bedding, feed for domesticated birds and other livestock, farm equipment, clothing, articles stored in or adjacent to barns or other structures, and other items (e.g., board fences and wooden feed racks).
- Materials to be appraised and destroyed will have been contaminated by or exposed to diseased domesticated birds and other livestock and will be incapable of being cleaned and disinfected adequately. Inputs, such as feed, and outputs, such as eggs, should be appraised using the sale comparison approach. Permanent assets, such as fences and barns, can be appraised using the cost-of-production approach with depreciation.
- Ensure that the owner or owner’s representative(s) is aware of the Owner-Claimant Mortgage Certification on VS Form 1–23 concerning liens and mortgages. The Owner-Claimant Mortgage Certification is to be signed by the owner and by each person holding a mortgage on the domesticated birds and other livestock or materials.
- Obtain an accurate inventory of domesticated birds and other livestock and materials to be destroyed for which indemnity will be paid.
- Complete forms, catalogue any visual records, crosscheck information and process for approval.

Appraisal Disputes

Disputes over appraisal and compensation will not delay the destruction of domesticated birds and other livestock and materials. USDA is authorized by the AHPA to seize domesticated birds and other livestock and materials to prevent the dissemination of the pest or disease, and the owner is required to follow the order of the Secretary. Owners and contract growers who wish to dispute the appraisal may appeal the evaluation. USDA will cooperate to promptly resolve any appraisal disputes.
Processing Indemnity Checks

Finance/Administration Section personnel will check the VS Form 1–23 and will then complete the “Indemnity Claim Transmittal” (VS Form 1–31). Under normal circumstances, after final approval, the package is forwarded to USDA-APHIS-VS, Marketing and Regulatory Programs Business Services, for final processing.

Alternative Processing

During a major HPAI outbreak, alternative indemnity payment processes may be used to expedite owner compensation. Upon reporting to the Field Operations Center, the Appraisal Officer should contact the Finance/Administration Section Chief to determine locally arranged procedures for processing the VS Form 1–23.

HPAI Appraisal and Compensation: Summary of the National HPAI Response Plan August 2007 - Appraisal Methods, Appendix G.

Fair market value is most effectively determined when a sale occurs between a knowledgeable and willing buyer and seller. Obviously, the destruction of an owner’s birds/livestock is not a sale between a willing buyer and seller, so fair market value must be estimated. An appraisal is an estimate of what an animal is worth or the price it would have received if it had been sold. Special consideration may be needed to establish the fair market value of species of birds/livestock of valuable genetic stock.

The sales comparison approach is a method for determining value where the appraiser uses information from recent sales of comparable properties to form an opinion of the value of the subject property (the animal being appraised). Ideally, comparable properties match with the subject property in major characteristics; however, this may not always be the case. When there are some differences in major characteristics, the appraiser must make adjustments to the values of the comparable properties to estimate the value of the subject property. When using the sales comparison approach, it is important to base the estimated sale price on what the owner would receive for his or her birds/livestock at the farm.

Sometimes, only retail prices are observed (as is the usual case with pet birds or pet fish). However, the sales comparison approach method is not an effective method for estimating fair
market value when market prices are not observable or reflective of true value due to the low number of birds/livestock traded. When the sales comparison approach method cannot be used, two other appraisal methods are available: the cost-of-production approach and the income approach. Both approaches require detailed knowledge of production costs.

The cost-of-production approach assumes that an asset should have worth at least equal to the cost to produce it. The cost-of-production approach can also be used to estimate value of breeding stock to the point of sexual reproduction; e.g., egg laying in poultry and piglets in swine.

The income approach is an appraisal approach that incorporates the value of future production into the value of the asset (birds/livestock). Asset value is a function of both revenues and costs associated to produce the revenues. Since the income approach incorporates future production, there is no payment of additional indemnity for lost egg production.
On March 29, 2007 a flock of 25,000 forty-pound turkeys on a farm in West Virginia was found to be serologically positive by the agar gel immunodiffusion test for avian influenza during routine preslaughter monitoring. Several months later, on July 6, 2007, similar results were reported for a 24,000-bird flock of forty pound turkeys located in the Shenandoah Valley, Virginia. This farm also contained 30,000 three-week-old birds. In both cases swabs were immediately submitted for real-time polymerase chain reaction (rtPCR) testing and virus isolation. Both flocks were reported to be matrix positive after 35 cycles on the rtPCR test and both sets of swabs were subsequently reported to be negative for virus isolation. A low pathogenicity H5N1 virus was isolated from follow-up samples in the Virginia case. Virus was never isolated from the West Virginia case although sequence information from the PCR product indicated that the seroconversion was due to a low path H5N2 virus. Both viruses were believed to be of wild waterfowl origin.

In both incidents the decision was made to depopulate the farms and dispose of the animals by composting on the farm. As this was the first test of the Low Path H5 and H7 Avian Influenza Plans in both Virginia and West Virginia, there were things that went very well and there were opportunities to improve the response in future breaks.

The two most positive outcomes from these incidents were the cooperation that occurred between companies in dealing with depopulation and disposal and the use of foaming as a depopulation method. The application of foam was not without problems, but consideration must be given to the fact that this was the first time this procedure had been applied in large scale to animals of this size. By all accounts, after the logistics of foam application were worked out, the process was quick and efficient.

As with any new program or procedure, several opportunities for improvement can be identified. These include:

1. Diagnosis – The objective of preslaughter surveillance
needs to be evaluated. If we are trying to identify flocks that have been exposed to avian influenza during their lives, antibody testing is appropriate because it represents a historical record of what has occurred during the life of the flock. If, however, our objective is to identify flocks with active infections in order to prevent spread of disease during movement, perhaps one of the newer rapid antigen detection tests should be considered as the test of choice.

2. Execution of depopulation and disposal: In the West Virginia incident the affected company was responsible for depopulation and disposal. While this was an efficient method, the downside was that the procedures tied up virtually all of the manpower from that company and they were not able to accomplish other surveillance testing in a timely fashion. In the Virginia break, depopulation and disposal was handled but a commercial company. This also was efficient but expensive. A third option that has been discussed is a regional response team consisting of personnel from companies in the area. Regardless of which option is used, efficient response dictates that decisions and training be made in advance.

3. Appraisal for indemnification: In the Virginia case, a significant delay occurred due to a requirement that the birds be appraised before depopulation could occur. It would seem that for mainstream commercial birds it would be possible to document the number of birds involved and their size and proceed with depopulation before the monetary value of the birds is officially determined.

4. Disposal: In neither of the incidents was there a pre-determined plan for disposal of the animals. Just as commercial operations are required to have pre-approved nutrient management plans, it would seem prudent to have pre-approved disposal plans for the worst case scenario of the maximum capacity of market aged animals that can be expected for that farm. The plan should include method of disposal and acquisition of materials, equipment and manpower to complete the disposal in an efficient manner.

5. Controlled Slaughter: In neither incident was the option of controlled slaughter discussed. In cases such as the West Virginia incident where no virus was ever recovered, it would seem that controlled slaughter might have been one option to save the taxpayers of the United States significant money yet not represent a threat to other animals.
In both of these incidents, it might be argued that the significant expenditure of the taxpayer’s money may not have been necessary. In any new program, such as the low path H5-H7 program, there is going to be a learning curve and many opportunities for improvement. Future success of the program depends on thorough examination of the successes and failures in each incident with the intent of building on the successes and fixing the failures.
As part of the government-wide National Strategy for Pandemic Influenza, the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Department of Interior (DOI), and State Wildlife agencies provided leadership in conducting surveillance for the early detection of highly pathogenic avian influenza (HPAI) starting in 2005. Within APHIS, Wildlife Services (WS) was delegated the responsibility for plan development, implementation, and oversight. WS, in collaboration with State Wildlife Agencies, DOI, and Department of Health and Human Services, and other entities such as the Southeastern Cooperative Wildlife Disease Study (SCWDS), developed An Early Detection System for Highly Pathogenic H5N1 Avian Influenza in Wild Migratory Birds, U.S. Interagency Strategic Plan. This plan was developed through an interagency effort, and represented the largest coordinated wildlife disease surveillance effort ever implemented.

International Efforts

With the assistance of USDA-APHIS, International Services (IS), USDA Foreign Agricultural Service (FAS), and several non-governmental organizations, WS has achieved significant accomplishments and results regarding a variety of HPAI issues in wild, migratory birds. Issues related to developing wild bird surveillance plans, conducting workshops on bird capture, identification, and sampling, epidemiology, data management and diagnostics activities, and conducting in-country surveillance have yielded beneficial results. For example, IS and WS collaborated with the Wildlife Trust Alliance to implement the HPAI surveillance system in Mexico. Wild, migratory birds
REPORT OF THE COMMITTEE

were sampled at 26 different wetland sites with assistance from USDA. The collection of the subsequent 4,500 bird samples from 50 species improved the North American surveillance system and added protection to the US should the virus become established or detected in South and Central America. Through collaboration with FAS, WS and the University of Saskatchewan are bolstering surveillance in the Central Flyway to sample an additional 1600 wild, migratory birds. This support comes as a request from the Central Flyway Council. Additional surveillance agreements in Russia and Greenland have also helped trace virus movements and provide a more robust early detection system. The Russian, Danish/Greenland, and Canadian projects truly provide information on the potential movement of H5N1 into North America. These surveillance efforts coupled with programs in China, Cambodia, Lao, Indonesia, Philippines, Vietnam, Thailand, Argentina, Chile, and Brazil have helped APHIS improve the biosecurity of the United States concerning HPAI, and have laid the groundwork for improving disease surveillance in wildlife worldwide.

Domestic Efforts

The initiative is divided into two phases. The initial phase addresses early detection activities in Alaska, and in particular, coastal areas that have the most potential for contact among Asian and North American birds. The second phase addresses subsequent HPAI detection activities in four major North American flyways and relies on fall migration to move wild, migratory birds further south for an improved surveillance design. The plan for wild bird surveillance includes several interrelated components, including: the investigation of morbidity/mortality events; the sampling of live-captured birds; the deployment of sentinel species; environmental sampling; and sampling hunter-harvested birds.

APHIS is collaborating with other federal agencies and state officials to conduct surveillance in wild, migratory birds and cross training to improve surveillance strategies. To date, over 110,000 wild birds and 60,000 environmental samples have been tested for HPAI through the APHIS funded program. DOI and others have tested approximately 30,000 wild birds to date. The current year’s APHIS plan is to collect and analyze 50,000 wild birds and test 25,000 environmental samples through a targeted
surveillance approach. Detailed information can be found in WS' Implementation Plan for HPAI Surveillance in Wild Migratory Birds in the United States. The targeted surveillance approach will provide a better protective measure for the early detection of HPAI by sampling high value species using live-wild bird and hunter-harvest methods. Additionally, environmental fecal sample collection will be focused in high-use areas of migratory birds. This targeted approach leads to cost efficiency by collecting smaller sample sizes while maintaining integrity of the science-based approach.

While targeted-surveillance using live-wild birds, hunter-harvested birds, and environmental sampling is an important component of the surveillance effort, sampling morbidity/mortality events remains the most important sampling method in the program. It is highly recommended that all morbidity/mortality events in wild birds be evaluated for HPAI sampling, regardless of the species involved. To facilitate and improve the reporting of these types of events, WS has implemented a reporting system to answer calls and inquires from the public regarding dead or sick wild birds. The toll-free number, 866-4-USDA-WS, has been published on the APHIS website and popular literature to support public inquires and help expedite calls. The calls are being tracked through an on-line system to monitor any potential increases in dead or sick bird reports. A protocol and decision tree has also been developed to help triage reports of dead or sick birds. The protocol is a step-by-step guide to determine if sampling should be conducted or whether disposal is the best option. WS has partnered with many State Wildlife Agencies to help triage the calls.

In partnership with all 50 State Wildlife Agencies, WS accomplished a majority of sampling during 2006 fall migration and on wintering grounds of migratory birds, but efforts have continued through 2007 spring migration and breeding ground surveillance. Currently, surveillance activities are being increased during the current fall migration. Surveillance is conducted in all 4 major flyways - Pacific, Central, Mississippi, and Atlantic; all 50 States, Guam, and Puerto Rico; and foreign countries. Diagnostic testing of all wild bird samples collected in the U.S. is conducted through 45 National Animal Health Laboratory Network (NAHLN) laboratories and environmental samples are tested at WS' National Wildlife Research Center. Confirmatory testing
of all samples is conducted at the National Veterinary Services Laboratories (NVSL), Ames, Iowa. All wild bird samples are being submitted to laboratories in the NAHLN for initial screening using real-time, reverse transcription-polymerase chain reaction tests. Following these tests, matrix and H5/H7 positive samples are sent directly to the NVSL for additional testing including virus isolation, subtyping, and molecular sequence characterization. WS immediately notifies the appropriate State Wildlife Agency and DOI of NVSL test results for presumptive positive H5/H7 samples collected in the USDA program via email. In the case of presumptive H5N1 test results, WS notifies the State Wildlife Agency by telephone call to the State designated contact. VS notifies the State Veterinarian and the NAHLN laboratory of results.

To date, 33 presumptive positive and/or confirmatory test results for the low pathogenic H5N1 avian influenza in 13 States: Illinois, Maryland, Michigan, Montana, New York, Ohio, Delaware, South Dakota, Missouri, North Carolina, New Jersey, Pennsylvania, and Vermont. In all cases, genetic testing at NVSL ruled out the presence of the strain of HPAI that is circulating overseas. During the 2006 biological year, 253 low pathogenic H5 avian influenza viruses were detected in wild, migratory birds. To date during this biological year, 44 low pathogenic H5 avian influenza viruses have been detected in wild, migratory birds. Analyses of the 2006 H5 findings from wild birds are presented as a preliminary analysis.
As part of the United States Interagency Strategic Plan for early detection of HPAI H5N1 in migratory birds, DOI conducted surveillance during the 2006 season (April 1, 2006 – March 31, 2007) and is currently engaged in the 2007 season (April 1, 2007 – March 31, 2008). Surveillance strategies used by DOI include sampling of live-trapped birds (Strategy #2) and sport- and subsistence-hunted birds (Strategy #3), and avian influenza (AI) testing of carcasses from wild bird mortality events (Strategy #1). During 2006, DOI surveillance focused on sampling in Alaska, the lower Pacific Flyway, and Hawaii and United States territories and freely associated states in the Pacific while mortality investigations spanned all states and territories. During 2007, surveillance efforts expanded to include all four North American flyways. Species selected for surveillance were prioritized based on known ecology, behavior, and population movement and migration patterns and likely interactions with migratory birds from HPAI areas in Asia.

Cloacal and oral-pharyngeal swabs (cloacal swabs only in 2006) from birds sampled in strategies #2 and #3, and cloacal and tracheal swabs from carcasses necropsied in strategy #1 were screened for AI at the United States Geological Survey - National Wildlife Health Center (NWHC) by matrix reverse transcriptase-polymerase chain reaction (RT-PCR) assay. AI-positive samples were then screened for H5 and H7 subtypes. Samples positive for H5 and H7 subtypes were sent to the United States Department of Agriculture (USDA) - National Veterinary Services Laboratory (NVSL) for confirmation and further characterization. Swab samples were also inoculated into chicken eggs at NWHC for virus isolation.

During the 2006 season, 27,295 wild birds were tested, representing 177 species from 11 orders of birds. Avian influenza was identified by matrix PCR in 741 (2.7 percent) of the swab
samples; 23 of these were identified as H5 subtype, and 25 as H7 subtype. Virus isolation from swab samples yielded 20 H5 AI isolates; including 16 H5N2, 4 H5N3, and 3 H5N9 subtypes. Other hemagglutinin subtypes identified included H1-H8, H10, H11, H13, and H16, as well as representatives of all nine neuraminidase subtypes. In the 2007 season, samples from 8,800 birds have been submitted to date (11 October 2007), including 2,638 subsistence-hunted birds from Alaska, 5,761 live-captured birds, and 401 carcasses from mortality events. To date, 134 (1.5 percent) of the birds were positive for AI based on matrix PCR. We anticipate a total of >20,000 wild birds will be tested in the 2007 season.

Results of DOI surveillance under the Interagency Strategic Plan, combined with those from the USDA expanded surveillance, can be viewed at the NWHC-managed HPAI Early Detection Data System (HEDDS) found at http://wildlifedisease nbii.gov/ai.
In 2006 we tested all live bird markets in the New York City area. There are approximately 90 live bird markets. There are 22 poultry dealer/transporters licensed to deliver poultry directly to New York live bird markets. Most are located outside of New York.

We have three New York based producers who supply birds for this system on a consistent basis. Occasionally we have some other small flocks that provide birds to the system. Prior to entering the live bird marketing system, birds must be tested negative for avian influenza (AI), H5 and H7 and meet certain minimum requirements. All sample collection in New York is conducted by state or federal personnel or, alternatively, the producer may hire an accredited veterinarian. This is not true in all states that supply the east coast live bird markets.

H7N2 Summary

In 2006, we conducted 928 sampling visits to live bird markets and collected over 11,300 samples. Between January 1, 2006 and April 17, 2006, we had 18 samplings that were positive for a low pathogenic H7N2. These were from 12 different markets. During this 3.5 month period seven of the 12 markets were positive only one time. These markets were negative throughout the rest of the year. Four markets were positive twice and one market was positive three times. This latter market underwent a change in ownership in early summer and has been under new management since then. There were no other findings of low pathogenic avian influenza (LPAI) H7N2 in the markets after April 17, 2006.
H5N2 Summary

Between May 10 and June 19, 2006, we identified five markets as positive for a low pathogenic H5N2. None of these markets were the same as any of the 12 markets that were positive for H7N2 earlier in the year. Trace backs that were conducted attempting to identify the farms of origin for the positive birds did not identify positive production far.

On October 3, 2006, an inspector sampled a water duck (Khaki Campbell) as it was being delivered to a market which had just completed and passed a routine depopulation, cleaning and disinfection procedure. The pooled duck samples were positive for a low pathogenic H5N2 avian influenza virus. Environmental samples collected from the market before the birds entered the market were negative for all avian influenza viruses. At the time of delivery three pooled environmental samples were collected from the delivery truck and seven pooled samples from other birds. All were negative. The poultry dealer had just completed a voluntarily cleaning and disinfecting procedure that morning before taking delivery of these birds. Environmental samples collected at that time, before the birds arrived, were all negative for influenza viruses. This particular poultry transporter’s facility and delivery vehicles were sampled 99 times (3,163 pooled samples) in 2006 and all sampling was negative save for this October 3 duck delivery.

Trace back of the positive ducks identified a source flock, Farm W, associated with a single corporation with multiple contract farms in Pennsylvania. All markets receiving birds from Farm W were immediately tested. At the time of notification regarding the Farm W trace back, Pennsylvania Department of Agriculture (PDA) was investigating suspicious findings at Farm B, another contract farm associated with the same company. PDA was unaware of Farm W’s status until notified of the trace back. Later it was learned that Farm B had been sending ducks to the live bird markets during the two weeks preceding the October 23 sampling.

Ultimately a decision was made to sample all live bird markets once it became obvious that infected ducks from this corporation (Farm B and Farm W) had been entering the markets for at least the two weeks prior to the October 23 testing. A total of eight markets were found positive for the same H5N2 virus. Seven of the eight positive markets all had received deliveries.
from the implicated corporation within the two weeks in question. All positive markets were depopulated, cleaned, disinfected and re-sampled. All subsequent sampling during 2006 was negative for avian influenza.

2007 Update

Since January 1, 2007, we have conducted over 600 market sampling visits, collecting over 4,600 samples. Of these, 19 samples from 11 markets were found positive for H5N2 low pathogenic avian influenza virus. We also collected over 2,900 samples from poultry delivery trucks and New York-based poultry dealer facilities during this time and found one sample positive.

The first positive market sample was collected on January 23, 2007. On February 1, a sample from the bed of a delivery truck tested H5 positive via RRT-PCR. The delivery truck belonged to the same distributor who supplied the positive ducks on January 23. Although trace back information was provided for all positive birds findings, positive flocks of origin could not be confirmed via subsequent testing when such testing was conducted. To date, April 18th was the last finding of H5N2 in any of the New York markets.
REPORT OF THE COMMITTEE

THE IMPORTANCE OF INCLUDING SWINE AND POULTRY WORKERS IN INFLUENZA PREPAREDNESS PLANS

Gregory C. Gray
Center for Emerging Infectious Diseases
University of Iowa

Recent research has shown that swine and poultry workers, especially those with intense exposures, are at increased risk of zoonotic influenza virus infections. Multiple studies have found U.S. swine workers to have very strong evidence of previous infections with swine influenza viruses compared to non-exposed controls. Similarly, poultry-workers, and poultry veterinarians have been shown to be at increase risk of avian influenza virus infections. As these workers may contribute to the novel generation of viruses, serve as a bridging population in the cross-species sharing of influenza viruses, and increase the morbidity of pandemic viruses in their communities, it seems prudent to include swine and poultry workers in influenza preparedness programs. Possible preventive and control interventions include: special education programs to increase workers’ use of personal protective equipment such as gloves, increased surveillance for influenza viruses among workers and their animals, recommendations that workers seek medical attention should they develop influenza-like-illness, workers’ priority receipt of annual influenza vaccines, and workers’ priority receipt of pandemic vaccines and antivirals.

References


Gray GC, Baker WS. Importance of Including Swine and Poultry Workers in Influenza Vaccination Programs Clin Pharmacol Ther 2007; in press (Dec)


REPORT OF THE COMMITTEE ON
TRANSMISSIBLE DISEASES OF SWINE

Chair: Mark Engle, Hendersonville, TN
Vice Chair: Harry Snelson, Burgaw, NC

Paul L. Anderson, MN; John K. Atwell, NC; Carter Black, GA; Philip E. Bradshaw, IL; Becky L. Brewer-Walker, OK; Corrie C. Brown, GA; Tom Burkgren, IA; Max E. Coats, Jr., TX; James E. Collins, MN; Gene A. Erickson, NC; J. Kieth Flanagan, FL; James M. Foppoli, HI; Nancy A. Frank, MI; Michael J. Gilsdorf, DC; Thomas J. Hagerty, MN; Ned C. Hahn, IL; Gregg Hawkins, TX; Michael E. Herrin, OK; Sam D. Holland, SD; Ken Horton, TX; Elizabeth A. Lautner, IA; James W. Leafstedt, SD; Donald H. Lein, NY; Bret D. Marsh, IN; David T. Marshall, NC; Chuck E. Massengill, MO; MaryAnn T. McBride, NC; James D. McKean, IA; Sandra K. Norman, IN; Gary D. Osweiler, IA; Richard E. Pacer, MD; Kristine R. Petrini, MN; Kurt D. Rossow, MN; Mo D. Salman, CO; David D. Schmitt, IA; Jeff Schnell, IA; Rick L. Sibbel, IA; Dennis Slate, NH; James E. Stocker, NC; Paul L. Sundberg, IA; Paul O. Ugstad, TX; Lyle P. Vogel, IL; Max Waldo, NE; Patrick Webb, IA; Margaret A. Wild, CO; Larry L. Williams, NE; Nora E. Wineland, CO; Paul Yeske, MN; Pam Zaabel, IA.

The Committee met at 12:30 p.m. on Tuesday, October 23, 2007 at John Ascuaga’s Nugget Hotel, Reno, Nevada. Vice Chair Harry Snelson called the meeting to order. There were 42 attendees including 13 Committee members.

Patrick Webb opened the meeting with a discussion of the swine identification (ID) program. He noted that pork producers have voted in support of a mandatory premises registration program and animal identification. The Pork Industry Identification Working Group developed a set of program standards outlining the industry’s plan to achieve the goals of the National Animal Identification System (NAIS). Basically, the proposed program expands on existing identification requirements in place since 1989. The industry developed a Swine Identification Implementation Task Force to address the issues associated with implementing the proposed plan. The National Pork Board (NPB) has entered into a cooperative agreement with United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) to promote premises registration among pork producers. To date, more than
41,000 swine premises have been registered. This equates to approximately 61 percent of the estimated premises.

John Korslund updated the Committee on the recent African swine fever (ASF) outbreak in the Republic of Georgia. He and three other APHIS employees were detailed to the region to investigate the outbreak and offer recommendations for control and recovery. He described swine production in the Republic of Georgia as composed of backyard-type operations. There are approximately 500,000 pigs in the Republic of Georgia with relatively little infrastructure to support the industry (i.e. no commercial-style operations, no packing plants, and no feed mills). ASF is believed to have entered the country through poor sanitation at the Port of Poti and was spread throughout the country before it was diagnosed. Infection results in significant mortality, reportedly with losses in excess of 70,000 pigs. Clinical signs and lesions are typical of severe septicemic diseases such as classical swine fever or salmonella. He expressed concern regarding the ability to control the spread of the disease due to lack of significant infrastructure.

