PROCEEDINGS

ONE HUNDRED AND SEVENTEENTH ANNUAL MEETING

OF THE

UNITED STATES ANIMAL HEALTH ASSOCIATION

TOWN AND COUNTRY HOTEL
SAN DIEGO, CALIFORNIA
OCTOBER 17 – 23, 2013
ABOUT USAHA

USAHA’S MISSION…

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.

USAHA MEMBERSHIP

State Official Agency Members (50)

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

Federal Official Agency Members (11)

USDA, APHIS, Veterinary Services
USDA, Agriculture Research Service
USDA, Cooperative State Research, Education and Extension Service
USDA, APHIS, Wildlife Services
USDAHS, Centers for Disease Control and Prevention
USDHS, Science and Technology Directorate
USDHS, Office of Health Affairs
USDI, US Fish and Wildlife Service
USDI, National