Troy Bigelow briefed the Committee on a modeling program attempting to estimate the amount of pseudorabies virus (PRV) vaccine that would be needed to respond to an outbreak in a swine dense region of the United States. According to the model, which utilized data from North Carolina and Iowa, it is estimated that the industry would need 800,000 doses of vaccine within the first week and 12.5 million doses by the end of the outbreak. Bigelow was able to determine from the vaccine manufacturers that it would be possible to produce an adequate amount of vaccine if timely clearance was achieved through USDA. There was concern, however, that the domestic vaccine production capability may decline if there is a decline in the international market and that this availability should be revisited in five years.

Aaron Scott discussed efforts at the National Surveillance Unit (NSU) to develop a comprehensive swine surveillance program. The NSU is developing a plan based in part on a prioritized list of diseases of concern produced by the swine industry. He stressed the importance of the program design to trading partners, consumers, policy makers and the health of the swine industry. He noted that the program must be comprehensive across populations, diseases and species.
REPORT OF THE COMMITTEE

Lisa Ferguson provided an interpretation of the 30-day health rule which places veterinarians' accreditation at risk if they are not inspecting individual animals prior to shipment. According to APHIS' interpretation of wording in 9 Code of Federal Regulations (CFR)161.3(a)(2), pigs born into a herd participating in a herd health plan and being visited every 30 days by an accredited veterinarian must be individually inspected prior to shipment. Historically, a veterinarian was allowed to include these animals on a Certificate of Veterinary Inspection (CVI) following inspection of the herd. This interpretation would disallow that and could place the veterinarian in jeopardy of losing his or her accreditation. She suggested that the issue was that the veterinarian should not attest to false statements on official documents and that the documents should be altered to accurately represent the activities of the veterinarian. Follow-up discussion expressed concern that veterinarians should not be altering official documents. A Resolution was passed to request a change in the language of the CFR that would allow for the inclusion of animals born on the farm since the last 30-day visit to be included on a CVI based on visiting the herd rather than the individual animals.

Carter Black presented a report from the Feral Swine Subcommittee on PRV and Brucellosis, which was approved by the Committee and is included in these proceedings following this report.

Bigelow presented the Committee with a plan to adopt a hazard analysis and critical control points (HACCP) approach to PRV monitoring and program compliance that would replace the current state status based on program standards approach. This proposal was in response to the requirement that APHIS-VS codify program standards in the CFR and the necessity to keep the language as broad as possible to allow for future changes without the need to alter the CFR language. HACCP is commonly used by packing plants to minimize risks. He suggests expanding the concept to allow for a risk-based analyze at the state level to determine critical control points and risk levels. There was significant interest and much discussion with direction to continue to explore this opportunity.
TRANSMISSIBLE DISEASES OF SWINE

The Committee then approved five Resolutions, that were referred to the Committee on Nominations and Resolutions.
The Subcommittee was called to order by the Chair at 1:00 p.m. on Monday, October 22, 2007. There were 49 attendees, including eight members of the Subcommittee. Reports were provided on feral swine issues relating to brucellosis and pseudorabies.

Joseph L. Corn, Southeastern Cooperative Wildlife Disease Study (SCWDS), University of Georgia, provided a report on development of the National Feral Swine Mapping System (NFSMS). SCWDS produced nationwide feral swine distribution maps in 1982, 1988 and 2004 by working directly with state and territorial natural resources agency personnel. In 1982, 17 states reported feral swine in a total of 475 counties. In 2004, 28 states reported feral swine in 1,014 counties. With support from United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) SCWDS has now developed the National Feral Swine Mapping System (NFSMS), an interactive data collection system to be used to collect and display real time data on the distribution of feral swine in the United States. The real time feral swine distribution maps will be produced using data collected from state and territorial natural resources agency personnel and from USDA-APHIS, Wildlife Services (WS). The real time map will be available to be viewed by the public on the NFSMS home page. Distribution data submitted by agency personnel will be evaluated by SCWDS on a continual basis, and the real time distribution map updated with verified additions on a monthly basis. Feral swine populations included in the map will be those determined to be established and breeding. Updated maps will be available to be viewed and downloaded from the web site.

Joseph L. Corn, next provided a report on disease exposure in feral swine populations geographically associated with high densities of transitional swine premises and commercial swine production. Surveys for evidence of exposure to pseudorabies virus (PRV), Brucella suis (SB), swine influenza virus (SIV) (human-like H1N1,
TRANSMISSIBLE DISEASES OF SWINE

reassortant type H IN 1, H 1 N2-like IH IN1 and IH3N2), porcine circovirus 2 (PCV 2), and porcine respiratory and reproductive syndrome virus (PRRSV) in feral swine were conducted in areas where feral swine were geographically associated with high densities of transitional swine premises in South Carolina and in areas where feral swine were geographically associated with high densities of commercial swine production in North Carolina. These areas were identified using overlays of maps of the distribution of feral swine in the United States, maps of the distribution of transitional swine premises in South Carolina, and county-level maps of the distribution of commercial swine premises in North Carolina.

Tom Ray, North Carolina Department of Agriculture and Consumer Services, gave an update on feral swine programs in North Carolina. Of the 10 largest hog producing counties in the U.S., eight of these 10 counties are in North Carolina. Swine inventories are over nine million with the vast majority located in the eastern third of the state. Feral swine have been found in 84 of the 100 counties in the state. In addition to surveillance sampling by USDA-APHIS-WS and SCWDS in eastern North Carolina, hunter sampling has occurred in other parts of the state, particularly in and around the Great Smokey Mountains National Park. Sampling over the past three years has shown no positive samples for PRV, SB or CSF in the eastern third of the state where the vast majority of North Carolina’s commercial swine industry is located. A small number of PRV positive samples have been found in western North Carolina, and the number is increasing. Because feral swine are the greatest and primary risk for spreading PRV and SB to our commercial swine industry, an objective-based surveillance plan, or Hazard Analysis Critical Control Points (HACCP), is suggested, based on a sound, reliable epidemiological investigation of prevalence, statistical sampling and incidence rates, combined with education, outreach and regulatory involvement.

Troy Bigelow, VS-APHIS-USDA gave an update on USDA-APHIS-VS programs related to feral swine. Feral swine continue to be a threat to domestic swine. Feral swine, being carriers of PRV and brucellosis, have transmitted the disease to herds that allow or potentially allow exposure to feral swine. This presentation reviews the number of indemnified herds due to feral
or potential feral swine exposures and discusses possible ways to modify the regulations to account for different risks in different states. HACCP is a systematic thought process used as the regulatory background in other agencies to mitigate risks. HACCP principles, if adopted, could be used to mitigate risks of PRV and swine brucellosis from entering the commercial compartment. The HACCP principle will be discussed as a way to protect the commercial compartment from possible risks.

Seth Swafford, WS-APHIS-USDA, gave an update on USDA-APHIS-WS related to feral swine. As part of an intra-agency initiative, WS has continued to partner with VS to design and implement a nationwide surveillance approach regarding sampling feral swine for CSF. As an equally important component, these APHIS agencies have included monitoring two diseases that are endemic in feral swine populations. Monitoring for Brucella suis (SB) and pseudorabies virus (PRV) has occurred over the last three years in feral swine populations and has only been possible with support provided by State Departments of Agriculture and State Wildlife Agencies. This approach has truly become an inter-agency effort and represents one of the largest coordinated wildlife disease surveillance efforts implemented by Wildlife Services. Information provided below is a general compilation of activities conducted between October 2006 and September 2007 and the planned approach for the following year. The inter-agency effort involved sampling 2029 feral swine from 20 States as one surveillance stream to support a comprehensive swine disease surveillance program.

CSF surveillance remains the emphasis of the effort and is based on serological analyses performed by VS Foreign Animal Disease Diagnostic Laboratory, Plum Island, New York. CSF was not detected in any of the samples collected during the sampling period. Surveillance for SB and PRV is also serologically based, but samples are analyzed at state or university laboratories. This is an important distinction between the two components of the effort, foreign animal disease surveillance and endemic disease monitoring, and establishes the local experts as the leading authority. Brucella suis and PRV was detected in many, but not all, local populations of feral swine. Data are presented from three states, Oklahoma, Florida, and South Carolina, to highlight the disparity between apparent sero-prevalance findings in feral swine. These states are used to only highlight the differences
between apparent sero-prevalence findings and are not meant to implicate these states in any way. Apparent sero-prevalence of SB and PRV in feral swine from these states ranged from 0.6 percent to 19.0 percent for SB and 3.8 percent to 26.5 percent for PRV. These findings document the large degree of variability in which SB and PRV circulate in feral swine populations. Monitoring endemic diseases in feral swine should continue as a long term objective to establish baseline data, monitor for epidemics in feral swine which could increase risk to domestic swine, aid in response and eradication if necessary and leverage information and education to local counties. The intra-agency initiative has planned to sample approximately 2,100 feral swine in 30 States during the next sampling period.

Ned Hahn, College of Veterinary Medicine, University of Illinois presented Feral Pig PRV: What is in Your Neighborhood? The overlap of feral and domestic swine herds and the traffic among transitional herds and shooting preserves poses a high risk of reintroduction of PRV in commercial herds. There are markers in the PRV DNA that will assist in identifying the source of infection. Pinpointing the source of infection will dictate appropriate management changes needed to mitigate the risk. Improved preparedness presents confidence to the world that our nation can handle the persistent reservoir of infection. The risk of infection of domestic swine from the feral reservoir will not diminish. The route of transmission can occur by oral as well as venereal routes and marker technology can differentiate viruses to establish sources of infection.

There was a discussion of the status of transitional herds. This will require more discussion as the nation moves toward the OIE Free status.
REPORT OF THE COMMITTEE ON TUBERCULOSIS

Chair: Kathleen M. Connell, Olympia, WA
Vice Chair: Michael S. VanderKlok, Lansing, MI

John B. Adams, VA; Bruce L. Akey, NY; Joan M. Arnoldi, WI; Daniel R. Baca, TX; Lowell R. Barnes, IN; Derek J. Belton, NZ; Warren Bluntzer, TX; Bob H. Bokma, MD; Steven R. Bolin, MI; Richard E. Breitmeyer, CA; Becky L. Brewer-Walker, OK; Shane A. Brookshire, GA; Charles S. Brown, NC; Charles E. Brown, II, WI; Scott W. Bugai, TX; Erika A. Butler, ND; John R. Clifford, DC; Thomas F. Conner, OH; Robert A. Cook, NY; Ed Corrigan, WI; Daniel T. Crowell, NV; Donald S. Davis, TX; Jere L. Dick, MD; Phillip T. Durst, MI; Michael T. Dutcher, WI; Reta Dyess, TX; Anita J. Edmondson, CA; Dee Ellis, TX; Steven R. England, NM; Donald E. Evans, KS; John R. Fischer, GA; Dave E. Fly, NM; James M. Foppoli, HI; W. Kent Fowler, CA; Nancy A. Frank, MI; Bob Frost, CA; Tam Garland, MD; Michael J. Gilsdorf, DC; Velmar Green, MI; Jennifer L. Greiner, IN; Thomas J. Hagerty, MN; Steven L. Halstead, MI; Beth Harris, IA; William L. Hartmann, MN; Burke L. Healey, NC; Del E. Hensel, CO; Bob R. Hillman, TX; E. Ray Hinshaw, AZ; Donald E. Hoenig, ME; Sam D. Holland, SD; Fred Huebner, IA; Dennis A. Hughes, NE; John P. Huntley, NY; Carolyn Inch, CAN; Billy G. Johnson, AR; Jon G. Johnson, TX; Susan J. Keller, ND; Karl G. Kinsel, TX; Terry L. Klick, OH; Paul Kohrs, WA; Maria A. Koller-Jones, CAN; Steve K. Laughlin, OH; Maxwell A. Lea, Jr., LA; Jay C. Lemmermen, FL; Thomas F. Linfield, WY; Sharon L. Lombardi, NM; Konstantin Lyashchenko, NY; Stephen Maddox, CA; Daniel M. Manzanares, NM; Bret D. Marsh, IN; Chuck E. Massengill, MO; John Maulsby, CO; George L. Merrill, NY; Robert M. Meyer, CO; Andrea Mikolon, CA; Michael W. Miller, CO; Michele A. Miller, FL; Henry I. Moreau, LA; Donald P. O’Connor, WI; Dustin P. Oedekoven, SD; Bruno Oesch, SWI; Kenneth E. Olson, IL; Mitchell V. Palmer, IA; Janet B. Payeur, IA; Kristine R. Petrini, MN; Michael R. Pruitt, OK; Anette Rink, NV; Nancy J. Roberts, OK; Nancy J. Robinson, MO; Enrique A. Salinas, MEX; Mo D. Salman, CO; Bill Sauble, NM; Shawn P. Schafer, MN; Galen H. Schalk, MI; Tom A. Scheib, WI; David D. Schmitt, IA; Stephen M. Schmitt, MI; Andy Schwartz, TX; Charly Seale, TX; Sarah B. S. Shapiro Hurley, WI; Les C. Stutzman, NY; George A. Teagarden, KS; Cleve Tedford, TN; Tyler C. Thacker, IA; David Thain, NV; Charles O. Thoen, IA; Kenneth J. Throlson, ND; Paul O. Ugstad, TX; Ray Waters, IA; Scott J. Wells, MN; Diana L.
The Committee met on October 22, 2007, from 1:00 to 6:00 p.m. at John Ascuaga’s Nugget Hotel, Reno, Nevada. There were 148 members and guests in attendance. Kathleen M. Connell and Michael S. VanderKlok presided. In her opening remarks, Connell reviewed the day’s agenda and welcomed members and guests. The Chair determined that a quorum was present to conduct business.

Formal presentations began with C. William Hench, National Tuberculosis (TB) Eradication Program, Veterinary Services (VS), Animal and Plant Health Inspection Services (APHIS), United States Department of Agriculture (USDA). Hench provided the current status of the U.S. Bovine TB Eradication Program. The full text of this report is included in these proceedings.

Kathy Orloski, Epidemiologist, National TB Eradication Program, VS-APHIS-USDA, presented an update on the U.S. National Surveillance Program for Bovine TB. The full text of this report is included in these proceedings.

Brian Morrow, Director, Trace First Ltd., provided a presentation entitled Disease Management and Surveillance Using IT Systems Such as Modeling Exercises, an Emergency Preparedness Toolkit and Surveillance Programs. The full text of this report is included in these proceedings.

Pauline Nol, National Center for Animal Health Programs, Ruminant Health Program-Wildlife, National Wildlife Research Center APHIS-USDA, presented an update entitled The Efficacy of Oral Bacille Calmette-Guerin (BCG) Vaccination in White-tailed Deer. The full text of this report is included in these proceedings.

Phil Durst, Extension Dairy Educator-Northeast Michigan, gave a presentation entitled A Case Study of the Test-and-Remove TB Herds in Michigan: A Description, History and Comparison. The full text of this report is included in these proceedings.
REPORT OF THE COMMITTEE

The current status of Mexico’s campaign against TB and an update on Mexico’s national surveillance program was delivered by MVZ M en C José Alfredo Gutiérrez Reyes, Subdirector de Sanidad en Especies Mayores, Dirección de Campañas Zoosanitarias, Dirección General de Salud Animal, Servicio Nacional de Sanidad, Inocuidad y Calidad Agroalimentaria (SENASICA). The full text of this report is included in these proceedings.
Cervid Serum Bank Activities and Update in Response to Resolution 21
Jeffrey T. Nelson
National Veterinary Services Laboratories

In response to Resolution 21 passed at the 2006 Annual Meeting, USDA-APHIS-VS began collection of serum samples from various deer species to create a serum bank of well-characterized samples. Skin test data as well as histopathology and culture results, when available accompany samples. Most samples have been submitted from white-tailed deer, fallow deer and reindeer. Lesser numbers of samples have been submitted from other deer species. Serum panels have been provided to various developers of serological assays for test validation. Future work will focus on continued collection of samples and creation of serum panels for test validation. It has been suggested that a similar serum bank be created using samples from cattle. Such a bank could be used to create serum panels for use in bovine TB test evaluation and validation.

An Efficient Cost Effective Serology Assay for Accurate Identification of *M. Bovis* Infected Cattle.
Larry Green
PriTest

PriTest’s new diagnostic test for cattle tuberculosis infection, SeraLyte-*Mb*™, greatly improves the speed and accuracy of TB detection. An accurate test is needed to reach the goal of finally eliminating TB in the United States. A serologic screening test has long been hoped for, but it has not been identified. Many experts in the industry, based on the
poor performance of serologic tests previously used to detect *Mycobacterium bovis*, have assumed that no satisfactory serologic test could be identified. It appears by all measures that with the PriTest proprietary imaging method in a well worked out assay protocol, serologic methods for accurately identifying *M. bovis* infected cattle are easily achieved. Most importantly, the test is rapid and economical compared to other methods currently in practice. Since our report to the USAHA in October 2006, two large USDA blinded studies have been completed in cattle with infected animals. PriTest evaluated serum samples from both studies. In addition to the blinded studies, we have tested extensively to gather data the will be useful in evaluating specificity for the test by testing cattle in presumed *Mycobacterium bovis* free zones. Based on these findings it appears that our serologic test can achieve specificity measurements in the range 95 to 100 percent. We believe the current sensitivity is greater then 90 percent. SeraLyte-Myco*Mycobacterium bovis™* enables a paradigm shift from diagnosing only limited surveillance populations and animals with active disease forms of TB, along with testing those in reactor herds, to screening large populations for unsuspected infection with the *Mycobacterium bovis* bacillus. Based on the test results in its current validation work on US and United Kingdom cattle, PriTest is requesting the USAHA TB SAS to assist PriTest in proceeding to a phase 3 field trial; that would include side-by-side comparison testing to current screening and confirmation test methods on the appropriate number of reactor and Accredited Tuberculosis Free herd samples in the US.

**Update on Guidelines for the Control of Tuberculosis in Elephants, 2007.**
Michelle Miller
Disney Animal Programs, Department of Veterinary Services.

The emergence of TB in elephants in 1996 prompted the formation of an advisory panel to draft guidelines for the control of tuberculosis in elephants. Since that time various modifications of the guidelines have been drafted. The proposed 2007 guidelines incorporate several changes including the addition of serological testing using Chembio’s elephant TB Stat-Pak and additional options for culture positive elephants. Proposed guidelines would call for annual testing by the triple culture method (three trunk wash
samples) and a single sample of serum collected for analysis by the elephant TB Stat-Pak. Guidelines for treatment and movement restrictions would be based on culture and serological results. A Subcommittee has been formed to review and comment on the proposed guidelines.

**Tuberculosis Diagnosis: Analyzing the Parameters of the Interferon-gamma Assay.**

Irene Schiller, Roland Hardegger, Annika Kyburz, Alex Raeber, Bruno Oesch
Prionics AG

Ray Waters, Mitchell Palmer, Brian Nonnecke, National Animal Disease Center

Martin Vordermeier, Teklu Egnuni, Veterinary Laboratory Agency, Great Britain

The Bovigam interferon (IFN-g) assay constitutes an ante-mortem, in vitro laboratory based tuberculosis test and is widely used complementary to tuberculin skin testing. The assay is performed in two stages: first, whole blood is cultured with antigens stimulating blood leukocytes to produce IFN-g that is quantified by enzyme-linked immunosorbent assay (ELISA) in a second step. Environmental conditions before and during the culturing of the leukocytes influence the efficacy of in vitro IFN-g production. Optimal conditions are therefore essential. In this study we analyzed the effect of stimulation vessel geometry, temperatures during stimulation, and the stability of antigens stored at different temperatures. Blood from experimentally infected cattle and from tuberculosis negative cattle was stimulated in 24 well tissue culture trays (standard), 48 well and 96 well culture plates with the following antigens: purified protein derivative from *Mycobacterium bovis* (PPD-B) and from *Mycobacterium avium* (PPD-A), a fusion protein from early secretory antigenic target 6 (ESAT-6), culture filtrate protein 10 (CFP-10), and pokeweed mitogen. Stimulation was equally efficient in all plate formats. The results with specific antigens correlate with mitogen induced stimulation. CO$_2$ is not required during incubation, as cultures from an incubator with five percent CO$_2$ produced similar amounts of IFN-g as without CO$_2$. However,
REPORT OF THE COMMITTEE

the temperature used for stimulation was critical. Stimulation at 37°C and 33°C was equally efficient, but a culture temperature of 29°C reduced IFN-γ production significantly. At 25°C and 22°C no stimulation was detectable. Antigens are usually stored at 2°-8° C (tuberculins) or at -80° C (recombinant proteins) until usage. We tested in parallel antigen storage of recombinant proteins (ESAT-6:CFP-10 fusion protein, TB10.4, TB27.4, MPB3) at 4°C for 24 hr at 20°C for 8 hrs prior to use in cell culture. Our results show that antigens may be stored at either of these conditions without affecting the efficacy of stimulation. Finally, we compared the activities of tuberculins from five different sources in naturally infected cattle (n=10). Matched PPD-B and PPD-A tuberculins were used at eight dilutions each. Relative potency 30 (RP30) was defined as the tuberculin concentration required to induce 30 percent of the peak response values. RP30 differed by a factor of more than 10 between the PPD-B with the highest and lowest potency. Therefore, tuberculins of different sources may give different results and the overall assay performance may be improved by optimizing tuberculin concentrations.

Update on Chembio Tuberculosis Assays
Konstantin Lyaschenko
Chembio Diagnostics Systems

Multiple animal species are susceptible to tuberculosis (TB) that has serious zoonotic and regulatory concerns. The current testing methodologies are inadequate for most of the non-domestic species. To improve TB control programs, new diagnostic tools that would be simple, rapid, accurate, and inexpensive are urgently needed. Chembio developed two serological assays, PrimaTB STAT-PAK and ElephantTB STAT-PAK, using lateral-flow technology to detect specific antibody in animals infected with Mycobacterium tuberculosis or M. bovis. These two rapid tests were approved by USDA, Center for Veterinary Biologics in 2007. In addition, the Multi Antigen Print ImmunoAssay (MAPIA) was proposed for elephants, particularly, as confirmatory test and treatment monitoring tool. The results of clinical evaluation of PrimaTB STAT-PAK assay showed 87 percent sensitivity and 99 percent specificity in macaques. Extended studies with ElephantTB STAT-PAK (100 percent sensitivity and 97 percent specificity in elephants) demonstrated
TUBERCULOSIS

its potential to be a valuable animal-side diagnostic tool in multiple zoo animals as well as in a number of free-ranging wildlife species involved in maintaining *M. bovis* reservoirs worldwide.

Robert M. Meyer
Kathy A. Orloski
Veterinary Services

Drs. Bob Meyer and Kathy Orloski discussed the identification of tuberculosis in two New Mexico dairy herds. Serum samples were collected from a large number of cattle from these herds and submitted blindly to three different companies for analysis by four different assays; PriTest’s SeraLyte Mbv assay, Chembio’s TB Stat-Pak and MAPIA, and Diachemix FPA. Sensitivity and specificity estimates for each assay were presented. Depending on the assay, sensitivity estimates ranged from 26 to 82 percent and specificity estimates ranged from 76 to 100 percent.

Although no specific assignments were given to the TB SAS nor was any data provided to the TB SAS for evaluation and comment several observations were made. Significant progress has been made in development of serological assays for TB in various species as well as standardization of existing assays such as the Bovigam. Further progress will require continued cooperation between USDA, industry and producer groups. USDA’s continued support of the creation of well defined serum banks and use of samples from naturally infected herds, such as that in New Mexico, for test validation will be critical. Continued support from producers as a source of samples with accompanying skin test data will also be needed.

The Committee approved the Subcommittee Report.

State Updates followed, provided by Mike VanderKlok, Michigan, Linda C. Glaser, Minnesota Board of Animal Health, and Tim Hanosh, New Mexico Assistant State Veterinarian. The full texts of these reports are included in these proceedings.

Billy Johnson, Bi-National TB and Brucellosis Committee Coordinator, followed with a report on the Bi-National Committee.
REPORT OF THE COMMITTEE

(BNC) activities. Johnson gave a brief history of this 16-member committee. He discussed TB reviews in Mexico, the waiver conditions document and the current statuses of states. The full text of this report is included in these proceedings.

Formal presentations continued with C. William Hench providing an update on proposed changes to the Code of Federal Regulations (CFR) regarding the bovine tuberculosis program. He summarized the status of proposed changes to the domestic and international rules for the TB program. No written report is available for this presentation.

At the conclusion of the formal presentations, Connell reported on 2006 Resolutions. USDA-APHIS-VS responded promptly in writing to both resolutions from 2006. Connell read the USDA-APHIS-VS responses to the two resolutions to the attendees.

Four Resolutions were approved and forwarded to the Committee on Nominations and Resolutions:
The cooperative State–Federal–Industry effort to eradicate bovine TB from the United States has made significant progress toward eradication, markedly decreasing the prevalence of the disease. However, the goal of eradication has been elusive despite renewed efforts. Remaining challenges—primarily infected wildlife and infected cattle from Mexico—hinder eradication.

In fiscal year (FY) 2006, there was a rise in the number of cattle herds that were found to be tuberculosis-affected relative to the previous year. These herds were all located in areas where we have discovered affected herds in previous years. In FY 2006, a total of nine affected herds were found. In contrast, seven affected herds, six bovine and one captive cervid, were discovered in FY 2007. Slaughter surveillance for TB continues to exceed our national goals in FY 2007, and three of the newly discovered herds were detected as a result of this surveillance and epidemiological investigations. This shows that slaughter surveillance continues to be an integral part of our eradication program. Nevertheless, TB response plans remain critical in areas where the disease has recently been detected.

At the end of FY 2006, 49 States and Territories were TB Accredited-Free (AF), including Puerto Rico and the U.S. Virgin Islands. Two States, New Mexico and Michigan were regionalized, and Texas was classified as Modified Accredited Advanced (MAA). New Mexico was regionalized in FY 2005 with a small zone in the eastern region of the State classified as MAA and the remainder of the State TB-Free. Michigan was further regionalized during FY 2005. At that time, Michigan was divided into three zones: the Upper Peninsula was classified as AF, 11 counties and portions of two others in the northeastern Lower Peninsula were Modified Accredited (MA), and the remaining counties in the Lower Peninsula were MAA.

In January 2006, as a result of the discovery of three affected herds in the State, Minnesota was downgraded to MAA status. During 2006, the State of Texas once again became
eligible and applied for TB-Free Status. Texas’ AF status was initially restored with the October 2006 publication of an interim rule in the Federal Register and was finalized with the January 2007 publication of a final rule. As a result of these changes during FY 2006, at the end of the year, 49 States and Territories were classified AF, including Puerto Rico and the U.S. Virgin Islands, two States remain regionalized, New Mexico and Michigan, and one state, Minnesota, has MAA status. There has been no change in the status of any State or Territory during FY 2007.

Of the six affected cattle herds discovered in FY 2007, two were beef herds in Minnesota. The two new herds were identified during continued surveillance and epidemiological investigations. The source of this infection has not yet been determined and epidemiological investigation of the subsequent herds is in progress. In addition to the two new beef herds discovered in 2007, surveillance of free ranging white-tailed deer is on-going through hunter-harvested and targeted culling sample collection. As a result of finding these additional herds and infected wildlife, the State of Minnesota and USDA jointly developed a management plan for livestock and wildlife statewide. The goal of this management plan is to determine the extent of the infection in livestock and to determine whether or not the disease has become established in wildlife. All herds affected in Minnesota to date have been depopulated with federal indemnity.

In Michigan, two herds – one bovine and one captive cervid – were detected in FY 2007. Both of these herds are located in northern Lower Michigan in the bovine MA zone. The captive cervid herd was identified through hunter kill surveillance. The bovine herd was a small dairy and was identified through annual surveillance testing. Both of these herds have been depopulated.

The other three herds detected in FY 2007 were all a result of investigations initiated by Food Safety Inspection Service (FSIS) identification of Mycobacterium bovis infected animals detected during routine slaughter inspection. Trace testing confirmed infection in a beef herd in western Oklahoma in April 2007. Oklahoma has been classified as AF since 1996. Trace testing also confirmed infection in a large dairy operation in New Mexico’s AF zone. This dairy operation encompasses two premises and totals approximately 12,000 head of cattle. In Colorado, an affected herd was disclosed through epidemiological
Investigation of a rodeo bull found to be infected at slaughter. Testing of herds in which the affected animal resided confirmed infection in performance cattle (bucking bulls) herd. Colorado has been classified AF since July 1975. The herds in Colorado and Oklahoma have been depopulated with federal indemnity. The New Mexico dairy operation is currently in the depopulation process.

Three affected herds detected prior to FY 2005 remain under quarantine and test and removal herd plans. The first of these herds is a dairy herd in New Mexico which declined to depopulate. Two dairies in Michigan also remain under quarantine and test and removal herd plans. One of these quarantined dairies in Michigan is a reinfected herd. All three herds continue to undergo regular herd testing as part of their herd plans. Michigan herd plans also include requirements for mitigating the risk of infection from wildlife.

FY 2007 herd depopulations were accomplished at a cost of $1,499,430. 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 $1,451,926 in FY 2007. Total indemnity costs for all purposes were $2,951,356.

Due to continuing concern about the level of surveillance for TB in captive cervids, a working group of State-Federal personnel developed a surveillance plan for captive cervids in 2004. That plan, conditionally approved by cervid industry leadership, was presented during the 2004 Annual Meeting of the USAHA Committee on Tuberculosis and discussed and comments and suggestions were made. All of this input was incorporated into a draft Uniform Methods and Rules (UMR) for Captive Cervids. Finalization of this UMR has been delayed while USDA drafts comprehensive revisions of both the bovine and cervid portions of the TB rules in the Code of Federal Regulations (CFR).

Currently there are 15 states and the U.S. Virgin Islands that have achieved and maintained their TB Free status for over 25 years; 22 states that have been TB Free for 15 or more years; seven states that have been TB Free for 10 or more years; three states and Puerto Rico that have been TB Free for five or more years; and two states and two regionalized zones which have had TB Free status for less than five years. Given the six bovine herds discovered this year and the three herds that remain under quarantine from previous years, there were nine affected herds.
REPORT OF THE COMMITTEE

among the estimated 971,400 cattle herds in the United States at the end of FY 2007. Therefore, the national prevalence for FY 2007 is estimated to be 0.0006 percent, or one affected herd per 107,933 U.S. herds. Though TB does exist in the United States, this extremely low level of prevalence should be a significant factor in convincing international trading partners of the very low level of risk with TB in our cattle.

Veterinary Services (VS) has completed its oversight of the operation for the removal of all dairy operations from the El Paso, Texas milk shed. This process was completed during calendar year 2007. There were a total of 10 dairy operations, some with multiple production units, removed to create a buffer zone between the U.S. and the TB affected dairy operations immediately across the border in Juarez, Mexico. All 10 operations have completed close out procedures. During this program, designated VS and Texas Animal Health Commission personnel ensured that every animal leaving the premises was identified and permitted to slaughter or quarantine feedlots. All depopulated cows were inspected at slaughter and had no TB lesions detected. Each depopulated dairy will remain out of operation, in the El Paso area, for at least the next 20 years.

VS continues to work with Mexico on ensuring there is equivalency between the two countries' requirements. To accomplish this, reviews of Mexican State TB programs have been conducted under the umbrella of the U.S. and Mexico BiNational Tuberculosis and Brucellosis Eradication Committee. For this fiscal year there were seven review trips completed. The review teams examined TB program integrity, progress and the level of prevalence. There were two reviewers working under contract, 11 that were VS or International Services (IS) employees, one National Veterinary Services Laboratories employee, and seven that were employed and paid for by State or industry agencies in Arizona, California, Missouri, Texas, and Washington. The financial contributions of those States and industry groups are recognized and appreciated.

In 2007, a five-year plan, Strategic Plan for Reducing the Risk of Importing Tuberculosis Infected Cattle from Mexico 2008-2012, was developed and presented to Mexico. This plan requires that the Mexican TB eradication program achieve equivalency with the U.S. program by the end of 2012.

Extensive efforts have been taken in regards to the U.S. rule making efforts related to tuberculosis. Changes to the CFR
TUBERCULOSIS

will be proposed for the bovine, cervid, international, roping steer and the indemnity regulations. These CFR revisions are currently in various stages of review. Given the complexity of the revisions and the linkage between the bovine, cervid, and international rules, this process is lengthy. The bovine and cervid rules were separated this year to allow the domestic and international bovine rules to proceed at a faster pace. The roping steer regulation has been has been drafted and is currently undergoing final review and economic analysis. Changes to the TB indemnity section of the CFR are also in final stages of review before publication.

Updates on States with Recent Infection

Colorado update: As a result of a rodeo bull identified as infected by FSIS inspection in January 2007 a thorough epidemiological investigation was initiated. One herd was identified as affected and depopulated with federal indemnity. Seventeen contact herds were tested, approximately 950 animals, without any additional findings of infection. Epidemiologic investigations are ongoing and extend to over 30 states but have led to no additional sources of infection at this time.

Michigan update: Two new affected herds were found in FY 2007. One herd was a small dairy and the other was at captive cervid ranch. Both herds were depopulated. The State continues as regionalized in three zones: TB Free, MAA, and MA. Eleven hundred herds are tested in the MA zone annually. Eight hundred randomly-selected cattle herds are tested each year in the TB Free and MA zones. The prevalence of TB in wild deer continues to decrease. The prevalence in wild deer in the core of the Modified Accredited zone (DMU 452) was 2.3 percent in 2006 which is up from 1.2 percent in 2005. Continued monitoring will be necessary to see if this is indeed a trend in prevalence or a one year anomaly.

Two dairy herds in Michigan continue under test-and-removal herd plans and are classed as carry-over herds from FY 2006. One is located in Alpena County, with about 100 head total. This herd was detected through area (annual surveillance, FY 2004) testing and one positive animal was found. The other herd is located in Montmorency County, with about 175 head total. It was detected through area (annual surveillance, FY 2004) testing as well with five reactors found. This is the second time this herd has been found affected. It was originally found positive in 2000 and released in 2002, before being detected again in 2004.
Minnesota Update: There were two positive beef herds detected in FY 2007 through continued epidemiological testing of area and high risk herds. All affected herds have been located in either Roseau or Beltrami Counties. Through FY 2007, all affected herds in Minnesota have been depopulated. Epidemiological investigations for all affected herds continue in Minnesota and additional states. In FY 2006, The Minnesota Department of Natural Resources and the Minnesota Board of Animal Health worked with USDA to develop a surveillance plan in both livestock and wildlife. This surveillance plan calls for risk-based, statewide testing of livestock and wild deer to determine the extent of the TB infections in the State and to also clarify whether the disease has become established in wildlife or not. Additional federal funding has been provided in support of TB surveillance in Minnesota in both cattle and wildlife, funding for fee-basis veterinarians, and federal TB testing teams.

New Mexico update: One dairy herd in the MAA zone of New Mexico continues under a test and remove herd plan. To date, no additional TB has detected in this herd. Five FSIS slaughter inspections identified infected cattle that were traced back to two herds in New Mexico’s accredited-free zone. Over 100 caudal fold test (CFT) and gamma interferon suspects were removed from one dairy for laboratory analysis with no further findings of TB. At the other dairy TB infection was confirmed. This dairy is currently under quarantine and depopulation efforts have begun.

As a result of finding this dairy operation affected a Task Force was initiated in August 2007 to assist New Mexico Animal Health Officials with the tremendous load of traces and testing that needed to be accomplished. At the time of this report the work effort there is winding down with no signs that infection has spread beyond the original herd.

Oklahoma update: A November 2006 FSIS slaughter trace led to a herd which was identified as affected through on farm testing. Herd testing was initially delayed because of inordinately bad winter weather in this part of the country. The herd has been depopulated. Traces from this case extend to several western states and no further findings of TB have been found.
Primary surveillance for bovine TB in the United States (U.S.) consists of slaughter surveillance for granulomas and skin and blood testing in cattle.

The national granuloma submission surveillance program for adult cattle met or exceeded the target rate of five submissions per 10,000 adult cattle killed for the sixth consecutive year as of the third quarter of federal fiscal year (FY) 2007, with 15.2 granuloma submissions per 10,000 adult cattle killed. A total of 10,286 granulomas were submitted from US plants. A total of 36 of the top 40 adult slaughter (90 percent) establishments met the target rate of five submissions per 10,000 adult cattle killed. Four establishments were at 18, 43, 73 and 79 percent of the standard as of the third quarter of federal FY 2007.

A critical component of the granuloma submission program is diagnostic laboratory support. Three diagnostic laboratories provide outstanding support for the national bovine TB surveillance effort. A total of 7,090 (68.9 percent) samples were evaluated by National Veterinary Services Laboratories (NVSL), 1,816 (18.5 percent) by the Food Safety Inspection Service (FSIS) Pathology Laboratory, Athens, Georgia, and 1,298 (12.6 percent) by the California State Diagnostic Laboratory, Tulare, California.

Slaughter surveillance continues to identify new cases of TB in both adult and fed cattle. Twenty-four new cases of TB were found in cattle in U.S. slaughter plants during FY 2007, compared with 28 cases in FY 2006. No cases of TB were detected in bison or captive cervids slaughtered under state or federal inspection during FY 2004 through FY 2007.

Of the 24 new TB cases, six (25 percent) cases occurred in adult cattle. Three cases resulted in the identification of three new affected herds in Colorado (rodeo/beef), Oklahoma (beef) and New Mexico (dairy). The herds in Colorado and Oklahoma have been depopulated with federal indemnity. The New Mexico dairy operation is currently in the depopulation process.

A fourth adult case in a culled dairy cow was traced back to a New Mexico herd of origin; no additional infected animals
REPORT OF THE COMMITTEE

were found following comprehensive herd testing. This dairy was not depopulated, but has been identified as a high risk herd and will undergo additional testing. A fifth adult case (beef) was from South Dakota; extensive testing did not identify additional infected animals. A sixth adult case (beef) was slaughtered in South Dakota. No additional infected cattle were found during herd testing in South Dakota; however, a vaccination eartag was found to be a duplicate, bringing into question whether the herd of origin was correctly identified.

One adult TB case occurred in a rodeo performance bull from Colorado. This animal traveled extensively while performing, resulting in trace back investigations in over 20 states. An additional infected bull was found in a beef and rodeo cattle herd in Colorado where the index case had previously resided. In FY 2006 a TB case occurred in a Kansas Mexican-origin roping steer, resulting in the exposure and depopulation of exposed beef breeding cattle. These cases illustrate the risk that longer-lived, roping and performance cattle may cause to our livestock industries. The Colorado bull was not of Mexican-origin, but may have been exposed to TB-infected Mexican-origin cattle.

The New Mexico affected dairy was identified in April of this year when an adult Holstein cow presented with lesions suggestive of TB during regular slaughter inspection at a federally-inspected plant in Arizona. Tissues from this animal were positive for TB by polymerase chain reaction (PCR) and culture. Epidemiologic investigation found that this cow had originated from a large dairy in eastern New Mexico milking approximately 2,400 adult Holstein cattle. On further investigation, an associated herd milking nearly 3,600 cattle was found to be involved due to movement of cattle from the index herd.

Genotyping is being used to assist in epidemiologic investigations of TB cases. Genotyping confirmed that two isolates of *Mycobacterium bovis* in the Oklahoma affected herd were identical and that this strain was the same as only ten other isolates in the NVSL database. An evaluation of eight *M. bovis* isolates from roping steers cases detected between 2001-2006, found that the variability in these isolates was similar to that seen in *M. bovis* isolates obtained from feeder cattle detected through slaughter surveillance.

The remaining 18 (75 percent) cases were detected in fed steers or heifers considered to be beef-type cattle. These cattle had been fed in Texas (14 cases), California (three cases) and
TUBERCULOSIS

Kansas (one case). Of these 18 cases, 17 were of Mexican origin. The state of origin for 14 cases with Mexican official eartags include Aguascalientes, Chihuahua, Coahuila, Jalisco, Sonora, one case each; Campeche and Tamaulipas, two cases each; Nuevo Leon, five cases. Three additional cases originated from Mexico, but the state of origin has not yet been identified. One domestic fed cattle case occurred and was traced back to the depopulated beef herd from Oklahoma.

In FY 2006, approximately 1.1 million cattle were imported to the U.S. from Mexico; a majority of these are feeder cattle. A sample of 22 recent TB cases in Mexican origin feeder cattle found these animals resided in the U.S. a median of 10 months (range 4.6 to 16 months). Using FY 2007 TB cases in cattle of Mexican origin and FY 2006 Mexican cattle import records, the overall incidence of TB cases is 1.6 cases per 100,000 imported cattle. This is a substantial decrease from 1995 through 1997, when there were 7.3 to 18.7 infected cattle per 100,000 imports annually. Beginning in 1998 through the present, the annual rate has ranged from 1.0 to 5.4 infected cattle per 100,000 imports. Though this represents a sustained decrease from earlier years, infected cattle continue to be imported from Mexico and present an ongoing risk of TB transmission to U.S. cattle.

National TB surveillance is also accomplished through tuberculin skin testing and gamma interferon testing of livestock. Preliminary data of caudal fold tuberculin tests conducted during FY 2007, show that 961,475 tests were conducted on cattle and bison with 12,488 responders (1.3 percent, 46 states and Puerto Rico reporting). The response fraction in FY 2006 was 1.0 percent. A standard for caudal fold testing was implemented in 2005, based on an expected false positive response fraction of 1 percent (Uniform Methods and Rules, Appendix C, January 2005).

During FY 2007, a total of 231 suspects (2.2 percent) were reported to USDA from the 10,353 captive cervids tested by the single cervical test. The FY 2007 reports are preliminary; however, cervid testing reported in FY 2007 appears to have decreased from the 25,421 cervids reported in FY 2006 (374 responders, 1.5 percent).

The gamma interferon test (GI) has been available as an official test in the national eradication program for bovine TB for three years. Four laboratories throughout the United States are approved to conduct gamma interferon testing (California, Michigan, Texas, National Veterinary Services Laboratory).
REPORT OF THE COMMITTEE

Collectively, these laboratories reported testing 14,618 blood samples during FY 2007. Ninety-seven percent of tests were for cattle from four states (Colorado 773 tests, Michigan 2,581, New Mexico 9,622, and Texas 1,125).
The importance of strong foundations in the creation of efficient systems for disease surveillance is often overlooked. This is, in part, due to a natural tendency to look towards the program-specific aspects of the IT systems rather than the more general requirements. The term “good foundations” encompasses information, processes and systems; for example, you should ask yourself difficult questions.

- Is my data available electronically 24 x 7, 365 days?
- Is it systematically refreshed?
- Is it available in a system my staff can actually use?

Equally important are the processes that are used to capture the data. Do they allow the introduction of errors or do they exclude them? The critical point is, do I generate data or information?

Do not build different systems for each quality or disease program; work to find a common set of requirements and build a system that meets the majority of your requirements for all. You can then generate the information that is required to effectively manage each program. Watch out for common pitfalls such as allowing bad data to accumulate in your systems; remember that it is many, many times more expensive to manually correct bad data after it has gained entry to your systems. Periodic updates and refreshes are essential to not only run your programs effectively, but also because in the event of an emergency or notification requirement your core information must be accurate.

Our team at Trace First has been involved in livestock traceability systems since 1986; our team of world-class experts understands your challenges and can deliver the veterinary information systems you need. Trace First has earned the trust of customers like you and wants to demonstrate what we can do for you.
REPORT OF THE COMMITTEE

Our products include:
- Quality Program and Disease Surveillance Management
- Premises Registration and Update Service
- Emergency Preparedness Toolkit.

These systems, individually or combined, can deliver substantial benefits to your department and can be implemented to complement your existing systems.
Bovine tuberculosis poses a serious continual threat to the health and economic well-being of both livestock and humans. Free-ranging white-tailed deer (Odocoileus virginianus) can be endemically infected with Mycobacterium bovis, and serve as a potential reservoir of infection to livestock, other wildlife species, and humans, representing a significant obstacle to disease eradication efforts. An effective vaccination program, involving a mucosal vaccine that can be distributed in the field, would be very useful for disease management on a herd-wide level.

We investigated the efficacy of oral and parenteral BCG in its ability to protect white-tailed deer against disease and shedding caused by M. bovis infection. Thirty white-tailed deer were divided into four groups. One group was vaccinated with $10^6$ colony forming units (cfu) BCG (Danish strain 1331) subcutaneously, one group received $10^9$ cfu BCG in culture directly to the oropharynx, one group received $10^9$ cfu BCG via a lipid-formulated oral bait, and the last group received a placebo directly to the oropharynx. Throughout the study, oropharyngeal swab and fecal samples were collected monthly. Three months post-vaccination, all deer were challenged with virulent M. bovis. Five months post-challenge, the animals were examined for lesions caused by M. bovis. Results indicate that both oral forms of BCG offered significant protection against M. bovis challenge as compared to placebo. No differences in shedding among vaccine groups could be detected at the time points examined. These positive results warrant expanded research of oral BCG in white-tailed deer for eventual use in field investigations.
REPORT OF THE COMMITTEE

A CASE STUDY OF THE TEST-AND-REMOVE TB HERDS IN MICHIGAN: A DESCRIPTION, HISTORY AND COMPARISON

Phil Durst,
Extension Dairy Educator, Michigan

Galen Schalk
Michigan dairy producer

Dan Grooms
Michigan State University

It has been almost eight years since the diagnosis of bovine tuberculosis (bTB) in a Michigan dairy herd that was allowed to undergo a test and remove program rather than whole-herd depopulation. Since then, four additional dairy herds have gone, or are going, through a test and remove program. The experience with these herds allows us to evaluate the ability of the test and remove protocol to control bTB while maintaining herds as economic drivers in their communities. In four of five herds, only one animal was ever diagnosed with bTB even though testing including the caudal fold test (CFT), comparative cervical test (CCT) and gamma interferon (ifn-g) repeatedly throughout a two year quarantine period initially and now throughout four and a half years of quarantine. Only one animal was diagnosed in those herds also in spite of the fact that 178 animals, 33 percent of the combined mature herds, have been taken for slaughter, necropsy and histopathology. One herd has become reinfected, although it may have been new infection from the wildlife source. Even so, this compares to a recrudescence of at least 3 of 22 repopulated beef herds following whole herd depopulation. Meanwhile, the test and remove herds are still in business and bringing income into Michigan communities of approximately $1.4 million per year. This paper presents a case for allowing test and remove as an option for producers where certain conditions are met.
Mr. Gutiérrez provided a report on the current situation of México’s Bovine TB Program. He first covered the country’s laws and rules, to include:

Regarding laws, the Federal Law of Animal Health was published on July 25, 1995, and the Federal Law on Metrology and Normalization, Chapter III, Articles 52 to 57, was published on June 30, 1992.

Regarding regulations, the Mexican NOM-031-ZOO-1995 is being updated. NOM-046-ZOO-1995, National System of Epidemiological Surveillance, was published on February 19, 1997. NOM-018-ZOO-1994 was published on April 25, 1995, and covered veterinarians approved to conduct verification and other official services in zoosanitary activities. NOM-054-ZOO-1996 deals with quarantine establishment for animals and their products and was published on June 8, 1998.

Mexico now has 11 states and 14 regions in the eradication phase of the TB campaign. Mr. Gutiérrez reviewed a PowerPoint presentation with some data on the program.

He discussed the modification of the federal regulations regarding campaign phases, mobilization and quarantine procedures and gave the tentative schedule of TB reviews in México for 2008. He also mentioned records for tuberculin tests, quarantined premises, results of epidemiological surveillance from slaughter cattle and laboratory results. Mr. Gutiérrez spent some time reviewing TB cases in Mexican cattle slaughtered in the U.S. and reported to SAGARPA.
REPORT OF THE COMMITTEE

Strengths of the Mexican TB program include:

- Federal appropriation of approximately 33 percent of the General Animal Health budget for the TB program through the “Alianza para el Campo”;
- Specialized and trained personnel;
- Surveillance systems becoming more efficient;
- Reliable TB program indicators;
- Continuous TB inspections at slaughterhouses and movement training; and
- Equivalent regulations in constant update.
The Michigan Department of Agriculture, in conjunction with the Michigan Department of Natural Resources, United States Department of Agriculture, Animal and Plant Health Inspection Service, VS and WS, and other state and federal agencies have been working on eradicating bovine TB from all livestock and wildlife species since it was identified in free-ranging white-tailed deer in 1995. Since that time TB has been found in 42 cattle herds and two captive cervid herds, all located in the current modified accredited (MA) zone of the northern lower peninsula. It has also been found in free-ranging white-tailed deer in this same area. As of October, 2007, over 1.3 million TB tests have been completed in Michigan cattle, and over 153,000 free-ranging white-tailed deer have been tested for TB statewide. Evidence to date supports that the disease appears to be confined to the MA area, and the specific strain of TB in Michigan has not spread to any other area of the state, and has not been found in any other state or country. Evaluation of historical testing and epidemiological information demonstrates that the risk of TB infection in cattle herds is related to the location of the herd, and geospacially related to proximity to the northeastern area of lower Michigan. This area contains over 90 percent of all the TB infected wildlife and cattle herds found to date.

Although the current animal identification, movement tracking, annual TB testing of cattle herds, and TB movement testing requirements appear to prevent the spread of disease through cattle movement, the risk of transmission from TB infected wildlife is still present. Future activities will continue to expand the areas of preventing this spillover, and developing more risk-based targeted surveillance strategies in the modified accredited advanced and TB free areas of the state. Future enhancements to the TB program include the following:

- Mandatory Radio Frequency Identification (RFID) cattle movements statewide (implemented March, 2007);
- Increased tracking of cattle movements from the Modified Accredited Advanced (MAA) zone;
- Increased use of technological/passive tracking systems
REPORT OF THE COMMITTEE

for RFID identified cattle (market flow);
- Increased surveillance in feedlots in MA zone;
- Risk-targeted Surveillance programs in MAA/TB Free;
  - Increasing emphasis on compliance programs throughout the state including activities at the Mackinac bridge, mobile surveillance patrols, inventory reconciliation, and heightened presence at livestock markets.
  - Wildlife – more tools for deer population control/ increased focus on enforcement of baiting bans.
- Programs to eliminate the transmission from wildlife into livestock. Implementation of wildlife Risk mitigation plans for herds in the MA zone and evaluation of the use of indemnity. In wildlife populations, more liberal use of deer control permits and continued investigation and research into the potential of vaccines.

Minnesota
Linda C. Glaser
Minnesota Board of Animal Health

Since the 2005 discovery of bovine tuberculosis (TB) in northwestern Minnesota, a total of seven infected beef cattle herds have been identified and subsequently depopulated. TB positive white-tailed deer have been found in close association with five of the infected premises and the Minnesota Department of Natural Resources (DNR) has defined a Core Area in order to identify this area of concern. The DNR is taking a multi-pronged approach to reduce deer populations in this area and eliminate TB infected deer, including: implementing a recreational feed ban, granting landowner hunting permits, developing a special permit area with increased bag limits, assisting producers in construction of deer-proof fencing for their stored feed, and contracting sharp shooters to collect deer in the Core Area. The Minnesota Board of Animal Health adopted the DNR Core Area boundaries; producers in this area are now required to restrict cattle movement and adopt management practices that reduce the interaction between cattle and deer on their premises. Minnesota has TB tested deer statewide and is in the middle of a statewide campaign to TB test cattle herds. With the Core Area measures in place and with completion of statewide surveillance in cattle, the state will apply for reinstatement of TB-Free status in December 2008.
New Mexico is a Tuberculosis (TB)-free state with a small Modified Accredited Advance (MAA) zone along the eastern edge of the state. The MAA zone has stringent and specific requirements. All herds within the MAA zone are under strict movement control and are TB tested annually. TB testing within the MAA zone revealed no positive cases in 2007. Mitchell dairy, one of the two herds responsible for creation of the MAA zone, underwent a complete herd test in July 2007 with no positive cases. Schapp dairy, the other TB positive dairy responsible for creation of the MAA zone, depopulated shortly after TB was diagnosed in the herd in 2003. Over 20,000 animals were TB tested within the MAA zone during 2007. The majority of testing was performed by state or federal regulatory personnel.

In February 2007, a cow from Cornerstone Dairy in southeastern New Mexico, outside of the MAA zone, was diagnosed with TB via slaughter surveillance. The dairy was quarantined and underwent a complete herd test. Approximately 5,000 animals were TB tested with no positive animals found. The quarantine was lifted with the agreement that the dairy will undergo a complete herd test in December 2007 and again in December 2008.

In April 2007, a cow from the DoRene/Milagro Dairy was diagnosed with TB via slaughter surveillance. The DoRene/Milagro herd consists of two dairies and one heifer-raising facility, all near, but outside of, the MAA zone. The herd was quarantined and a complete herd TB test led to necropsies which confirmed the diagnosis of TB. With the aid of a federal task force, the regulations set forth in the TB Uniform Methods and Rules (UMR) were followed and all ancillary testing was completed with no other positive TB cases found. Approximately 20,000 animals were tested. The owners of the DoRene/Milagro herd accepted a depopulation plan and, as of this writing, 1,950 cows of the original 12,000 head remain to be depopulated. The depopulation will be completed by December 14, 2007. Epidemiology continues with the final epidemiology report due November 30, 2007. The DoRene/Milagro owner plans to repopulate as soon as possible. The DoRene/Milagro herd will be TB tested according to the UMR at six months and again at one year post-repopulation. It should
be noted that the DNA fingerprint from the organism isolated from the DoRene/Milagro herd is not the same as the DNA fingerprint from the organism isolated from Mitchell dairy, Schapp dairy or Cornerstone dairy.

There are seven other dairy herds in New Mexico that have been or will be TB tested in the near future. These herds are being labeled as “high gamma” herds. These herds, although testing negative for TB during their last herd tests in 2004, had one or two animals with suspiciously high gamma interferon tests. In an attempt to be as thorough as possible in the search for TB in New Mexico, these herds were added to the list to be TB tested.
TUBERCULOSIS

REPORT ON BI-NATIONAL BRUCELLOSIS AND TUBERCULOSIS COMMITTEE ACTIVITIES

Billy Johnson, Coordinator

The U.S.-Mexico Bi-National Brucellosis and Tuberculosis Eradication Committee (BNC) was formed in 1993 based on a recommendation by United States Animal Health Association (USAHA) with responsibility to provide oversight on the eradication programs in each country and to provide recommendations for the minimum requirements for the exportation of cattle from Mexico to the United States. The BNC has sixteen members with representation from the livestock industries, research, and State and Federal officials. It should be pointed out that there is no government funding for the Committee members to attend the meetings. These expenses are paid by the members or their sponsoring organizations. The Committee has met three times during the past year, twice in the US in conjunction with the National Cattlemen Beef Association and at the USAHA Annual Meeting and once in Mexico during the Confederation National Ganadera (CNG) meeting. There will be a meeting on Thursday, October 25th during this USAHA Annual Meeting. These organizations as well as other industry groups have worked cooperatively with the BNC since it’s beginning by providing space, financial aid and other assistance. By meeting at these locations, cattlemen and other industry and veterinary officials have the opportunity to participate.

The BNC has no authority to pass or implement regulations or procedural changes. However, it has been involved in providing input and recommendations in all phases of the programs since its formation. The BNC worked closely with Animal and Plant Health Inspection Service (APHIS) officials in developing the present requirements and in developing review procedures to be followed in Mexico. The most critical step in forming the BNC was to bring the livestock industries into the process of program development and implementation.

In 1993 when the BNC first was started there was concern by the U.S. cattle producers that their herds were being exposed to large numbers of tuberculosis infected steers and spayed heifers when they were being put on grass before movement to feedlots. At the time over 500 infected animals were being found at U.S. slaughter establishments each year. United States
Department of Agriculture (USDA) implemented regulations to refuse entry of Holstein and cross bred Holstein steers into the U.S. and the Border State Veterinarians developed a procedure called the Consensus Document which required each state in Mexico to be enrolled in an eradication program in order to export cattle to the U.S. This program was coordinated by the BNC until USDA-APHIS could publish new regulations controlling the import of Mexican feeder animals. The goal under these regulations was to work towards equivalency between the eradication programs in the two countries.

Status reports are provided at each meeting on the following issues:

- Slaughter reactor traceback efforts;
- Eradication program progress;
- Research programs in each country;
- State reviews; and
- Interstate and inter zone movement controls.

As the two countries work towards equivalency in the eradication programs, areas of concern continue to arise because of the differences in normal cattle operating procedures and the disease levels in the two countries. These concerns are brought before the Committee for discussion and recommendations to be presented to Secretaría de Agricultura Ganadería, Desarrollo Rural, Pesca y Alimentación (SAGARPA) and APHIS. During the past year the following issues have been presented and discussed.

1. Standardization of tuberculins used in Mexico, the United States and Canada. This is progressing and a Committee with representatives from the three countries.

2. Approval of designated feedlots for Modified Accredited Advanced states or zones. Designated feedlots are permitted in Modified Accredited and Accreditation Preparatory states. Industry officials in Modified Accredited Advanced States indicate they are not getting sufficient cattle to meet their needs.

3. Request for approval of designated pastures in Modified Accredited and Accreditation Preparatory states to operate under conditions similar to designated feedlots.
4. Movement of purebred cattle from Accredited Free herds in non-accredited states to all other states.
5. Recognition of Mexico’s National Identification System for imported cattle to the U.S. and simplification of import documents.
6. Proposal to modify outlines for the authorization of designated feedlot so only electronic identification systems are required.
7. System for the movement of rodeo bulls between status and non status states.
8. A system for sampling slaughter cattle in slaughter plants that are too small to have full time slaughter inspection.
9. Request for APHIS to reconsider their requirements that any new zone must contain at least 1,000 herds.
10. Request for a cooperative agreement between Mexico and USDA that would allow SAGARPA to funnel user fees back into their program.

The procedures in place allow time for SAGARPA and the Mexico industries and APHIS and the U.S. industries to meet prior to the full BNC meeting to develop their issues and then time after the BNC meeting for SAGARPA and APHIS officials to meet to discuss actions to be taken on the issues.

Although the disease level in imported animals has decreased as programs have been implemented in more states there still are from 15 to 20 infected Mexican steers being found at slaughter in the U.S. and in Mexican rodeo animals used in the U.S. There is still concern by officials in the U.S. that there are a significant number of states and zones in Mexico that have not implemented full surveillance programs for tuberculosis nor eradication programs. These problems will continue to be areas of discussion in the BNC.

Although the BNC was originally established for tuberculosis procedures, brucellosis was later added to the Committee responsibilities. Although the brucellosis programs in most states in Mexico are not progressing at the same rate as their tuberculosis eradication programs, the state of Sonora has progressed well and is requesting Brucellosis Class A status. Also a U.S.-Mexico Tick Committee meets at the same time as the BNC and provides a summary of their meeting to the BNC since most of the BNC members are also involved with tick eradication programs.
The Committee met from 12:30-5:30 PM on October 21 at John Ascuaga’s Hotel, Reno, Nevada. At least 109 people attended, including 44 committee members. Reports were provided concerning ongoing and emerging health issues involving wildlife and of interest to the United States Animal Health Association (USAHA) and its members. Summaries of the reports follow.

**Avian influenza virus research studies**

Dr. Justin Brown, Southeastern Cooperative Wildlife Disease Study (SCWDS) provided a summary to the committee on the collaborative research being conducted at SCWDS and
the Southeast Poultry Research Laboratory, Agriculture Research Service (ARS), U.S. Department of Agriculture (USDA) on H5N1 highly pathogenic avian influenza (HPAI) virus transmission in wild birds. Specifically, he discussed two projects which evaluated: 1) the species-related differences in susceptibility and viral shedding among wild avian species in the Orders Anseriformes and Charadriiformes; and 2) the concentration of virus required to produce infection and death in wood ducks (*Aix sponsa*).

To evaluate the potential for H5N1 HPAI viruses to be maintained in wild avian populations, the morbidity, mortality, and extent and duration of viral shedding in eleven species of anseriforms and two species of charadriiforms were assessed after intranasal (IN) challenge with an Asian H5N1 HPAI virus. Species-related differences in morbidity, mortality, viral shedding, and viral distribution exist between the examined species. Based on these differences, the thirteen species were separated into four general categories of susceptibility: 1) 100 percent mortality within two days with viral antigen present in the endothelial cells throughout the body and/or parenchymal cells of numerous visceral organs and brain (black swans *Cygnus atratus*); 2) 100 percent mortality within 4 to 7 days with viral antigen located in the parenchymal cells of numerous visceral organs and brain (mute swans *Cygnus olor*, trumpeter swans *Cygnus buccinator*, and whooper swans *Cygnus cygnus*); 3) high morbidity and variable mortality with viral antigen primarily located in the parenchymal cells of the brain, adrenal gland, and pancreas (herring gulls *Larus argentatus*, laughing gulls *Larus atricilla*, wood ducks, bar-headed geese *Anser indicus*, and cackling geese *Branta hutchinsii*); and 4) no mortality or detectable viral antigen (mallards *Anas platyrhyncos*, blue-winged teal *Anas discors*, redheads *Aythya americana*, Northern pintails *Anas acuta*). As with previous studies on H5N1 HPAI virus infection in waterfowl, viral titers were higher in oropharyngeal (OP) swabs than cloacal swabs, and generally, titers were positively associated with the susceptibility of a species: the highest viral titers were excreted by the most susceptible species. The results from these experimental infection trials indicate that H5N1 HPAI viruses are virulent for select wild avian species and this is consistent with field data from outbreaks of H5N1 HPAI throughout Eurasia. Based on this study, viral titers are lower in species that remain asymptomatic compared to those species that exhibit morbidity associated with H5N1 HPAI virus infection. This is consistent with the Eurasian active field surveillance results thus far, in which isolation of H5N1 HPAI virus from clinically healthy wild birds has been extremely rare. Taken
REPORT OF THE COMMITTEE

together, these experimental and field data suggest that the wild avian species that are affected clinically are the primary species involved in the transmission and spread of H5N1 HPAI viruses in wild bird populations, as opposed to an asymptomatic avian host. Furthermore, these data suggest that an asymptomatic wild bird reservoir for H5N1 HPAI viruses may not exist and that epidemics in Europe during 2005-2006 likely represent spill-over events from domestic poultry into wild birds with limited persistence and transmission within the wild avian population.

In order to further examine the susceptibility of a “highly susceptible” wild bird species, the median bird infectious dose (BID\textsubscript{50}) and lethal dose (BLD\textsubscript{50}) of a H5N1 HPAI virus for wood ducks were determined after IN inoculation. The results of this study indicated that wood ducks have a low BID\textsubscript{50} and BLD\textsubscript{50} of $10^{0.95}$ EID\textsubscript{50} and $10^{1.71}$ EID\textsubscript{50}, respectively. These infectious and lethal viral doses are less than those of the domestic chicken, traditionally considered one of the most susceptible avian species to H5N1 HPAI viruses, using the same H5N1 HPAI isolate. These results confirm that wood ducks are highly susceptible to H5N1 HPAI viruses and suggest that wild avian species that appear to be “highly susceptible” to H5N1 HPAI viruses based on field data or experimental infection trials, are truly sensitive to infection with these viruses.

National wild bird avian influenza surveillance – United States Department of Agriculture, (USDA) Animal and Plant Health Inspection Service (APHIS)-Wildlife Services

Dr. Tom Deliberto, WS-APHIS-USDA, reported that as part of the government-wide National Strategy for Pandemic Influenza, USDA-APHIS, Department of Interior, and State Wildlife Agencies provided leadership in conducting surveillance for the early detection of highly pathogenic avian influenza (HPAI). Within APHIS-WS was delegated the responsibility for plan development, implementation, and oversight. WS, in collaboration with State Wildlife Agencies, Department of Interior (DOI), and Department of Health and Human Services (HHS), and other entities such as the Southeastern Cooperative Wildlife Disease Study, developed An Early Detection System for Highly Pathogenic H5N1 Avian Influenza in Wild Migratory Birds, U.S. Interagency Strategic Plan (U.S. Strategic Plan).

Prior to implementation, Congress appropriated APHIS $71.5 million in emergency 2006 supplemental funding to address
WILDLIFE DISEASES

the threat of HPAI throughout the world. Wildlife Services was provided $17 million to conduct both domestic and international activities regarding surveillance for HPAI in wild, migratory birds and developing capacity to respond to emergency events regarding wildlife and domestic animal health. Congress appropriated $47.2 million for APHIS in 2007 to continue similar activities in support of the National Strategy for Pandemic Influenza, and WS received $13 million to fund surveillance activities. Although the Federal FY08 budget currently has not been passed, surveillance activities continue.

Domestic surveillance is divided into two phases. The initial phase addresses early detection activities in Alaska and the second phase addresses subsequent HPAI detection activities in four major North American flyways. The plan for includes several interrelated components, including: the investigation of morbidity/mortality events; the sampling of live-captured birds; the deployment of sentinel species; environmental sampling; and sampling hunter-harvested birds. All samples are submitted to the laboratories in the National Animal Health Laboratory Network (NAHLN) for initial screening using real-time, reverse transcription-polymerase chain reaction tests. Following these tests, matrix and H5/H7 positive samples are sent directly to the National Veterinary Services Laboratory (NVSL) for additional testing including virus isolation, subtyping, and molecular sequence characterization.

To date, over 109,000 wild birds and 60,000 environmental samples have been tested for HPAI through the APHIS-funded program. The current year’s APHIS plan is to collect and analyze 50,000 wild birds and test 25,000 environmental samples through a targeted surveillance approach. Detailed information can be found in WS’ Implementation Plan for HPAI Surveillance in Wild Migratory Birds in the United States.

In June 2007, WS hosted six training workshops to review the current activities and better plan for fall sampling of wild, migratory birds. The workshops, attended by over 180 participants from State Wildlife Agencies, NAHLN laboratories, and WS, greatly improved communication among all partners and increased efficiency regarding surveillance for HPAI.

WS has implemented a reporting system to answer calls and inquires from the public regarding dead or sick wild birds. The toll-free number, 866-4-USDA-WS, has been published on the APHIS website to support public inquires and expedite calls. The calls are tracked through an on-line system to monitor any
potential increases in dead or sick bird reports. To support avian influenza surveillance in wild birds, a protocol and decision tree were developed to triage reports of dead or sick birds.

To date, 32 presumptive positive and/or confirmatory test results for the low pathogenic H5N1 avian influenza have been reported from 13 States: Illinois, Maryland, Michigan, Montana, New York, Ohio, Delaware, South Dakota, Missouri, North Carolina, New Jersey, Pennsylvania, and Vermont. In all cases, genetic testing at NVSL ruled out the presence of the strain of HPAI that is circulating overseas. Because low pathogenic avian influenza detections from wild birds are common and pose no threat to human health, USDA transitioned to a new method of notifying the public online. In the event of a presumptive H5N1 test result involving a large number of sick or dead birds, or other circumstances that suggest the possibility of a highly pathogenic virus, USDA in coordination with the State Wildlife Agency, DOI, and HHS will issue a news release or conduct a technical briefing to notify the media and the public.

Avian Influenza in Wild Birds – U.S. Department of the Interior

Christine Bunck, National Wildlife Health Center, reported that interagency surveillance for the early detection of highly pathogenic avian influenza (HPAI) H5N1 in migratory birds began in the spring of 2006 and is continuing into the fall of 2007. The Policy Coordinating Committee of the U.S. Department of Homeland Security directed the U.S. Department of the Interior (DOI) and the USDA, in conjunction with U.S. Department of Health and Human Services, the Association of Fish and Wildlife Agencies, and the state of Alaska to develop an interagency plan for detecting the potential introduction of HPAI H5N1 in the United States. The plan was completed by March 2006 and implemented in the spring of 2006. The plan identified 5 approaches for surveillance in wild migratory birds:

1. Investigating morbidity and mortality events to determine the role (if any) of HPAI H5N1 in the event
2. Sampling apparently healthy migratory birds that were typically captured live and released
3. Sampling apparently healthy migratory birds killed during sport and subsistence hunts as well as management activities
4. Sampling sentinel migratory birds placed in various locations
WILDLIFE DISEASES

5. Testing samples of water, soil or bird feces gathered from the environment at various locations where migratory birds congregate

DOI focused primarily on the first three of these approaches. DOI and its partners have conducted investigations of morbidity and mortality events throughout the Nation during 2006 season (1 April 2006 to 31 March 2007) and the 2007 season (1 April 2007 to 31 March 2008). Although live and hunter-harvested migratory birds were sampled throughout North America in both 2006 and 2007, DOI and its partners focused their efforts during the 2006 season on Alaska, the lower Pacific Flyway and the Pacific Islands, and expanded their efforts during the 2007 season to include the Central, Mississippi and Atlantic Flyways.

For surveillance of live birds and hunter-harvested birds in Alaska, the following criteria were used to select priority species:

1. Contact with Asia or birds migrating directly from Asia
2. Contact with location(s) where H5N1 has been found
3. Habitats used in Asia
4. Population size in region of interest
5. Ability to obtain samples

These criteria were stepped down in the Pacific Islands and Flyways to identify priority species. In the lower 48 states, northern pintail, Pacific black brant, Wrangel Island snow geese and lesser sandhill cranes were priority species. Additional species were added to the priority list for each flyway based on their contact with priority species in Alaska during the winter.

Cloacal and oral-pharyngeal swabs (cloacal swabs only in 2006) were collected from live and hunter-harvested birds; cloacal and tracheal swabs were collected from necropsied carcasses submitted from morbidity and mortality events. Swabs were screened for Avian Influenza (AI) at the U.S. Geological Survey (USGS), National Wildlife Health Center (NWHC) by matrix reverse transcriptase-polymerase chain reaction (RT-PCR) assay. AI-positive samples were then screened for H5 and H7 subtypes. Samples positive for H5 and H7 subtypes were sent to the USDA National Veterinary Services Laboratory for confirmation and further characterization. Swab samples were also inoculated into chicken eggs at the NWHC for virus isolation. Isolated viruses were characterized by sequence analyses at NWHC.

During the 2006 season, DOI and its partners tested samples from 27,295 migratory birds, representing 177 species and 11 orders of birds. Avian influenza was identified by matrix
PCR in 741 (2.7 percent) of the birds, representing 26 species and two orders of birds. Positive prevalence rates ranged from 0.35 percent in dunlin to 10.05 percent in green-winged teal. These findings include the first identification of avian influenza in Aleutian tern, pectoral sandpiper, common eider, king eider, spectacled eider, Steller’s eider, and glaucous gull.

As of October 11, 2007, 392 viruses have been isolated. Subtype information is currently available for 104 viruses and sequence information is available for 52 viruses. Subtyping and sequencing of samples from the 2006 season is continuing.

Thus far, hemagglutinin subtypes identified include H1-H8, H10, H11, H13, and H16. All nine neuraminidase subtypes have been identified. H5 has been identified in 23 birds and subtypes included 16 H5N2, 4 H5N3, and 3 H5N9. Co-infections of H5 with another hemagglutinin subtype were found in 20 percent of these birds. H5 viruses were identified in geese, mallards, gadwall, pintail, shoveler, and swans as well as several marine coastal species. H7 has been identified in 25 birds and subtypes include 17 H7N3, 1 H7N4, 1 H7N8, 4 H7N7, 1 H7N8 and 1 H7N9. H7 viruses were identified in mallards, teal, shoveler, pintail, geese, and eiders. Preliminary results of sequencing indicate that 8 of the 52 viruses sequenced so far contain RNA segments of Eurasian origin.

In the 2007 season, samples from 8,800 birds have been submitted as of October 11, 2007. These birds include 2,638 subsistence-hunted birds in Alaska; 5,761 live-captured birds in Alaska, the lower Pacific Flyway, Central Flyway, and Pacific Islands; and 401 carcasses from 54 mortality events throughout the Nation from April to October 2007. Details on mortality events can be found on the NWHC web site (http://www.nwhc.usgs.gov/). Thus far, 134 of the 8,800 birds (1.5 percent) were positive for AI based on matrix PCR. We anticipate a total of >20,000 migratory birds will be tested at NWHC by the end of the 2007 season.

Results of DOI surveillance under the Interagency Strategic Plan, combined with those from USDA surveillance, for the 2006 and 2007 seasons can be viewed at the HPAI Early Detection Data System (HEDDS) found at http://wildlifedisease.nbii.gov/ai/.

Mycoplasma ovipneumoniae in bighorn sheep

Dr. Donald Knowles, USDA-ARS, reported that utilizing
WILDLIFE DISEASES

16S clone library analysis, conventional bacteriology, PCR, DNA sequencing and serology, a hypothesis was tested that primary infection with one or more currently unidentified agents precede *Mannheimia* or *Pasteurella* spp. infections associated with bronchopneumonia in bighorn sheep. Data from testing this hypothesis demonstrated that *Mycoplasma ovipneumonnaie* was a major component of the bacterial flora of pneumonic lungs from bighorn sheep lambs.

Wildlife/Livestock Disease Interactions – Finding Common Ground

Dr. Jim Logan, Wyoming Assistant State Veterinarian, reported that the significance of diseases involving wildlife and livestock has increased conflict between natural resource and livestock interests. The concerns are valid for the potential for disease transmission in either direction between wildlife and livestock. Domestic and wild species frequently share the same habitat and may share several pathogens. This interface creates many complex problems. Unfortunately, these problems are not always easily solved scientifically and so remedy is sought through political and/or legal channels.

Diseases such as brucellosis in the Greater Yellowstone Area (GYA), Tuberculosis in Michigan, pseudorabies and swine brucellosis in feral swine, and avian influenza are some program diseases of concern to wildlife managers, livestock interests, and regulatory agencies. Other diseases such as bluetongue, vesicular stomatitis, rabies, malignant catarrhal fever, and fever ticks pose a threat to domestic and wild species. In addition, several foreign animal diseases could devastate naïve populations of wild and domestic animals.

The issues surrounding the bighorn sheep/domestic sheep disease interactions are many. There is controversy between wildlife managers and sheep producers regarding the pathogenesis of Bighorn sheep die-offs. Bighorn sheep die-offs have occurred in relation to the presence/proximity of domestic sheep and, conversely, die-offs have occurred in the total absence of domestic sheep. Certainly there are many contributing factors involved in the bighorn sheep die-offs.

It has been recognized at the Bighorn Sheep Disease Workshops that there are “knowledge gaps” and that there is still a need for further study and research to determine the etiology of the respiratory complex diseases associated with the die-offs.
We know that *Pasteurella* (*Mannheimia*) species, viruses, and *Mycoplasma* species have been implicated. It is also known that factors such as stress, weather, parasites, other animals, and nutrition very likely play roles in pathogenesis.

Controversy also exists within this issue pertaining to the loss of grazing allotment opportunities for the domestic sheep industry. Historical grazing allotments are inextricably linked to base property values and mortgage-ability. When grazing allotment usage is curtailed, the viability of a ranch is jeopardized. This has the potential to negatively affect both the private sector rancher and the wildlife interests due to habitat and migration corridor loss if a ranch is subdivided and developed due to better economic opportunity than wool-growing.

Based upon the available literature, limited surveillance and limited research, the domestic sheep industry contends that it is premature to incriminate domestic sheep as the major cause of bighorn sheep disease and herd decline. It is time to encourage appropriate collaborative research and increased surveillance activities on which both wildlife and livestock interests can agree and on which policy decisions can be made.

Agriculture and wildlife interests share common risks/threats such as mutual foreign animal disease risk, loss of land/habitat to urban sprawl and land developments, and animal rights activism. It is imperative that we work together to preserve our common interests. Working together will require extensive cooperation, coordination, communication, and collaboration between several agencies and interest groups. It will also require respect for the responsibilities, authorities, skills, and livelihoods of all partners, and will help to develop trust. The domestic sheep industry asks for cooperation from wildlife interest groups and agencies, the United States Animal Health Association (USAHA), regulatory agencies, land management agencies, Agriculture Research Service (ARS) and Cooperative State Research Education and Extension Service (CSREES) to collaborate on focused efforts to enhance surveillance, diagnostics, epidemiology, and research involving domestic sheep/Bighorn sheep disease transmission, resulting in policy decisions based on the results of these efforts.
Recent Risk Assessments of Bighorn Sheep/Domestic Sheep Disease Interactions

Dr. Mark Drew, Idaho Departments of Agriculture and Fish and Game, reported that currently, bighorn sheep (BHS) populations are less than 5 percent of historic levels. Disease appears to be a major factor in BHS population dynamics, largely through pneumonia associated with *Pasteurella* spp., *Mycoplasma* spp., respiratory viruses, lungworms, and other factors. In general, disease is very difficult, if not impossible to control or manage in free-ranging populations.

The Payette National Forest (PNF) is located in west central Idaho and encompasses 2.3 million acres. The forest is managed for multiple use including timber production, livestock grazing, recreation, and wildlife. The southeast part of the Hells Canyon National Recreation Area is managed by the PNFt. In 2003, the Payette National Forest Plan was developed, but the plan was appealed to the Washington, D.C., U.S. Forest Service (USFS) office based largely on lack of management strategies for bighorn sheep. In 2005, the USFS rejected the Payette National Forest Plan and remanded the plan back to PNF Supervisor for revision. The revision required three things for approval, any of which could result in adjustments to domestic livestock grazing allotments:

- Analysis of BHS viability in Hells Canyon Management Area of the Payette National Forest
- Compliance with applicable law and regulation, specifically the Hells Canyon National Recreation Act
- A supplemental Environmental Impact Statement (EIS) for the revised Forest Plan

In order to comply with the decision of the USFS, the Payette National Forest Supervisor initiated a process to gather the needed information. The process consisted of three steps:

- Review of scientific literature on disease transmission between domestic sheep (DS) and BHS and impacts of disease on BHS populations
- Evaluation of population data for BHS within and near the forest
- Expert panel assessment of risk of disease transmission from DS on grazing allotments to nearby BHS populations

The final report was released on February 6, 2006 and entitled Risk Analysis of Disease Transmission Between Domestic Sheep and Bighorn Sheep on the Payette National Forest. An additional
meeting was called by the Payette National Forest Supervisor on November 2, 2006. A Science Panel was convened with two objectives: Clarify the science based concerns regarding the Risk Analysis of Disease Transmission between DS and BHS on the PNF; and allow panelists to provide additional science-based information regarding disease transmission and its risk of occurring on the Payette National Forest for consideration in conjunction with the risk analysis.

The members of the Science Panel represented a diverse group of wildlife and livestock veterinarians, and wildlife and domestic livestock researchers, all with diverse views on bighorn-domestic sheep health issues. At the end of the panel discussion, a set of six statements was developed and unanimously agreed by all panel members as best summarizing existing knowledge about disease transmission and risk in bighorn sheep. Since then, these statements have come to be regarded as potential common ground for further discussing bighorn-domestic sheep (and domestic goat) interactions and disease issues. The “Payette Principles” are as follows:

1.a. Scientific observation and field studies demonstrate that “contact” between domestic sheep and bighorn sheep is possible under range conditions. This contact increases* risk of subsequent bighorn sheep mortality and reduced recruitment, primarily due to respiratory disease. * alternative wording suggested “can increase risk” (A. Rink)

1.b. The complete range of mechanisms/causal agents that lead to epizootic disease events cannot be conclusively proven at this point.

1.c. Given the previous two statements, it is prudent to undertake management to prevent contact between these species.

2. Not all bighorn sheep epizootic disease events can be attributed to contact with domestic sheep.

3. Gregarious behavior of bighorn sheep and domestic sheep may exacerbate potential for disease introduction and transmission.

4. Dispersal, migratory, and exploratory behaviors of individual bighorn sheep traveling between populations may exacerbate potential for disease introductions and transmission.
5. There are factors (e.g., translocation, habitat improvement, harvest, weather, nutrition, fire, interspecies competition, and predation), some that can be managed and some that cannot, that can influence bighorn sheep population viability.

6. Pasteurellaceae, other bacteria, viruses, and other agents may occur in healthy, free-ranging bighorn sheep.

Since the Science Panel meeting, the Payette Principles have been used in numerous settings for discussions about bighorn sheep and domestic sheep disease issues. Subsequent products arising from these discussions include the Western Association of Fish and Wildlife Agencies’ (WAFWA) “Recommendations for domestic sheep and domestic goat management in wild sheep habitat”; the American Veterinary Medical Association – “Policy on “Wildlife-livestock interactions” recommended by Animal Agriculture Liaison Committee; and the Council for Agricultural Science and Technology (CAST) – “Commentary on bighorn sheep/domestic sheep disease issue. In addition, two subsequent meetings were held to further discuss these disease issues – The BHS Respiratory Workshop at the University of California-Davis, Davis, California and the bighorn sheep/domestic sheep Disease Risk Assessment Workshop held in conjunction with The Wildlife Society in Tucson, Arizona.

Dr. Mark Atkinson, Nevada Department of Wildlife reported that in April 2007, a two-day facilitated workshop was held at the University of California, Davis to review the issue of respiratory disease in bighorn sheep (Ovis canadensis). Participants representing a broad array of scientific disciplines from both the wildlife and domestic livestock fields convened to discuss current knowledge of respiratory disease, identify gaps in that knowledge and set priorities for future research. Break-out groups discussed the issues of study design, field experimentation, disease risk assessment and analysis, outbreak investigation and research needs. The resulting management and research priorities included issues of identification, characterization, ecology and epidemiology associated with the introduction of novel and/or virulent microorganisms into free-ranging bighorn sheep populations; investigation of social factors impeding acceptance and implementation of current research findings; and development of applicable quantitative risk assessments for bighorn and domestic sheep management. Guidelines for sample collection
REPORT OF THE COMMITTEE

and analysis for herd health assessment and disease outbreak investigations also were developed and will soon be published.

As a follow-up to this workshop, a one-day meeting focusing on information sharing and practical disease-risk assessment took place in Tucson, Arizona in late September, 2007. The goal of this meeting was to provide biologists, veterinarians, wildlife and wild land managers, domestic sheep producers and other interested parties, with the most current and relevant information pertaining to bighorn sheep health investigation and management. The ‘Payette Principles’ and the outcomes of the University of California Davis workshop and the Western Association of Fish and Wildlife Agencies (WAFWA) Wild Sheep Working Group were discussed. Several presenters addressed issues raised in the first workshop including the physical problems, costs and concerns of woolgrowers and collaborative approaches for conflict resolution. Participants also received detailed information about the value of performing quantitative disease risk assessment. Workshop details and proceedings are posted on the American Association of Wildlife Veterinarian’s website www.aawv.net and at www.mwvcrc.org/content/view/100/102.

A third workshop is scheduled to take place at the Foundation for North American Wild Sheep (FNAWS) 2008 Convention in Salt Lake City. The goals of this workshop are to identify common ground, best management practices and common sense solutions that will serve the conservation of bighorn sheep, while simultaneously promoting best use of public grazing land in the Western US.

Bovine Tuberculosis in Wild Deer in Minnesota

Dr. Linda Glaser, Minnesota Board of Animal Health, reported that bovine tuberculosis (TB) was identified in northwestern Minnesota in 2005 with a total of seven infected beef cattle herds were found and depopulated to date. With the identification of TB in cattle, the Minnesota Department of Natural Resources (DNR) initiated TB surveillance in free-ranging white-tailed deer within a 15 mile radius of any infected cattle farm during the 2005 hunting season. Since then, the DNR also has collected samples from over 6000 deer throughout the state; thirteen deer were positive for bovine TB. All infected deer were collected within five miles of infected cattle farms.

In 2006, after two consecutive years of TB surveillance in
WILDLIFE DISEASES

hunter-killed deer, the DNR identified a ‘TB Management Zone’ with a ‘Core Area’ of concern related to bovine TB in free ranging deer populations. The ‘Core Area’ encompasses a minimum two mile radius around all TB positive deer identified to date and includes five of the seven infected cattle premises. The habitat in this area supports deer densities of six to eight deer per square mile. It is primarily agricultural land used for cattle grazing and alfalfa production with forested public lands and wetlands managed for wildlife.

The DNR has initiated several measures to reduce potential disease transmission opportunities in this critical area in order to reduce the opportunity for deer to deer or deer to livestock transmission of bovine TB. These measures include:

• A recreational deer feeding ban in a 4000 square mile area around the ‘TB Management Zone’ effective in November 2006; baiting is already illegal in Minnesota.

• A contract with USDA-Wildlife Services to provide sharp shooters to collect deer in the “Core Area’ from February through early April 2007; sharp shooters reduced the estimated deer population in this area by half.

• The DNR worked with eight producers to plan and construct deer-proof fencing of stored feed in 2007; an additional seven producers will have fences constructed next year.

• A new ‘Bovine TB permit area’ was created around the ‘Core Area’. This permit area has special hunts, expanded bag limits, and issues free bonus permits in an effort to increase deer collected by hunters.

TB surveillance in deer collected during the hunting season from a 15 mile radius circle around infected cattle farms will be conducted again in 2007.

Brucellosis in Wildlife in Wyoming

Dr. Terry Kreeger, Wyoming Game and Fish Department reported that elk feedgrounds were begun by Wyoming in the early 20th century to mitigate elk starvation. As brucellosis concerns in cattle increased, the feedgrounds served to prevent commingling of cattle and elk. There are now 23 feedgrounds (22 state and 1 federal), feeding approximately 20,000 elk. Feedgrounds were designed to “shortstop” elk migration routes to prevent them from contacting cattle now occupying traditional elk winter ranges, but feedgrounds concentrated elk facilitating increased disease
REPORT OF THE COMMITTEE

transmission. Brucellosis seroprevalence on feedgrounds is an order of magnitude higher than in non-feedground elk.

Elk vaccination for brucellosis began in 1985; currently 22 of 23 feedground elk calves are vaccinated annually with Strain 19 vaccine. Although seroprevalence data do not demonstrate statistical differences between vaccinated and unvaccinated elk, vaccination still may be effective in preventing abortions, even though the animals are seropositive. Developing winter habitat can decrease elk dependence on feedgrounds. Since 1990, over 70,000 acres have been improved, but such improvements require lots of time and money.

In 2003 and again in 2004, cattle herds in Wyoming were diagnosed with brucellosis. Epidemiologic investigations implicated infected elk and perhaps bison as the source of infection. Wyoming subsequently lost its federal “brucellosis free” status. Responding to the loss of free status, the governor of Wyoming convened the Wyoming Brucellosis Coordination Team and charged it with identifying issues, describing best management practices, and developing recommendations related to brucellosis in wildlife and livestock in the state. The goal of the Team was to reduce and eventually eliminate brucellosis in wildlife, and specifically address winter elk feedgrounds. After a year of meetings, the Wyoming Brucellosis Coordination Team developed several recommendations, the two most affecting wildlife were: (1) develop Brucellosis Management Action Plans (BMAPs) for each elk herd unit that has a feedground and (2) establish a five-year pilot project to reduce seroprevalence in the region where the first cattle brucellosis cases occurred. The operational definition of “reduction of seroprevalence” was the test and slaughter of feedground elk.

A large corral trap was constructed on the Muddy Creek feedground, the site of the first cattle exposure to brucellosis. The trap was monitored from a blind; when enough female elk were in the trap, the trap gates were remotely closed. Elk were herded into smaller alleyways and chutes for individual processing. Blood samples were taken from adult and yearling females; bulls and calves were ear-tagged and released. Bled elk were held overnight to run serology tests. A temporary laboratory ran serological tests on all cows and yearlings. Testing followed Uniform Methods and Rules (UM&R) criteria: card+, standard plate test+, rivanol+. If one or more result was positive, samples were tested by competitive enzyme-linked immunosorbent assay
WILDLIFE DISEASES

(cELISA). If the cELISA was positive, the animal was sent to slaughter. Fluorescence polarization assay also was done for validation purposes only. Females considered serologically negative were released. Seropositive elk were shipped to a USDA meat processor and packaged meat was donated to the public. At the processor, multiple tissues were taken for bacterial culture to compare with serologic results. In 2008, two feedgrounds (Muddy Creek and Fall Creek) will be tested.

2006-2007 Results of Test and Slaughter:
  2006:  314 total captured; 2 mortalities (1 trap, 1 transit)
  2007:  174 total captured; 1 trap mortality

  2006:  171 adult and yearling females bled and tested
  2007:  79 adult and yearling females bled and tested

  2006:  58 (34%) seropositive
  2007:  13 (16%) seropositive

  2006:  18 (31%) culture positive
  2007:  8 (44%) culture positive

Total 2006 costs were $310,856 ($5,911 per elk removed)
Total 2007 costs were $293,319 ($22,563 per elk removed)

Montana Brucellosis Situation, 2007

Dr. Marty Zaluski, Montana State Veterinarian, reported that the state experienced its first case of brucellosis in cattle since regaining its Class-Free Status in 1985. The index animal was a three year old beef cow that was given as a wedding present from an individual ranching in Emigrant, Montana to a daughter and son-in-law ranching in Bridger, Montana. The animal aborted as a 2 year old within a month of arriving in Bridger, and then again as a three year old. She was subsequently sold through a sale in Billings, Montana for use as an embryo transfer recipient. During export testing, she was found to be a reactor, and further testing revealed 6 additional reactor animals in the index herd. Epidemiological investigation revealed that exposure most likely occurred from elk co-grazing and co-mingling at the Emigrant herd, however, genetic fingerprinting of the Brucella strain was not conclusive.
REPORT OF THE COMMITTEE

Montana is enhancing surveillance by two methods: First, Montana Department of Livestock (MDOL) is working with Montana Fish, Wildlife, & Parks to increase surveillance (blood and tissue) of hunter harvested elk in the area directly north of Yellowstone National Park. Second, MDOL is working with USDA-APHIS to assess risk of brucellosis in Greater Yellowstone Area (GYA) ranches and to enhance the number of herds with herd plans that include brucellosis testing, as well as adult brucellosis vaccination.

Yellowstone National Park Brucellosis Update

Dr. Glenn Plumb, Branch of Natural Resources, Yellowstone National Park, reported that Yellowstone National Park has an active brucellosis risk management program focused primarily on reducing the probability of wild bison commingling on common ranges used by domestic livestock. This management strategy is cooperatively implemented with USDA-APHIS, U.S. Forest Service, Montana Department of Livestock, and Montana Department of Fish, Wildlife and Parks. The action plan has been in place since December 2000.

Seasonal climate variability is a significant ecological driver in the Yellowstone ecosystem causing all native ungulate populations to shift from high elevation summer ranges to lower elevations as snow accumulates in the mountains. The majority of the bison population uses ranges within the park on a year around basis. Portions of the population migrate variable distances, in response to population density and winter severity, to find suitable winter habitats to survive the long cold winters. Bison tend to migrate later than other species and in some years migratory movements outside the National Park can be up to 30 percent of the population. Bison winter range overlaps with livestock range. To reduce the risk of brucellosis transmission from wild bison to domestic livestock, interagency partners actively haze bison away from livestock and when necessary capture and cull portions of the wild bison population. These actions keep the wild bison population within the primary conservation area established by the interagency management plan. The active management period generally runs from October through the winter and ends in June when the bison population returns to high elevation summer range.

During winter 2006-2007, risk management activities were successful in preventing brucellosis transmission from Yellowstone
bison to livestock. One hundred twenty five hazing events were conducted to keep bison within the primary conservation area. Nine individual bison were culled because they persistently moved outside the conservation area onto spring livestock ranges. Yellowstone National Park is evaluating the feasibility of remote vaccination of the bison population. An ongoing environmental impact study is showing that the current program to vaccinate young (non-reproducing) bison only during years when risk management operations capture and release individuals will do little to reduce disease prevalence. Uncertainty about the duration of vaccine protection, the effects of vaccinating pregnant animals and the comparability of experimental trials with expected results in wild populations are driving new efforts to initiate field studies in association with an expanded vaccination program that was directed in the 2000 management plan.

Yellowstone Wildlife Health Program

Plumb reported that wildlife, domestic animals and humans share a large and increasing number of infectious diseases. The continued globalization of society, human population growth, and associated landscape changes will further enhance interfaces between wildlife, domestic animals, and humans, thereby facilitating emergence and resurgence of infectious diseases. Further, habitat loss and other human-caused stresses on ecosystems have reduced the ability of many wildlife populations to recover following declines. The increasing challenges of zoonotic diseases has given new attention to the century-old concept of “the one medicine” because of the need to address these diseases across species if their economic, social and other impacts are to be effectively minimized. The wildlife component of this triad has received inadequate focus in the past. Disease emergence and resurgence has reached unprecedented importance for the sustainability of desired population levels for many wildlife populations and for the long-term survival of some species.

At Yellowstone National Park, the following wildlife diseases are currently, or have the potential to, determine the outcome of the park’s conservation mandate: brucellosis (bison & elk), hantavirus (small mammals), whirling disease (trout), West Nile Virus (birds), chronic wasting disease (elk & deer), Johne’s disease (bison), and highly pathogenic avian influenza (waterfowl and mammals). In response, Yellowstone National Park formed
a new partnership with Montana State University and University of California-Davis Wildlife Health Center in 2007 to create the Yellowstone Wildlife Health Program (YWHP), a long term research program focused on understanding and solving priority wildlife health problems in Yellowstone National Park.

With government and private sector funding, the Yellowstone Wildlife Health Program will design and implement a long term wildlife health assessment program to monitor and evaluate wildlife diseases and health indicators; a subcomponent of the Vital Signs Monitoring Program; design and implement a disease surveillance program for priority wildlife disease threats; manage and conduct research on urgent and emergent wildlife disease and ecosystem health issues; prioritize and offer competitive grants for research projects pertaining to wildlife disease and health assessment; provide on-site wildlife veterinary services, including veterinary support for animal handling activities and disease outbreak investigation, including field evaluation, necropsy and specimen sampling; establish and manage an on-site wildlife disease diagnostics and research field laboratory; and facilitate graduate and post-doc research projects on wildlife disease and health.

The Yellowstone Wildlife Health Program (YWHP) operational design includes:

- **Program Coordinators**—each of the three principle program partners has designated a program coordinator. It is the responsibility of the Program Coordinators to coordinate research and facilitate cooperative efforts involving the three institutions and other program partners;
- **Scientific/Stakeholder Advisory Committee** - the YWHP will establish a scientific and stakeholder advisory committee to provide guidance to the program; provide a forum for scientific issues and assess the relevance and priority of research efforts among various research and stakeholder communities;
- **Resident Ecosystem Health Field Director**—a wildlife veterinarian/ecosystem health specialist will be based in the park to manage the Wildlife Health Program and to provide wildlife veterinary support services. The program may hire additional researchers and staff as needed if funding is available;
- **Competitive Grants Program for Wildlife Health Research**—to involve the best scientists and to include...
WILDLIFE DISEASES

pre-existing regional expertise, the program will annually award grants through a competitive grants program to address both urgent and long term ecosystem health issues including evaluating “vital signs” and protocols. Proposals to the competitive grants program will be reviewed and selected by the advisory committee with the assistance of external reviewers;

- Graduate and Post-Doc Field Research Element—this program element will facilitate research by graduates and post-doctorate researchers to tackle priority wildlife health research projects in the Park.

Chronic Wasting Disease (CWD) Update from USDA-APHIS-Veterinary Services

Dr. Dean Goeldner, USDA-APHIS-Veterinary Services (VS), updated the Committee and began by reporting that in FY 2007 APHIS received approximately $16.6 million in appropriated CWD funding. All earmarks were removed from the FY07 appropriation that was passed as a yearlong continuing resolution.

CWD Final Rule: In September 2006, APHIS delayed implementation of the final CWD rule that had been published in July 2006. This delay was precipitated by petitions to the rule received from three organizations representing state agencies and officials, including USAHA. On November 3, 2006, APHIS published these petitions for public comment. After reviewing these comments, APHIS requested additional information from the states in late June 2007 regarding their restrictions for the movement of cervids into their states. Based on all the information received, APHIS has begun drafting new proposed rule language and is circulating it internally for review. The primary focus of the changes to the CWD rule will be in the interstate movement restrictions.

CWD Testing: In FY 2007 more than 17,000 farmed and captive cervids were tested for CWD using immunohistochemistry. This is an increase over the recent three year average of approximately 15,000 samples tested. Rectal biopsy evaluation also continues.

Status: There were no additional CWD-positive herds identified nor any CWD positive herds depopulated in FY 2007. At this time, four positive elk herds remain in Colorado and one positive deer herd remains in Wisconsin. Funding from VS
REPORT OF THE COMMITTEE

continues to offer indemnity and cover depopulation, disposal and testing costs for CWD-positive and exposed herds and trace animals.

Regarding free-ranging cervids, again in FY 2007, $5 million in CWD cooperative agreement funding was made available to the state wildlife agencies. The tier system developed in consultation with AFWA remained unchanged from FY 2006. Forty-eight states requested funding. Unrequested funds were redistributed to tier one states that requested additional assistance.

APHIS-VS is now in the fifth year of CWD cooperative agreement assistance to state wildlife agencies and our regional epidemiologists report that the work plans for these agreements continue to improve. However, there appear to be increasing needs for alternative surveillance strategies and more effective management strategies.

APHIS-VS again provided $750,000 to support tribal CWD activities in FY 2007. In addition to the ongoing cooperative agreement with the Native American Fish and Wildlife Society, 23 individual tribes will receive CWD assistance.

For fiscal year 2008, the agriculture appropriations bill has not yet been passed by Congress. However, current indications are that the APHIS line item for CWD will be somewhat decreased from the FY 2007 level, depending on the number of congressional earmarks that are included in the final bill and the amount of funding that is included to cover them. This may mean that there will be somewhat less cooperative agreement funding available to the states and tribes in 2008. APHIS-VS will continue to work with AFWA to assure an equitable distribution of this funding.

Hemorrhagic disease in 2007

Dr. David Stallknecht, Southeastern Cooperative Wildlife Disease Study (SCWDS) reported that SCWDS has received an unprecedented number of samples for virus isolation originating from both penned and wild white-tailed deer this year. As of October 16, 237 virus isolations have been made at SCWDS. This number also is unprecedented and SCWDS continues to receive large numbers of samples as well as telephone reports and inquires every day. Nearly all virus isolations have been epizootic hemorrhagic disease virus-serotype 2 (EHDV-2) from white-tailed deer, although very low numbers of EHDV-1 and
WILDLIFE DISEASES

Bluetongue Virus (BTV)-10, -11, and -17 viruses have been isolated. EHDV-1, BTV-10, 11 and 17 have been isolated from Missouri and BTV-17 was isolated from a mule deer in New Mexico and pronghorn in Wyoming. The current distribution of isolates is presented below (Figure 1). A distribution map that is updated weekly can be seen at the SCWDS website (www.scwds.org).

Hemorrhagic disease (HD) occurs annually in the United States and as is occurring in 2007, most outbreaks in white-tailed deer are caused by EHDV-2. There is no reason to assume that this outbreak is associated with a particularly virulent strain; EHDV-2 can cause high mortality rates, especially when deer are infected in the northern United States. There are two aspects of this outbreak that have sparked speculation and discussion. The first involves a potential expansion of the traditional HD range due to climate change and the second involves clinical disease in cattle.

The historic distribution of reported HD, as shown below, includes much of the United States. It is important to note that this distribution map is compiled from reports of clinical disease from 1980-2003 (Figure 2). The map does not represent the entire distribution of HD viruses because infections in white-tailed deer in some areas, such as portions of Texas and Florida, often are subclinical. Based on the historic distribution, it appears that the current outbreak falls primarily within the historic range of HD, although some expansion may be occurring.

Although it is premature to suggest that the 2007 activity is a product of global climate change, we cannot ignore the fact that the Southeastern United States is in an unprecedented drought and that our initial cases in the eastern United States were spatially associated with areas of especially severe drought in Kentucky and Tennessee. But whether the current drought is a result of climate change is an issue yet to be determined. The drought/HD relationship is not new and has been suggested since the 1980’s. SCWDS currently is analyzing its historic data to better understand this potential relationship.

Epizootic hemorrhagic disease is not a recognized disease of cattle, but it is well established that they can be infected. There are two contrasting observations that cause confusion related to the issue of clinical disease in cattle. First, as is occurring this year, suspected cattle disease associated with EHDV-2 infection is a common occurrence during large scale EHDV epizootics.
REPORT OF THE COMMITTEE

Such reports occur routinely when the virus is causing deer mortality in the northern United States. In most cases, cattle show mild disease, but occasional reports of abortion and even death (both unconfirmed) do occur. Such reports are not obtained from HD-endemic areas. Unfortunately, “suspected” cattle cases are seldom confirmed and it needs to be clearly understood that the presence of antibodies in such animals does not confirm EHDV as a cause of either morbidity or mortality. On several occasions, including one this year, we have isolated EHDV-2 from a cow with bluetongue-like disease, but even this may not confirm that the virus was the cause of the disease.

In contrast, clinical disease never has been associated with experimental EHDV infections of cattle, including one SCWDS study (Abdy, M.J., E.W. Howerth, and D.E. Stallknecht. 1999. Experimental infection of calves with epizootic hemorrhagic disease virus. American Journal of Veterinary Research 60(5) 621-626). The truth likely lies somewhere between the field observations and the results of these experimental studies and the following hypothesis would fit with the limited data currently available: The reported disease in the field is bluetongue-like and it is not unreasonable to speculate that EHDV would cause similar signs and lesions. With BTV infections, clinical disease in cattle is not common but is mild when it occurs. However, even mild disease is the exception rather than the rule. If EHDV causes a generally mild disease in a very small proportion of those cattle infected, it may well be that the disease would not be detected in the small number of animals included in experimental studies and would only be detected in the field under exceptional challenge conditions as is occurring now. If this hypothesis is correct, EHDV would be of minor concern to cattle producers, but could be responsible for sporadic disease in certain areas of the United States. All reports received at SCWDS concerning suspected disease in cattle have been associated with the northern edge of the HD range (as defined by reported disease in white-tailed deer) and it is possible that such potential problem areas could be defined by vector distribution and herd immunity.

The reports of suspected EHD in cattle and confirmed HD in wild and penned deer can lead to one group of producers/managers blaming the other for their problems. Cattle, wild deer, and penned deer can all be infected with EHDV and can serve as a source of virus to vectors. It is not cattle, penned deer, or wild deer that represent the reservoir for these viruses. Rather, all
WILDLIFE DISEASES

Ungulate species can be involved in viral amplification. In reality, the population dynamics of the biting midge vector, *Culicoides sonorensis*, may be the most important factor in these outbreak situations.

Figure 1. Virus Isolation Confirmed Hemorrhagic Disease, 2007

Southeastern Cooperative Wildlife Disease Study. College of Veterinary Medicine - The University of Georgia. Updated October 16, 2007. Species represented include white-tailed deer (penned and free-ranging), pronghorn, and mule deer. Distribution based on 237 virus isolations.
Committee business

Six resolutions were approved by the Committee and forwarded to the Committee on Resolutions and Nominations.
II.F. 2007 USDA-ARS RESEARCH REVIEW

2007 USDA-ARS Research Review: Vector-Borne Diseases

Future Direction of the ARS Animal Health Vector-Borne Disease Research Program
   Dan Strickman, National Program Staff, USDA-ARS

The Molecular Epidemiology of Vesicular Stomatitis Virus (VSV)
   Luis Rodriguez, Plum Island Foreign Animal Diseases Laboratory

Predicting the Next Outbreak of Rift Valley Fever (RVF)
   Ken Linthicum, Center for Medical, Agricultural & Veterinary Entomology

New Diagnostic Tools for Detecting Rift Valley Fever (RVF) and Other Arboviruses
   William Wilson, Arthropod-Borne Animal Diseases Research Laboratory

Studies of the Determinants of Vector-Borne Transmission of Anaplasma marginale May Lead to New Control Strategies
   Glen Scoles, ADRU

Research Initiatives to Prevent the Introduction of Cattle Tick Fever in North America
   Don Knowles, ADRU
The USDA Agricultural Research Service (ARS), led by agency administrator Edward B. Knipling, has dual lines of administration intended to provide matrix management to the organization. ARS’ mission is to conduct research to develop and transfer solutions to agricultural problems of high national priority. The eight Area Offices, led by associate administrator Antoinette Betschart, provide day-to-day management, facilities development, personnel actions, budget management, etc. The National Program Staff (NPS), led by Associate Administrator Caird Rexroad, provides scientific direction and coordination. NPS is divided into four sections, each under the direction of a deputy administrator. The section that deals with animal production is Animal Production and Protection (APP), with Deputy Administrator Steven Kappes. All projects are peer-reviewed by the Office of Scientific Quality Review and evaluated by an outside panel of experts during a five-year cycle. The objectives of the research are constructed during a process that starts with stakeholder input at a national meeting and concludes with the writing of an action plan by the appropriate national program leader.

APP includes four national programs, Food Animal Production (NP 101), Animal Health (NP 103), Aquaculture (NP 106), and Veterinary, Medical, and Urban Entomology (NP 104). This abstract features the entomology program. The program develops more effective means to prevent or suppress insects, ticks and mites that affect animal and human well being. Its research aims to develop tools that eliminate losses to animal production and products caused by arthropod borne diseases and arthropod induced trauma; to reduce the risk to humans from arthropod borne zoonotic diseases; to enhance the safety of animal products and the quality of life for humans; and to increase the value and competitiveness of United States agriculture. NP 104 includes the efforts of 81 scientists working at 11 locations.
NP 104 scientists work on a number of subjects that have serious implications for animal health. Probably the most urgent problem concerns the one-host tick responsible for transmission of bovine babesiosis. The cattle fever tick has become re-established in southern Texas after 60 years of successful eradication, probably as a result of the burgeoning population of wild white-tailed deer. The program is concentrating on research that determines the extent of the problem and designs new methods for treating wild ungulates. Less alarming, but equally significant, is research in support of the screwworm eradication program. The barrier zone in eastern Panama is successfully keeping this pest out of Central and North America. ARS research is mainly directed at improving efficiency, including by developing a strain of flies that produces only male offspring for the sterile male release program. Other work includes mechanical transmission of bacteria by flies, fire ant control, stable fly distribution, mosquitoes as vectors of Rift Valley fever and West Nile viruses, biting midges as vectors of vesicular stomatitis, bluetongue, and epizootic hemorrhagic disease viruses, and the development of entirely new veterinary insecticides.

The Veterinary, Medical, and Urban Entomology National Program at USDA ARS has contributed significantly to animal health, with historical achievements ranging from the first discovery of an arthropod-borne pathogen (cattle fever) to the invention of ultra-low volume application of insecticides for mosquito and fly control. Current development of new diagnostics of infection in vector arthropods, better traps, anti-tick vaccines, and molecular pesticides should have great positive impact for U.S. agriculture in the future. Perhaps the most promising development would be the integration of veterinary and entomological interventions to solve infectious disease problems.
NEW DIAGNOSTIC TOOLS FOR DETECTING RIFT VALLEY FEVER (RVF) AND OTHER ARBOVIRUSES.

William C. Wilson, Barbara Drolet, Cecilia Kato, Mark Harpster, Kristine Bennett, Will Reeves, Myrna Miller, Emily S. O’Hearn, and James O. Mecham
Arthropod-Borne Animal Diseases Research Laboratory
Agriculture Research Service

Benjamin Hindson and Raymond J. Lenhoff
Lawrence Livermore National Laboratories
University of California

David Stallknecht and Daniel Mead
Southeastern Cooperative Wildlife Disease Study
College of Veterinary Medicine, University of Georgia

The outbreak of West Nile virus in the United States and the recent outbreak of Rift Valley fever (RVF) virus in East Africa have highlighted the need for validated early detection tools for arthropod-borne animal diseases. The Arthropod-Borne Animal Diseases Research Laboratory (ABADRL) has been involved with the development of diagnostic tests for bluetongue virus (BTV) and the related epizootic hemorrhagic disease virus (EHDV) for many years. Bluetongue viruses causes disease in sheep, cattle and deer and has significant economic impact due to trade barriers. Although US EHDV strains have not been experimentally proven to cause disease in cattle, there is serologic evidence of widespread infection in cattle. Several immunological based assays have been developed by ABADRL for detecting antibodies of, and antigens to BTV and EHDV. ABADRL has developed a high-throughput infrared reverse transcriptase polymerase chain reaction (RT-PCR) for detection of indigenous and exotic BTV and EHDV in insects. ABADRL has also developed quantitative real-time RT-PCR (qRT-PCR) tests that detect and distinguish RNA from indigenous and exotic BTV and EHDV serogroups. Many of these BTV/EHDV diagnostic tests are in use by diagnostic laboratories and the qRT-PCR is being validated. In addition, the RVF outbreak has prompted the evaluation of existing diagnostic tests and the development of new operator-safe diagnostic assays for livestock samples. These tests included immunological assays based on expressed RVF antigens and a multiplex qRT-PCR. In
addition, novel diagnostic approaches are being developed and evaluated. To accomplish this new research assignment, the ABADRL has established national and international cooperative agreements.
Abstract.

Rift Valley fever (RVF) is a mosquito-borne zoonotic disease of domestic ruminants in Africa. The disease is most severe in cattle, sheep, and goats, and it causes high mortality in young animals and abortion in adults. Exotic animal breeds from areas where RVF is not endemic tend to be more susceptible. Human infection causes significant morbidity and mortality. RVF has caused serious disease in laboratory workers and must be handled with high level biosecurity. RVF was first described in 1930 in the Rift Valley of Kenya, and the disease has since occurred irregularly in Kenya every 3 to 10 years. The disease first spread outside sub-Saharan Africa into Egypt in 1997 and resulted in large losses among the domestic animal populations and caused significant human disease. Subsequently, in 1987 a large outbreak in animals and people occurred in Sahel region of Senegal and Mauritania, and then in September 2000, a RVF outbreak occurred in Saudi Arabia and Yemen along the Red Sea Coast, representing the first Rift Valley fever cases identified outside Africa. RVF generally occurs during years of unusually heavy rainfall and when localized and widespread flooding occurs. It is thought that the flooding causes transovarially infected Aedes mosquito eggs to hatch and introduce the virus into domestic animals, thus allowing the maintenance of the virus in nature during dry non-epidemic conditions. After livestock are infected, a wide variety of mosquito species may act as the vector for transmission of RVF virus to spread the disease. There are no licensed animal or human vaccines available for use in the United States. We have developed a monitoring and risk mapping system using global sea surface temperatures and normalized
difference vegetation index (NDVI) times series data derived from the advanced very high resolution radiometer (AVHRR) instrument on polar orbiting national oceanographic and atmospheric administration (NOAA) satellites to map areas at risk for a potential outbreaks in sub-Saharan Africa, the Nile River Valley, and the Arabian Peninsula. This system is now an important tool for local, national and international organizations involved in the prevention and control of animal and human disease, permitting focused and timely implementation of disease control strategies several months before an outbreak. We are currently developing a geographic information system (GIS)-based remotely sensed early warning system for potential RVF vectors in the United States. Forecasts of the potential emergence of mosquito vectors will be disseminated throughout the United States, providing several months' warning in advance of potentially elevated mosquito populations. This would allow timely, targeted implementation of mosquito control, animal quarantine and vaccine strategies to reduce or prevent animal and human disease.
THE MOLECULAR EPIDEMIOLOGY OF VESICULAR STOMATITIS VIRUS (VSV)

Luis Rodriguez
Foreign Animal Disease Research Unit
Plum Island

Vesicular stomatitis is an insect-transmitted acute disease, primarily of horses, cattle and pigs, with less frequent infections of sheep and goats, and characterized the formation of vesicles, on snout, mouth, udder and feet. The causative agent is vesicular stomatitis virus (VSV), a member of the genus vesiculovirus in the family Rhabdoviridae. Outbreaks of vesicular stomatitis occur at 8-10 year intervals in the southwestern United States (U.S) with the most recent outbreak starting in 2004 and continuing in 2005 and 2006. Phylogenetic relationships among vesicular stomatitis-New Jersey virus (VSNJV) isolates obtained from these outbreaks showed little sequence divergence (≤1.3%) regardless of their location or time of isolation. However, five discrete genotypes based on single nucleotide polymorphisms were detected during the outbreaks. The earliest genotype detected in the US in 2004 showed identical sequence to viruses isolated in endemic areas of Mexico as early as 2002. Furthermore, viruses with identical genetic sequences to those causing US outbreaks in 1995 – 1997 and 2004 – 2005 were found circulating in Mexico between the years 2003 and 2004. Spatial and temporal analyses of VSNJV isolates showed a south-to-north migration along river-valley systems in the U.S from spring to fall in 2004 and 2005. Analyses for detecting molecular adaptation among isolates from the U.S provided evidence for positive selection in both the VSV P and G genes. This selection was most noticeable in a viral lineage emerging during 2005 in Wyoming and Nebraska and again in 2006 only in Wyoming. Phylogenetic data, temporal-spatial distribution and the finding of viral strains identical to those causing major outbreaks in the U.S circulating in Mexico demonstrate that vesicular stomatitis outbreaks in the southwestern U.S are the result of the introduction of single viral genetic lineages from endemic areas in Mexico.
Anaplasma marginale is a tick-borne rickettsial pathogen of cattle that is endemic throughout large areas of the United States. There is no licensed vaccine available in the U.S. and cattle that survive acute infection become life-long persistently infected carriers. The prevalence of infection with A. marginale and the incidence of disease vary considerably from area to area within endemic regions. The goal of our research is to examine the causes of this variation by examining the determinants of vector-borne transmission simultaneously from the perspective of tick vector competence, and A. marginale strain transmissibility.

We have shown that tick populations vary in their ability to acquire midgut infection with A. marginale and that there is limited gene flow between these tick populations, suggesting that there may be a genetic basis for these population differences. Ticks are infected with a wide variety of bacterial symbionts, and we have shown that these symbiont populations also vary between tick populations and that susceptibility to symbiont infection correlates with susceptibility to A. marginale infection. This suggests that tick innate immune responses to bacterial infection may play a role in vector competence. Fly-borne mechanical transmission can occur and there are undoubtedly some non tick-transmissible strains that are naturally maintained by mechanical transmission, however our work suggests that the efficiency of mechanical transmission is so much lower than the efficiency of tick-borne biological transmission that there can be only minimal selection pressure for evolution of non tick-transmissible strains. There is variation among A. marginale strains with regard to their ability to be transmitted biologically by ticks, and this appears to be a stable characteristic of A. marginale strains across tick species. Non tick-transmissible strains can also vary with regard to their pathogenesis in the tick vector, with some strains failing to invade or replicate in the midgut, while others successfully replicate in the midgut, then invade and replicate in the salivary glands but fail to be transmitted. With these data we have begun to define the
parameters that influence transmission, including factors relating to the vector, to the pathogen, and their interaction.

The lack of a safe and effective vaccine to prevent disease in U.S. cattle will be exacerbated in a future when the emergence of acaricide resistance is leading to a decreased number of options for chemical control of ticks. Because of this it is becoming increasingly important to define the role that ticks play in influencing the efficiency of transmission through their interaction with *A. marginale* strains. By simultaneously approaching studies of the determinates of transmission of *A. marginale* from the prospective of tick vector competence and strain transmissibility we can begin to define the parameters that influence transmission. Identification of these parameters may lead to discovery of vaccine targets that could be used to prevent disease and/or interrupt transmission.

II.F. OTHER REPORTS
Babesia bovis is a disease of cattle resulting in severe economic losses in the vast regions of the world where it is endemic. Re-introduction of babesiosis into the United States would result in significant mortality in the naïve cattle population. Our research goals are to develop immunologic strategies which reduce or prevent tick-borne transmission of the causative protozoan parasites and quantify the risk of tick-borne transmission from acutely and chronically infected cattle. Determining the efficiency of transmission is crucial to developing strategies that prevent re-introduction. If the efficiency of transovarial transmission is equivalent in females acquiring the parasite from either acutely or persistently infected cattle, and should emerging acaracide resistance lead to the re-establishment of Rhipicephalus microplus in the U.S., then the absence of serological screening of cattle entering the U.S. may contribute to outbreaks of clinical babesiosis.

In the first study, parasite levels were quantified in blood of experimentally infected splenectomized cattle during R. microplus acquisition feeding, and within hemolymph and larval progeny derived from these R. microplus females. There was a positive correlation \( r = 0.98 \) between capillary blood parasite levels and kinete levels in hemolymph of adult female ticks following acquisition. Infection rates of larval progeny were between 12 and 48%. There was no relationship between kinete levels in females and infection rates of larval progeny. Parasite levels in individual larvae ranged from below quantification levels to \( 1.2 \times 10^5 \). Importantly, larvae derived from replete females with low levels of kinete infection, as demonstrated by light microscopy and PCR, had infection rates of 22-30% and transmitted B. bovis during transmission feeding.

A second study examined the transovarial transmission
efficiency in female *R. microplus* fed to repletion on persistently infected calves. The hypothesis tested was that infection rates of larval progeny from females fed to repletion during persistent infection would be the same as those of larval progeny derived from females fed to repletion on acutely infected spleen intact calves. Parasite levels in persistently infected calves were below detection by light microscopy in capillary blood and below quantification levels by real-time PCR in jugular blood throughout acquisition feeding. In an acutely infected calf, peak parasitemia was $1 \times 10^2$ parasites/µl. Similar to the previous study, increasing parasite levels during acute infection correlated with increasing numbers of females harboring detectable kinetes in their hemolymph ($r=0.9$). Percent infected larval progeny ranged from 0-20% when derived from females fed to repletion on persistently infected calves and from 4-6% when derived from females fed to repletion during acute parasitemia. There was no significant differences between infection rates of larval progeny implying that the risk associated with the introduction of either persistently infected or acutely infected cattle is equal. Parasite levels in individual larvae derived from females fed during persistent infection ranged from below quantification to $1.9 \times 10^6$. One group of larvae failed to transmit the parasite suggesting that a threshold level of parasites must be obtained by larval progeny via transovarial transmission in order for larvae to deliver sufficient parasites to infect a naïve host.

Female *R. microplus* fed on persistent carriers, despite low blood parasite levels, are capable of acquiring the parasite and passing it transovarially to larval offspring. Infection rates of larval progeny were not significantly different when females fed on acutely or persistently infected calves, implying that introduction of a persistently infected animal into the U.S has a comparable risk to the introduction of an acutely infected animal.
Systematic Review of Vaccination as an Intervention for *Salmonella* in Broilers  
Robert Wills

Interrelationships of *Salmonella* Status of Flock and Grow-Out Environment at Sequential Segments in Broiler Production and Processing  
Robert Wills

An Outbreak of *Salmonella newport* in a Beef Cow Herd Associated with the Presence of BVD-PI Animals  
Russ Daly

Educational Materials for Control of Bovine Viral Diarrhea  
Brad White

Characterization of Johne’s disease in Mississippi cattle  
Jesse Carter

Antibody Responses and Outcome of Clinical Mastitis Cases Among J5 Vaccinates and Controls  
David Wilson

Association of climatic variables on the Day of Birth with Passive Transfer in Beef Calves  
Bill Epperson

Copper Nutrition and Toxicosis in Goats  
Patty Scharko

Evaluation of a Livestock Operation Damage Surveillance System after Hurricane Katrina  
Dale Moore
II.F. OTHER REPORTS

SYSTEMATIC REVIEW OF VACCINATION AS AN INTERVENTION FOR SALMONELLA IN BROILERS.

R.W. Wills, R.H. Bailey, B.E. Thames
Mississippi State University College of Veterinary Medicine

K.M. Clements
University of Illinois College of Veterinary Medicine

J.M. Sargeant
Ontario Veterinary College, University of Guelph

Systematic reviews are a method of identifying effective treatments or processes based on the available evidence from a variety of sources. They differ from traditional narrative or critical reviews of literature by using a replicable, scientific methodology to collect and assess all available information on a subject. We have conducted a formal systematic review to identify evidence for effectiveness of vaccines as interventions for Salmonella of food safety interest in the production and processing of broilers. In order to accommodate multiple study questions, the initial literature search was purposely broad. In the first level of relevance screening of abstracts from the scientific literature, the abstracts were categorized by type of poultry, segment of production, type of intervention strategy, and whether or not it was primary research. After this initial screening, a focused study question on vaccination as an intervention strategy in broilers was developed. A second level of screening was applied to identify peer reviewed papers or theses that addressed vaccination of broilers for Salmonella of food safety interest and met additional criteria. The remaining articles were further assessed for quality to determine if they were acceptable for data extraction and synthesis. Not enough qualified articles were found to fully evaluate the efficacy of vaccination as an intervention for Salmonella in broilers. Although laboratory evidence was supportive, there were not enough qualified field trials to adequately assess the efficacy of vaccination as an intervention for Salmonella in broilers under production conditions.
The objective of this project was to ascertain the relationship of Salmonella flock status at the end of each production segment on the Salmonella status of broiler carcasses at the end of processing. Presence of Salmonella was evaluated in 76 broiler flocks from 38 farms in four states in the southeastern United States. Salmonella flock status was determined by sampling a flock upon arrival at the grow-out farm (4 litter samples, 4 drag swabs, 30 transport tray pads (TP) and gastrointestinal truck (GI) samples from 30 chicks from the corresponding trays); one-week before processing (whole carcass rinse (WC), ceca (CA) and crop (CP) samples from each of 30 birds); following harvest of birds (4 litter samples and 4 drag swabs); upon arrival at processing plant (WC, CA and CP samples from each of 30 birds); prior to the chill tank (rinses from 30 carcasses); and post-chill tank (rinses from 30 carcasses). Logistic regression, using a generalized linear mixed model, was used to model the relationships between the likelihood of Salmonella in samples of each type collected at each sampling point and all the measurements of the flock and grow-out environment Salmonella status done at preceding production stages. The analysis suggested that Salmonella status of pre-chill tank carcasses is affected by many variables that are no longer associated with carcasses after they leave the chill tank. Furthermore, Salmonella status of litter prior to placement and at the end of grow-out was shown to impact the status of post-chill tank carcasses.
II.F. OTHER REPORTS

CASE REPORT: AN OUTBREAK OF SALMONELLA NEWPORT IN A BEEF COW HERD ASSOCIATED WITH THE PRESENCE OF BVD-PI ANIMALS

R.F. Daly, R.D. Neiger
Veterinary Science Department, South Dakota State University

Introduction

*Salmonella* infections are significant causes of illness in animals and humans. Immunosuppressive factors such as environmental stressors and infectious agents, such as BVD virus, may contribute to the expression of salmonellosis. This report describes an outbreak of salmonellosis in a beef herd associated with the presence of BVD-PI animals.

Materials and Methods

In Spring 2006, an outbreak of *Salmonella newport* occurred in a South Dakota beef herd. Severe illness (diarrhea, dehydration, weakness, and death) occurred in only one of three cow groups. Thirty-two of 407 cows (7.9%) died in the affected group, while no cows died in either of the other two groups. Calf mortality was also significantly higher in this group relative to the others (14.1% vs. 4.1% and 3.0%). Fecal and environmental samples, and ear notches from dead calves were obtained during a field visit.

Results

*Salmonella newport* was cultured from cows in all three groups. One dead calf from the affected group was found to be BVD-PI on antigen-capture ELISA. BVD-PI testing was then performed on all calves. A significantly higher proportion of BVD-PI calves was found in the salmonellosis-affected group compared to calves in the other two groups (2.7% vs. 0.3%).

Significance

This report describes an outbreak of *Salmonella newport* in a cow herd associated with the presence of BVD-PI animals. Exposure to BVD virus should be considered when outbreaks of salmonellosis or other infectious diseases occur in beef herds.
In recent years, the cattle industry has spent a large amount of time and energy on controlling bovine viral diarrhea (BVDv). Bovine Viral Diarrhea virus (BVDv) is an immunosuppressive virus affecting cattle in a multitude of manners. The varied presentation and insidious nature makes this disease difficult to identify at low levels in cow herds or feeder calves. Clinical signs of BVDv infection in a herd range from very subtle to severe health issues. The syndrome causes economic problems due to reduced herd fertility in cow-calf herds and increased disease rates in stocker and feeder calves. This disease impacts all stages of production and is economically important to all phases of the cattle industry.

The Persistently Infected (PI) animal is a unique reservoir for BVDv. These cattle are the result of in utero exposure to the noncytopathic biotype of BVDv prior to the development of a competent fetal immune system at about 125 days of gestation. Persistently infected animals are the primary method for the disease to propagate over time. PI cattle consistently shed BVD virus in relatively high levels and this exposure to the breeding herd can result in formation of new PI calves. PI animals result in propagation of BVDv in the herd and decreased pregnancy percentages compared to herds without a PI animal. These animals have also been shown to increase disease in pen mates in feeding situations.

Farms and ranches are faced with risk assessment and management decisions regarding the biosecurity implications of purchasing animals with an unknown history of disease exposure. Breeding herds and feeding operations that introduce new animals to the herd face the risk of importing a BVD PI animal. To mitigate this risk, PI animals must be accurately identified prior to herd introduction, but visual appraisal is not an accurate method of discovering these animals. Multiple diagnostic tests are available and accurate to determine the BVD PI status of incoming animals and all have an associated cost. Numerous strategies have been promoted to identify persistently infected animals in the herd and test selection should be based on both test accuracy (sensitivity and specificity for persistent infections) and economic implications to the herds.
Economic feasibility of determining the BVD PI status of animals upon arrival depends to a large degree on how common PI animals are in both the incoming population and the resident herd. Previous research has illustrated that PI calves entering the feedyard phase of production are fairly rare (about 3 per 1,000 calves); however, the herd prevalence in breeding herds is largely unknown. Economics is a factor in determination of the most appropriate testing program and in low risk situations, other forms of control programs may be most effective.

Numerous articles have been published in recent years describing BVD infections, testing, and control program. The challenge for veterinary practitioners and producers is determining the most relevant information to impact management decisions in their operation. The Academy of Veterinary Consultants BVD ad hoc committee recently published several documents describing BVD control programs for beef herds. (Larson, Grotelueschen et al. 2004; Larson, Grotelueschen et al. 2004; Larson, Brodersen et al. 2005) These documents are available for use for working with veterinarians and producers to generate BVD control programs.


The purpose of this study was to characterize the prevalence of Johne’s disease in Mississippi cattle. Nine-hundred eighteen animals from 23 livestock auctions across the state of Mississippi were tested for *Mycobacterium avium* subspecies *paratuberculosis* (MAP), the organism causing Johne’s disease. Ten milliliters of blood and approximately 4 grams of feces were collected from adult bovines over two years of age that were presented to the attending livestock auction veterinarian. Other information obtained at the time of sample collection included the animal’s sex, type (dairy or beef), and reproductive status (open or bred) for comparison. Serum samples were screened by a commercial enzyme-linked immunosorbent assay (ELISA) and confirmed using polymerase chain reaction (PCR) on the corresponding fecal sample. Overall, 17.3% of the sale barns had at least one animal testing positive for MAP. Of all individual animal samples, 0.54% were confirmed positive. These results show that Johne’s disease appears to be present at a similar prevalence level to the estimate of 0.4% found by the USDA National Animal Health Monitoring System Beef ‘97 study. The continued involvement of the state’s cattle producers in national prevention and control programs will likely be critical to the control of the disease in Mississippi cattle.
II.F. OTHER REPORTS

ANTIBODY RESPONSES AND CLINICAL OUTCOME COMPARED AMONG J5 VACCINATES AND CONTROLS FOLLOWING NATURALLY OCCURRING CASES OF CLINICAL MASTITIS

D.J. Wilson
Department of Animal, Dairy and Veterinary Science
Utah Veterinary Diagnostic Laboratory
Utah State University

Mechanism(s) of J5 vaccine immunity, including the relative importance of Th1 (IgG2), Th2 (IgG1) and IgM antibody responses, have never been conclusively determined. This is especially true for naturally occurring cases of clinical mastitis (CM). This study evaluated the association of a two-dose J5 vaccination program with production of anti-J5 antibodies and measures of outcome for naturally occurring CM.

Three Holstein dairy herds were studied. Milk production was approximately 25,000 pounds per cow per lactation and contagious mastitis was well controlled. Cows that met inclusion criteria were randomly assigned as J5 vaccinates or controls. The vaccine was administered subcutaneously in the supramammary region at dryoff, and again 21-28 d before the calving due date.

Milk samples were aseptically collected for microbiological culture at onset of any cases of CM. Blood samples were collected from all cows at drying off, 1 - 7 DIM following calving, and once between 17 – 77 d following the end of treatment for all CM cases.

This study used a subset of cows, from the 2 herds with 97% accuracy of cows’ daily milk weights recorded electronically, and with CM cases defined as either Severe or Mild. Comparing mean milk production for the 14 d before onset of CM to that of the 21 d after end of treatment, Mild cases had > 100% of pre-mastitic production. Severe cases had < 85% of pre-mastitic milk production, or were culled or died < 30 d after onset of CM and < 150 DIM when culled or died. Antibody against J5 was measured by ELISA at Michigan State University.

There were 51 CM cases selected for antibody testing, 32 Severe (17 controls, 15 vaccinates) and 19 Mild (7 controls, 12 vaccinates) cases. 28 Severe cases had milk production < 85% of pre-mastitic production after CM and the other 4 Severe cases were culled.
Post-calving IgG1 (P < 0.01) and IgG2 (P < 0.05) against J5 were higher in vaccinates. All 3 classes of J5-specific antibody were not different between vaccinates and controls 17-77 d following CM. J5-specific IgM and ratios of IgG1:IgG2 were not significantly different among controls and vaccinates at any time point. Logistic regression (85.7% Concordant pairs) showed that as DIM at onset increased, severity was more common, especially among J5 vaccinates (interaction of DIM x vaccination) (P < 0.03).

Linear regression showed that less milk production was lost for cases with onset earlier in lactation (P < 0.0001), in J5 vaccinates only among cows infected with *E. coli* (interaction, P = 0.02), and with post-calving (P = 0.06) and post-mastitic (P = 0.01) IgG1 values in moderate ranges compared with extreme high or low values. 83% of J5 vaccinates had post-calving IgG1 in the beneficial range, while 63% of controls did, a nearly significant difference (P = 0.06, Fisher’s Exact Test).

The hazard of being culled for all reasons was less for J5 vaccinates (44%) than for controls (64%), and vaccinates were especially less likely to be culled during early lactation (P < 0.05, time to event analysis). These cull rates are high because all Severe cases were included in this subset of cows. Hazard of culling with mastitis as the reason was also significantly less for vaccinates (4%) vs. controls (23%) (P < 0.03). Hazards of dying were not different among vaccinates and controls. Pathogens isolated did not differ between Severe and Mild cases.

J5 vaccination was associated with protection against effects of CM, especially in early lactation cases with *E. coli*. Following CM, controls were similar to vaccinates in increased antibody production, but vaccinates were protected by more IgG1 and IgG2 (memory immunity) against J5 before the disease. Antibody class (isotype) switching from IgM to IgG1 and IgG2 appears to be an important mechanism of J5 protection. Vaccine protection decreased as lactation progressed. The optimum J5 vaccination schedule for the most cost-effective protection (better immunological memory) against clinical mastitis should be further investigated.
ASSOCIATION OF CLIMATIC VARIABLES ON THE DAY OF BIRTH WITH PASSIVE TRANSFER IN BEEF CALVES.

B. Epperson
Department of Pathobiology and Population Medicine, College of Veterinary Medicine, Mississippi State University

A. Courtney
College of Agriculture and Biological Sciences, South Dakota State University

Failure to absorb adequate IgG from colostrum is an important risk factor for calf morbidity and mortality. Studies have documented a 3-6 fold increased risk of mortality in calves failing to absorb colostral IgG. Work in dairy breed calves has indicated that 1000 mg/dl IgG should be the recommended minimum level for prevention of calf mortality. Recent work has suggested that beef calf morbidity may be inversely related to IgG up to 2400 mg/dl.

Serum total protein (TP) measured after 24 hours post partum is correlated to IgG and is a useful estimate of immunoglobulin transfer. Beef calves, raised by their dams, are generally assumed to voluntarily ingest sufficient colostrum. Previous work in beef cows has indicated that udder conformation, mastitis, mothering ability, and dystocia impact the ability of the calf to acquire colostrum. However, effects from other environmental effects are largely unknown. The objective of this work was to examine the effects of cow variables, calf variables, and climatic variables on calf serum total protein, as a proxy for IgG.

Calves from four South Dakota State University herds were studied over a four year (1996-1999) period, supplying 1,227 singleton spring-born beef calves. Mean serum total protein, collected 1-3 days after birth, was 6.60 (range 3.5 – 9.8 mg/dl), and was the outcome of interest. Serum TP was treated as a continuous variable, with the inherent assumption that higher levels were beneficial. Failure of passive transfer (TP<5.6) was relatively uncommon, occurring in 7% of calves. Potential explanatory variables under study included cow factors (dam age at calving, dystocia), calf factors (assistance nursing, calf sex, birthweight), other factors (ranch, year) and climate variables, (minimum temperature [range -28F to 56F] and precipitation...
Following univariate analysis, a stepwise multiple regression analysis was used to identify significant effects. A mixed model GLM was developed with ranch and year as random variables. As expected, ranch, year, and the interaction term ranch*year were significant. These terms capture unmeasured variability associated with many things, among which include management, nutrition, and genetics. A quadratic relationship between cow age and TP was observed, with TP peaking in middle age cows (5-7 year old) and declining slightly thereafter. In the univariate analysis, assistance nursing and dystocia were associated with serum TP, but these variables were not significant in the final model. Both precipitation on the day of birth, and minimum temperature on the day of birth were significantly associated serum TP. The effect of temperature on serum TP was trivial but positive (a 10ºF higher minimum temperature was associated with an increase of .04 mg/dl in TP), while the association with precipitation was negative and important (1 inch of precipitation was associated with a decrease of 0.73 mg/dl).

These data suggest that environmental variables on the day of birth may be relevant to passive transfer for beef calves. Additional analyses focusing on risk of failure of passive transfer are warranted. This work should be extended to include other climatic locations and to define the specific microenvironment of the calf at the time of birth and investigate potential intervention strategies.
Copper (Cu) is an essential nutrient because of its roles in the actions of many crucial enzyme systems. Copper is required for cellular respiration, bone formation, proper cardiac function, connective tissue development, myelination of the spinal cord, keratinization, and tissue pigmentation. Copper at high levels (100 mg/day) stimulated growth and feed efficiency and may be an alternative to anthelmintics to control nematode parasites in goats.

Reports have indicated that dairy (Nubian) and meat goats (Boer crosses) are more tolerant to copper toxicity than sheep. Copper requirements for goats have been established for be 8-10 mg/kg diet DM. Data suggests that meat goats may require more copper for optimal growth. NRC 2007 recommends copper requirement of lactating goats to 15 mg/kg DM, mature goats and bucks to 20 mg/kg, and growing goats to 25 mg/kg diet DM. The maximum tolerable copper level for goats is not established. Maximum tolerable copper concentration for cattle is 40 mg/kg dry matter and for sheep is 15 mg/kg dry matter with normal molybdenum (Mo) (1-2 mg/kg DM) and sulfur (S) (0.15-0.25 percent) concentrations.

Copper supplementation strategies include mineral supplements with sulfate, chloride, or oxide forms, dosing or drenching with copper compounds, injections of organic complexes of Cu, Cu-oxide needles placed in a bolus, and/or copper fertilization of pastures (poultry and swine waste) can improve copper in soils. Supplemental chemical forms of available Cu that can be provided include Cu sulfate, oxide, carbonate, chloride, chelates, and proteinate. Copper sulfate and Cu oxide are the most commonly used. The copper in Cu oxide is largely unavailable and ineffective when compared to Cu sulfate. Amino acid chelates or proteinates have greater bioavailability than Cu sulfate.

Considerable variation has been reported in the tolerance by various species of livestock to chronic Cu toxicosis, and some variation exists among various breeds of animals. Copper poisoning is encountered in most parts of the world. Animals may experience nausea, vomiting, salivation, abdominal pain,
convulsions, paralysis, collapse, and death. Acute poisoning is usually observed after accidental administration of excessive amounts of soluble Cu salts, which may be present in anthelmintic drenches, mineral mixes, or improperly formulated diets. There are relatively few examples of acute Cu toxicosis. Chronic Cu toxicity is found in ruminants but not in monogastric species and rarely in humans.

The University of Kentucky Livestock Disease Diagnostic Center pathologists have diagnosed 25 cases of copper toxicosis over the past 5 years. Case history, gross examination, and other findings will be summarized.


Disaster damage assessment teams were mobilized to identify and evaluate farm operations for animal loss, farm damage and needs after Hurricane Katrina hit Mississippi. This study describes and evaluates the damage assessment system for lessons that could inform future preparedness efforts. To evaluate the assessment system, guidelines developed by the Centers for Disease Control and Prevention for evaluating public health surveillance systems were adapted and used. Evaluation was restricted to cattle operations. Analysis focused on describing and explaining the pattern of disaster assessment and identifying potential predictive factors for assessment rate by county. A negative binomial regression model was used to evaluate factors for assessment rate intensity. Assessment was focused in counties around the Gulf coast where Hurricane Katrina made landfall and was highly correlated with the proportion of damaged ranches reported (P<0.001) and with animal needs identified by the assessments (P=0.032) but not correlated with cattle mortality (P=0.997). Assessment rate by county was three times higher in counties recording high wind speed (>56 mph) compared to counties recording low wind speed (<56 mph) (p=0.016). Using the surveillance system evaluation, sensitivity of assessment by country was low but the assessments targeted appropriate farms. Analyses indicated that assessments were appropriately-focused on areas of most severe damage or highest winds. Although immediate needs appeared to be met by response teams,
opportunities to improve the process included standardization of data collection methods, reduction of potential selection bias for assessment and more rapid evaluation of the data generated for continuous assessment quality improvement.
III. Organizational Matters
   A. By-Laws of the USAHA
   B. USAHA Administrative Policies
   C. Previous Meetings
III.A. BY-LAWS OF THE USAHA

III.A.

BYLAWS
OF THE
UNITED STATES ANIMAL HEALTH ASSOCIATION
2007

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
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 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
III.A. BY-LAWS OF THE USAHA

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. Election to Life Membership of individual members shall be elected by a majority vote of the Board of Directors. Life Members shall be exempt from the payment of one-half of annual meeting registration fees; 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
III.A. BY-LAWS OF THE USAHA

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 therefore 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 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 state 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.
III.A. BY-LAWS OF THE USAHA

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 Committee and General Membership Meetings. Unless otherwise specifically set forth in these bylaws, all committee and general membership actions require a majority vote provided a quorum of the voting membership is present.

4.4 **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 thirty (30) or more members, providing that a majority of those in attendance is comprised of Official Agency Members. A quorum of all other committees shall be ten (10) voting members or thirty percent (30%) of the committee membership, whichever is less. A quorum of the general membership shall consist of thirty (30) or more members.

4.5 Proxy Voting. Proxy voting (the power of attorney given by one person to another to vote in his or her stead) is not permitted in any meeting.

ARTICLE V – OFFICERS AND EMPLOYEES

**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.
III.A. BY-LAWS OF THE USAHA

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 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
III.A. BY-LAWS OF THE USAHA

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.

**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.
III.A. BY-LAWS OF THE USAHA

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.

2.2 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.
   f. Members of the Executive Committee

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.
III.A. BY-LAWS OF THE USAHA

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 total membership, provided that a quorum is 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, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin.
III.A. BY-LAWS OF THE USAHA

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
III.A. BY-LAWS OF THE USAHA

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 (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.

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. These bylaws may be amended by: (1) Specific proposed amendment(s) being presented in writing to the Executive Committee for review. The Executive Committee shall then provide their recommendations on the proposed amendments to the Board of Directors for deliberation and action; (2) If preliminarily approved by majority vote of the Board of Directors, the proposed amendment(s) shall then be presented to the membership; by publication in the next annual proceedings; (3) The proposed amendment(s) shall then be presented to the membership at the next annual meeting.

b. Amendments to bylaws shall be presented section-by-section at a meeting of the members and shall be approved only upon an affirmative vote of two-thirds of the
III.A. BY-LAWS OF THE USAHA

voting members, provided a quorum is present.

c. 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) above as if the Board of Directors had initially approved the proposed amendment(s).

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.

8.8. Dissolution. In the event of dissolution, the Association shall distribute its assets as required by the laws and statutes of
III.A. BY-LAWS OF THE USAHA

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) (5) of the Internal Revenue Code of 1986, as amended, or any successor provision.
III.B. USAHA ADMINISTRATIVE POLICIES

(As adopted by the Board of Directors, October 2006)

ESTABLISHMENT AND OPERATION OF STANDING COMMITTEES

1. All members of standing committees must be official members of USAHA in good standing in accordance with Section 3.4 of the bylaws.

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 to a manageable number of 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 term of not more than five years, and should not be reappointed Chair for at least one year.

5. All USAHA members present at committee meetings may enter into discussions. Only committee members may introduce resolutions or vote on items of business.

6. Committees shall submit reports only to the Board of Directors and Resolutions only to the Committee on Nominations and Resolution. Committee reports are not considered official actions until approved by the Board of Directors. Committee resolutions are not considered official actions of USAHA until approved by the general membership.

7. Committee Chairs may appoint subcommittees as necessary. Subcommittee members must be members of the parent committee. Subcommittees shall deliberate only the subject matter(s) delegated to them by the parent committee and shall report only to the parent committee.
Federal agencies and personnel have long been an integral and valuable part of USAHA. Agencies have taken part in the organization through official membership and representation on the Board of Directors. This provides the opportunity for presenting agency positions and concerns to the Association.

Of undoubtedly greater value has been the individual membership and participation of numerous animal health, food safety, and research professionals from a variety of federal agencies. All disease program-related committees have long had key federal agency members who were critical to the committees’ success. A major function of USAHA is to develop and recommend policies and procedures of national disease control and eradication programs. This means that many committee findings and resolutions constitute recommendations to the appropriate federal agency which is responsible for the area of concern. Some of these recommendations are contrary to agency policy or position. For this reason, federal employees should actively share their expertise and opinions as committee members, but should not serve as chairmen where they would be making recommendations to their employer.

A number of committees have used federal employees as assistant chairmen to good advantage. Also, committees which do not deal with federal agency policy may be chaired by federally-employed USAHA members where appropriate.

The committee strongly recommends that we maintain USAHA as a professional and technical advisory organization. We recognize that many of the Association’s activities have political implications, but feel that lobbying and other political activity should be left to the official, affiliate and individual members.
### III.C. PREVIOUS MEETINGS

<table>
<thead>
<tr>
<th>Meeting</th>
<th>Date</th>
<th>Place of Meeting</th>
<th>President</th>
<th>Secretary</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<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>2</td>
<td>Oct. 11-12, 1898</td>
<td>Omaha, NE</td>
<td>*Mr. C.P. Johnston, Springfield, IL</td>
<td>*Mr. Taylor Riddie, KS</td>
</tr>
<tr>
<td>3</td>
<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>4</td>
<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>5</td>
<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>6</td>
<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>7</td>
<td>Sept. 22-23, 1903</td>
<td>Denver, CO</td>
<td>*Mr. E. Bolton, Woodward, OK</td>
<td>*Mr. Wm. P. Smith, Monticello, IL</td>
</tr>
<tr>
<td>8</td>
<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>9</td>
<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>10</td>
<td>Aug. 15-16, 1906</td>
<td>Springfield, IL</td>
<td>*Mr. M. M. Hankins, Quanah, TX</td>
<td>*Dr. S. H. Ward, St. Paul, MN</td>
</tr>
<tr>
<td>11</td>
<td>Sept. 16-17, 1907</td>
<td>Richmond, VA</td>
<td>*Dr. D. F. Luckey, Columbia, MD</td>
<td>*Dr. S. H. Ward, St. Paul, MN</td>
</tr>
<tr>
<td>12</td>
<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>13</td>
<td>Sept. 13-15, 1909 ‡</td>
<td>Chicago, IL</td>
<td>*Dr. W. H. Dalrymple, Baton Rouge, LA</td>
<td>*Dr. C. E. Cotton, St. Paul, MN</td>
</tr>
<tr>
<td>14</td>
<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>15</td>
<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>16</td>
<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>Meeting</td>
<td>Date</td>
<td>Place of Meeting</td>
<td>President</td>
<td>Secretary</td>
</tr>
<tr>
<td>---------</td>
<td>-----------------</td>
<td>------------------</td>
<td>--------------------------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>17</td>
<td>Dec. 2-4, 1913</td>
<td>Chicago, IL</td>
<td>*Dr. Peter F. Bahnsen, Atlanta, GA</td>
<td>*Mr. J. J. Ferguson, Chicago, IL</td>
</tr>
<tr>
<td>18</td>
<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>19</td>
<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>20</td>
<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>21</td>
<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>22</td>
<td>Dec. 2-4, 1918</td>
<td>Chicago, IL</td>
<td>*Dr. M. Jacob, Knoxville, TX</td>
<td>*Dr. S. H. Ward, St. Paul, MN</td>
</tr>
<tr>
<td>23</td>
<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>24</td>
<td>Nov. 29-Dec. 1, 1920</td>
<td>Chicago, IL</td>
<td>*Dr. S. F. Musselman, Frankfort, KY</td>
<td>*Dr. D. M. Campbell, Chicago, IL</td>
</tr>
<tr>
<td>25</td>
<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>26</td>
<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>27</td>
<td>Dec. 5-7, 1923</td>
<td>Chicago, IL</td>
<td>*Dr. W. J. Butler, Herena, MT</td>
<td>*Dr. O.E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>28</td>
<td>Dec. 3-5, 1924</td>
<td>Chicago, IL</td>
<td>*Dr. J. G. Ferneyhough, Richmond, VA</td>
<td>*Dr. O.E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>29</td>
<td>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</td>
<td>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</td>
<td>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</td>
<td>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</td>
<td>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</td>
<td>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</td>
<td>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</td>
<td>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>Meeting</td>
<td>Date</td>
<td>Place of Meeting</td>
<td>President</td>
<td>Secretary</td>
</tr>
<tr>
<td>---------</td>
<td>---------------</td>
<td>------------------</td>
<td>----------------------------------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>37</td>
<td>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</td>
<td>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</td>
<td>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</td>
<td>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</td>
<td>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</td>
<td>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</td>
<td>Dec. 6-8, 1939</td>
<td>Chicago, IL</td>
<td>*Dr. J. L. Axby, Indianapolis, IN</td>
<td>*Dr. O. E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>44</td>
<td>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</td>
<td>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</td>
<td>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</td>
<td>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</td>
<td>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</td>
<td>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</td>
<td>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</td>
<td>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>52</td>
<td>Oct. 13-15, 1948</td>
<td>Denver, CO</td>
<td>*Dr. Jean V. Knapp, Tallahassee, FL</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>53</td>
<td>Oct. 12-14, 1949</td>
<td>Columbus, OH</td>
<td>*Dr. T. O. Brandenburgh, Bismarck, ND</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>54</td>
<td>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>
<tr>
<td>55</td>
<td>Nov. 14-16, 1951</td>
<td>Kansas City, KS</td>
<td>*Mr. F. E. Mollin, Denver, CO</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>56</td>
<td>Oct. 29-31, 1952</td>
<td>Louisville, KY</td>
<td>*Dr. Ralph L. West, St. Paul, MN</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>Meeting</td>
<td>Date</td>
<td>Place of Meeting</td>
<td>President</td>
<td>Secretary</td>
</tr>
<tr>
<td>---------</td>
<td>---------------</td>
<td>------------------</td>
<td>------------------------------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>57</td>
<td>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</td>
<td>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</td>
<td>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</td>
<td>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</td>
<td>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</td>
<td>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</td>
<td>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</td>
<td>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</td>
<td>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>66</td>
<td>Oct. 30-Nov. 2, 1962</td>
<td>Washington, DC</td>
<td>*Dr. W. L. Bendix, Richmond, VA</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>67</td>
<td>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>69</td>
<td>Oct. 25-29, 1965</td>
<td>Lansing, MI</td>
<td>*Dr. J. W. Safford, Helena, MT</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>70</td>
<td>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</td>
<td>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</td>
<td>Oct. 6-11, 1958</td>
<td>New Orleans, IA</td>
<td>*Dr. John F. Quinn, Lansing, MI</td>
<td>*Dr. W.L. Bendix, Richmond, VA</td>
</tr>
<tr>
<td>73</td>
<td>Oct. 12-19, 1969</td>
<td>Milwaukee, WI</td>
<td>*Dr. John L. Oharra, Reno, NV</td>
<td>*Dr. W.L. Bendix, Richmond, VA</td>
</tr>
<tr>
<td>74</td>
<td>Oct. 18-23, 1970</td>
<td>Philadelphia, PA</td>
<td>*Dr. Frank B. Wheeler, Baton Rouge, LA</td>
<td>*Dr. W.L. Bendix, Richmond, VA</td>
</tr>
<tr>
<td>75</td>
<td>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</td>
<td>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>Meeting</td>
<td>Date</td>
<td>Place of Meeting</td>
<td>President</td>
<td>Secretary</td>
</tr>
<tr>
<td>---------</td>
<td>--------------------</td>
<td>------------------</td>
<td>------------------------------------------------</td>
<td>-------------------------------------</td>
</tr>
<tr>
<td>77</td>
<td>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>78</td>
<td>Oct. 13-18, 1974</td>
<td>Roanoke, VA</td>
<td>*Mr. O. H. Timm, Dixon, CA</td>
<td>*Dr. W.L. Bendix, Richmond, VA</td>
</tr>
<tr>
<td>79</td>
<td>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</td>
<td>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</td>
<td>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>82</td>
<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>83</td>
<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>84</td>
<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>85</td>
<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>86</td>
<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>87</td>
<td>Oct. 15-21, 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>88</td>
<td>Oct. 21-26, 1984</td>
<td>Fort Worth, TX</td>
<td>*Mr. J. O. Pearce, Jr. Okeechobee, FL</td>
<td>Dr. J. C. Shook, Annapolis, MD</td>
</tr>
<tr>
<td>89</td>
<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>90</td>
<td>Oct. 14-19, 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>91</td>
<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>92</td>
<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>93</td>
<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>94</td>
<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>95</td>
<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>Meeting</td>
<td>Date</td>
<td>Place of Meeting</td>
<td>President</td>
<td>Secretary</td>
</tr>
<tr>
<td>---------</td>
<td>------------------</td>
<td>-------------------</td>
<td>------------------------------------------</td>
<td>------------------------------------------</td>
</tr>
<tr>
<td>96</td>
<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>97</td>
<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>98</td>
<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>99</td>
<td>Oct. 28-Nov. 3, 1995</td>
<td>Reno, NV</td>
<td>Dr. H. Wesley Towers, Dover, DE</td>
<td>Dr. J. C. Shook, Mechanicsburg, PA</td>
</tr>
<tr>
<td>100</td>
<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>101</td>
<td>Oct. 17-24, 1997</td>
<td>Louisville, KY</td>
<td>Dr. Larry L. Williams, Lincoln NE</td>
<td>Dr. J. C. Shook, Mechanicsburg, PA</td>
</tr>
<tr>
<td>102</td>
<td>Oct. 3-9, 1998</td>
<td>Minneapolis, MN</td>
<td>Dr. Jones W. Bryan, Columbia, SC</td>
<td>Dr. J. C. Shook, Mechanicsburg, PA</td>
</tr>
<tr>
<td>103</td>
<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>104</td>
<td>Oct. 19-26, 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>105</td>
<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>106</td>
<td>Oct. 1-24, 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>107</td>
<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>108</td>
<td>Oct. 21-27, 2004</td>
<td>Greensboro, NC</td>
<td>Dr. Donald Lein, Ithaca, NY</td>
<td>Dr. J. Lee Alley, Montgomery, AL</td>
</tr>
<tr>
<td>109</td>
<td>Nov. 3-9, 2005</td>
<td>Hershey, PA</td>
<td>Dr. Richard D. Willer, Phoenix, AZ</td>
<td>Dr. J. Lee Alley, Montgomery, AL</td>
</tr>
<tr>
<td>110</td>
<td>Oct. 12-18, 2006</td>
<td>Minneapolis, MN</td>
<td>Dr. Bret D. Marsh, Indianapolis, IN</td>
<td>Dr. J. Lee Alley, Montgomery, AL</td>
</tr>
<tr>
<td>111</td>
<td>Oct. 18-24, 2007</td>
<td>Reno, NV</td>
<td>Dr. Lee M. Myers, Atlanta, GA</td>
<td>Dr. J. Lee Alley, Montgomery, AL</td>
</tr>
</tbody>
</table>

IV. Appendix

A. Commonly Used Acronyms
III.D. GLOSSARY OF COMMONLY USED ACRONYMS

AAHSC  Aquatic Animal Health Standards Commission
AAVCT  American Academy of Veterinary and Comparative Toxicology
AAVLD  American Association of Veterinary Laboratory Diagnosticians
ABADRL  Arthropod-Borne Animal Disease Research Laboratory
ABSL  Animal Biosafety Levels
AC  Animal Care (USDA-APHIS)
ACE  Antigen Capture ELISA
ACVIM  American College of Veterinary Internal Medicine
AF  Accredited Free
AFIA  American Feed Industry Association
AFS  American Fisheries Society
AFWA  Association of Fish and Wildlife Agencies
AHISC  Animal Health Information Systems Committee
AHP  Animal Health and Production Division
AHPA  Animal Health Protection Act
AHSM  Animal Health Surveillance and Management
AICAP  Avian Influenza Coordinated Agricultural Program
AI-CMC  Avian Influenza Crisis Management Center
ANV  Avian nephritis virus
APHIS  Animal and Plant Health Inspection Service
APIC  Association for Professionals in Infection Control and Epidemiology
ARS  Agriculture Research Service
AVMA  American Veterinary Medical Association
AVMC  Aquatic Vet Med Committee
AWA  Animal Welfare Act
AWI  Animal Welfare Institute
BCG  Bacille Calmette-Guerin
BEAP  Brucellosis Emergency Action Plan
BHS  Bighorn Sheep
BMAPs  Brucellosis Management Action Plans
BMP  Best Management Practices
BMST  Brucellosis Milk Surveillance Testing
BNC  Bi-National Committee
BQFS  Bison Quarantine Feasibility Study
BRT  Brucellosis Ring Test
BSC  Biological Standard Commission
## IV.A. GLOSSARY OF ACRONYMS

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>BSE</td>
<td>Bovine Spongiform Encephalopathy</td>
</tr>
<tr>
<td>BSL</td>
<td>Breed Specific Legislation</td>
</tr>
<tr>
<td>BTV</td>
<td>Bluetongue virus</td>
</tr>
<tr>
<td>BVDV</td>
<td>Bovine diarrhea virus</td>
</tr>
<tr>
<td>CAC</td>
<td>Codex Alimentarius Commissions</td>
</tr>
<tr>
<td>CAHFS</td>
<td>California Animal Health and Food Safety Lab</td>
</tr>
<tr>
<td>CAHFSE</td>
<td>Collaboration for Animal Health, Food Safety and Epidemiology</td>
</tr>
<tr>
<td>CAST</td>
<td>Council for Agricultural Science and Technology</td>
</tr>
<tr>
<td>CAstV</td>
<td>Chicken astrovirus</td>
</tr>
<tr>
<td>CBPP</td>
<td>Contagious bovine pleuropneumonia</td>
</tr>
<tr>
<td>CDC</td>
<td>Centers for Disease Control and Prevention</td>
</tr>
<tr>
<td>CDLVWD</td>
<td>Committee on Diagnostic Laboratory and Veterinary Workforce Development</td>
</tr>
<tr>
<td>CEAH</td>
<td>Centers for Epidemiology and Animal Health</td>
</tr>
<tr>
<td>CEI</td>
<td>Center for Emerging Issues</td>
</tr>
<tr>
<td>CEM</td>
<td>Contagious equine metritis</td>
</tr>
<tr>
<td>CENAPA</td>
<td>National Parasite and Toxic Residue Laboratory</td>
</tr>
<tr>
<td>CENASA</td>
<td>National Animal Disease Laboratory</td>
</tr>
<tr>
<td>CFIA</td>
<td>Canadian Food Inspection Agency</td>
</tr>
<tr>
<td>CFR</td>
<td>Code of Federal Regulations</td>
</tr>
<tr>
<td>CI/KR</td>
<td>Critical infrastructure and key resources</td>
</tr>
<tr>
<td>CIMBS</td>
<td>The Center for Research at the Interface of Mathematical and Biological Sciences</td>
</tr>
<tr>
<td>CMC</td>
<td>Crisis Management Center</td>
</tr>
<tr>
<td>CNS</td>
<td>Central Nervous System</td>
</tr>
<tr>
<td>CONASA</td>
<td>Consejo Nacional de Salud Animal</td>
</tr>
<tr>
<td>COOL</td>
<td>Country of Origin Labeling</td>
</tr>
<tr>
<td>COSDA</td>
<td>Communications Officers for State Department of Agriculture</td>
</tr>
<tr>
<td>CPA</td>
<td>Federal Foreign Animal Disease Laboratory</td>
</tr>
<tr>
<td>CPI</td>
<td>Consumer Price Index</td>
</tr>
<tr>
<td>CSF</td>
<td>Cerebrospinal fluid</td>
</tr>
<tr>
<td>CSF</td>
<td>Classical swine fever</td>
</tr>
<tr>
<td>CSPS</td>
<td>Caprine Scrapie Prevalence Study</td>
</tr>
<tr>
<td>CSREES</td>
<td>Cooperative State Research Education and Extension Service</td>
</tr>
<tr>
<td>CVB</td>
<td>Center for Veterinary Biologics</td>
</tr>
<tr>
<td>CVB-IC</td>
<td>Center for Veterinary Biologics - Inspection and Compliance</td>
</tr>
<tr>
<td>CVI</td>
<td>Certificate of Veterinary Inspection</td>
</tr>
</tbody>
</table>
IV.A. GLOSSARY OF ACRONYMS

CWD  Chronic wasting disease
DAL  District at Large
DBE  Designated Brucellosis Epidemiologist
DHHS  Health and Human Services
DHIA  Dairy Herd Improvement Association
DHS  Department of Homeland Security
DIVA  Differentiating Infected from Vaccinated Animals
DJC  Designated Johne’s Disease Coordinator
DNR  Department of Natural Resources
DOI  Department of the Interior
DS  Diplomatic Security
DVM  Doctor of Veterinary Medicine
EC  Executive Committee
EDEN  Extension Disaster Education Network
EHD  Epizootic Hemorrhagic Disease
EHDV  Epizootic Hemorrhagic Disease Virus
EIA  Equine infectious anemia
EIS  Environmental Impact Statement
ELISA  Enzyme Linked Immunosorbert Assay
EM  Election microspray
END  Exotic Newcastle disease
ESF  Emergency Support Function
EU  European Union
FAD  Foreign Animal Diseases
FAO  Food and Agriculture Organization
FAS  Foreign Agricultural Service
FAV  Food, Agriculture and Veterinary Defense
FD&C  Food, Drug and Cosmetic Act
FDA  Food and Drug Administration
FDA-CVM  Food and Drug Administration - Center for Veterinary Medicine
FEMA  Federal Emergency Management Agency
FERN  Food Emergency Response Network
FHS  Fish Health Section
FMD  Foot-and-mouth disease
FPA  Fluorescent Polarization Assay
FPD  Foreign Poultry diseases
FSIS  Food Safety and Inspection Service
FWD-IRN  Food and Waterborne Diseases Integrated Research Network
FWS  Fish and Wildlife Services
FY  Fiscal Year

847
IV.A. GLOSSARY OF ACRONYMS

GAP  Good aquaculture practice
GCC  Government Coordinating Council
GDB  Generic Database
GFRA  Global FMD Research Alliance
GIEFA  InterHemispheric Group for the Eradication of FMD
GTNP  Grand Teton National Park
GYA  Greater Yellowstone Area
GYIBBC  Greater Yellowstone Area Interagency Brucellosis Committee
HACCP  Hazard Analysis and Critical Control Points
HEYM  Herrold’s egg yolk medium
HD  Hemorrhagic Disease
HHS  Department of Health and Human Services
HPAI  Highly Pathogenic Avian Influenza
HSIN  Homeland Security Information System
IAI  Integrated Agricultural Intelligence
IBH  Inclusion body hepatitis
IBMP  Interagency Bison Management Plan
ICS  Incident Command System
IFAH  International Federation for Animal Health
IHC  Immunohistochemistry
ILRI  International Livestock Research Institute
IMT  Incident Management Teams
IS  International Services
ISO  International Standards Organization
IT  Information Technology
ITRCB  International Technical Regulatory Capacity Building
JEI  Johne’s Education Initiative
JNJDDHP  National Johne’s Demonstration Herd Project
JPPD  Johnin purified protein derivative
LBMS  Live Bird Marketing System
LC/MS  Liquid Chromatography/Mass Spectroscopy
LPAI  Low Pathogenic avian influenza
LPNAI  Low Pathogenic notifiable avian influenza
MA  Modified Accredited
MAA  Modified Accredited Advanced
MAC  Multi-agency coordination committee
MAP  Mycobacterium Avium Paratuberculosis
MAZ  Modified Accredited Zone
MCI  Market Cattle Identification
MDOL  Montana Department of Livestock
**IV.A. GLOSSARY OF ACRONYMS**

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MDR</td>
<td>Multi-Drug Resistant</td>
</tr>
<tr>
<td>MIM</td>
<td>Mobile Information Management</td>
</tr>
<tr>
<td>MOU</td>
<td>Memorandum of Understanding</td>
</tr>
<tr>
<td>MST</td>
<td>Microbial Source Tracking</td>
</tr>
<tr>
<td>MUMS</td>
<td>Minor Use/Minor Species</td>
</tr>
<tr>
<td>NAA</td>
<td>National Aquaculture Association</td>
</tr>
<tr>
<td>NADC</td>
<td>National Animal Disease Center</td>
</tr>
<tr>
<td>NAHLN</td>
<td>National Animal Health Laboratory Network</td>
</tr>
<tr>
<td>NAHMS</td>
<td>National Animal Health Monitoring System</td>
</tr>
<tr>
<td>NAHRS</td>
<td>National Animal Health Reporting System</td>
</tr>
<tr>
<td>NAHSS</td>
<td>National Animal Health Surveillance System</td>
</tr>
<tr>
<td>NAIS</td>
<td>National Animal Identification System</td>
</tr>
<tr>
<td>NARMS</td>
<td>National Anti-Microbial Resistance Monitoring System</td>
</tr>
<tr>
<td>NCAHEM</td>
<td>National Center for Animal Health and Emergency Management</td>
</tr>
<tr>
<td>NCBA</td>
<td>National Cattlemen’s Beef Association</td>
</tr>
<tr>
<td>NCFAD</td>
<td>National Centre for Foreign Animal Disease</td>
</tr>
<tr>
<td>NCIE</td>
<td>National Center for Import and Export</td>
</tr>
<tr>
<td>NDV</td>
<td>Newcastle disease virus</td>
</tr>
<tr>
<td>NER</td>
<td>National Elk Refuge Bison</td>
</tr>
<tr>
<td>NFSMS</td>
<td>National Feral Swine Mapping System</td>
</tr>
<tr>
<td>NIH</td>
<td>National Institute of Health</td>
</tr>
<tr>
<td>NJWG</td>
<td>National Johne’s Working Group</td>
</tr>
<tr>
<td>NOAA</td>
<td>National Oceanic Atmospheric Administration</td>
</tr>
<tr>
<td>NPB</td>
<td>National Pork Board</td>
</tr>
<tr>
<td>NPD</td>
<td>National Preparedness Directorate</td>
</tr>
<tr>
<td>NPIP</td>
<td>National Poultry Improvement Plan</td>
</tr>
<tr>
<td>NPS</td>
<td>National Preparedness System</td>
</tr>
<tr>
<td>NRF</td>
<td>National Response Framework</td>
</tr>
<tr>
<td>NRI</td>
<td>National Research Initiative’s</td>
</tr>
<tr>
<td>NSTC</td>
<td>National Science and Technology Council</td>
</tr>
<tr>
<td>NSU</td>
<td>National Surveillance Unit</td>
</tr>
<tr>
<td>NVAP</td>
<td>National Veterinary Accreditation Program</td>
</tr>
<tr>
<td>NVS</td>
<td>National Veterinary Stockpile</td>
</tr>
<tr>
<td>NVSL</td>
<td>National Veterinary Services Laboratories</td>
</tr>
<tr>
<td>NYSCAP</td>
<td>New York State Cattle Health Assurance Program</td>
</tr>
<tr>
<td>OCVI</td>
<td>Online Certificate of Veterinary Inspections System</td>
</tr>
<tr>
<td>OD</td>
<td>Optical density</td>
</tr>
<tr>
<td>OHA</td>
<td>Office of Health Affairs</td>
</tr>
<tr>
<td>OIE</td>
<td>World Animal Health Organization</td>
</tr>
<tr>
<td>OM</td>
<td>Osteomyelitis</td>
</tr>
</tbody>
</table>
**IV.A. GLOSSARY OF ACRONYMS**

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ORST</td>
<td>Outbreak Response and Surveillance Team</td>
</tr>
<tr>
<td>OSTP</td>
<td>Office of Science and Technology Policy</td>
</tr>
<tr>
<td>PADOH</td>
<td>Pennsylvania Department of Health</td>
</tr>
<tr>
<td>PC</td>
<td>Pre-Conditioning</td>
</tr>
<tr>
<td>PBS</td>
<td>Phosphate buffered saline</td>
</tr>
<tr>
<td>PCR</td>
<td>Polymerase Chain Reaction</td>
</tr>
<tr>
<td>PCV 2</td>
<td>Porcine circovirus 2</td>
</tr>
<tr>
<td>PETS</td>
<td>Pets Evacuation and Transportation Standards Act</td>
</tr>
<tr>
<td>PFGE</td>
<td>Pulsed Field gel electrophoresis</td>
</tr>
<tr>
<td>PFI</td>
<td>Pet Food Institute</td>
</tr>
<tr>
<td>PHLIS</td>
<td>Public Health Laboratory Information Systems</td>
</tr>
<tr>
<td>PIIWG</td>
<td>The Pork Industry Identification Working Group</td>
</tr>
<tr>
<td>PKEMRA</td>
<td>Post Katrina Management Reform Act</td>
</tr>
<tr>
<td>PNF</td>
<td>Payette National Forest</td>
</tr>
<tr>
<td>PQA</td>
<td>Pork Quality Assurance</td>
</tr>
<tr>
<td>PRRSV</td>
<td>Porcine respiratory and reproductive syndrome virus</td>
</tr>
<tr>
<td>PRV</td>
<td>Pseudorabies virus</td>
</tr>
<tr>
<td>PSAs</td>
<td>Public Security Advisors</td>
</tr>
<tr>
<td>PT</td>
<td>Proficiency Test</td>
</tr>
<tr>
<td>PVS</td>
<td>Performance, Vision and Strategy</td>
</tr>
<tr>
<td>RA/HMP</td>
<td>Risk Assessments/Herd Management Plans</td>
</tr>
<tr>
<td>RAPIDD</td>
<td>The Research and Policy for Infectious Disease Dynamics</td>
</tr>
<tr>
<td>RES</td>
<td>Regionalization Evaluation Services</td>
</tr>
<tr>
<td>RFID</td>
<td>Radio Frequency Identification</td>
</tr>
<tr>
<td>RML</td>
<td>Rocky Mountain Laboratory</td>
</tr>
<tr>
<td>RSSS</td>
<td>Regulatory Scrapie Slaughter Surveillance</td>
</tr>
<tr>
<td>RT-PCR</td>
<td>Real-Time Polymerase Chain Reaction</td>
</tr>
<tr>
<td>SAGARPA</td>
<td>Secretary of Agriculture, Ranching, Rural Development, Fisheries and Food Supply</td>
</tr>
<tr>
<td>SB</td>
<td>Brucella Suis</td>
</tr>
<tr>
<td>SCWDS</td>
<td>Southeastern Cooperative Wildlife Disease Study</td>
</tr>
<tr>
<td>SENASICA</td>
<td>Servicio Nacional de Sanidad, Inocuidad y Calidad de Agroalimentaria</td>
</tr>
<tr>
<td>SEPRL</td>
<td>Southeastern Poultry Research Laboratory</td>
</tr>
<tr>
<td>SFCP</td>
<td>Scrapie Flock Certification Program</td>
</tr>
<tr>
<td>SHI</td>
<td>Synergistic Hemolysin Inhibition</td>
</tr>
<tr>
<td>SHTP</td>
<td>Slaughter Horse Transport Program</td>
</tr>
<tr>
<td>SIV</td>
<td>Swine Influenza Virus</td>
</tr>
<tr>
<td>SNGD</td>
<td>Scrapie National Generic Database</td>
</tr>
<tr>
<td>SODA</td>
<td>Statistical Outbreak Detection Algorithm</td>
</tr>
</tbody>
</table>
### IV.A. GLOSSARY OF ACRONYMS

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOP</td>
<td>Standard Operating Procedure</td>
</tr>
<tr>
<td>SOSS</td>
<td>Scrapie Ovine Slaughter Surveillance</td>
</tr>
<tr>
<td>SPP</td>
<td>Security and Prosperity Partnership of North America</td>
</tr>
<tr>
<td>SRM</td>
<td>Specified Risk Materials</td>
</tr>
<tr>
<td>SWAP</td>
<td>Swine Welfare Assurance Program</td>
</tr>
<tr>
<td>TAD</td>
<td>Targeted Advanced Development</td>
</tr>
<tr>
<td>TB SAS</td>
<td>Tuberculosis Scientific Advisory Subcommittee</td>
</tr>
<tr>
<td>TDC</td>
<td>Tibial dyschondroplasia</td>
</tr>
<tr>
<td>TRV</td>
<td>Turkey-origin Reovirus</td>
</tr>
<tr>
<td>TSE</td>
<td>Transmissible spongiform encephalaphy</td>
</tr>
<tr>
<td>UDB</td>
<td>Unified Database</td>
</tr>
<tr>
<td>UEP</td>
<td>United Egg Producers</td>
</tr>
<tr>
<td>UHF</td>
<td>Ultra High Frequency</td>
</tr>
<tr>
<td>UM&amp;R</td>
<td>Uniform Methods &amp; Rules</td>
</tr>
<tr>
<td>USAHA</td>
<td>United States Animal Health Association</td>
</tr>
<tr>
<td>USDA</td>
<td>United States Department of Agriculture</td>
</tr>
<tr>
<td>USFS</td>
<td>United States Forest Service</td>
</tr>
<tr>
<td>USFW</td>
<td>United States Fish &amp; Wildlife Services</td>
</tr>
<tr>
<td>VBJDCP</td>
<td>Voluntary Bovine Johne’s Disease Control Program</td>
</tr>
<tr>
<td>VHS</td>
<td>Viral Hemmoratic Septicemia</td>
</tr>
<tr>
<td>VHSV</td>
<td>Viral Hemmoratic Septicemia Virus</td>
</tr>
<tr>
<td>VICH</td>
<td>International Cooperation on Harmonization of Technical Requirements for Registration of Veterinary Medicinal Products</td>
</tr>
<tr>
<td>VIC-S</td>
<td>Veterinary Infection Control Society</td>
</tr>
<tr>
<td>VJDHSP</td>
<td>Voluntary Johne’s Disease Herd Status Program</td>
</tr>
<tr>
<td>VLT</td>
<td>Vaccinal Laryngotracheitis</td>
</tr>
<tr>
<td>VS</td>
<td>Veterinary Services</td>
</tr>
<tr>
<td>VSPS</td>
<td>Veterinary Service Process Streamlining</td>
</tr>
<tr>
<td>WAFWA</td>
<td>Western Association of Fish and Wildlife Agencies</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organization</td>
</tr>
<tr>
<td>WS</td>
<td>Wildlife Services</td>
</tr>
<tr>
<td>WTO</td>
<td>World Trade Organization</td>
</tr>
<tr>
<td>YNP</td>
<td>Yellowstone National Park</td>
</tr>
<tr>
<td>YWHP</td>
<td>Yellowstone Wildlife Health Program</td>
</tr>
</tbody>
</table>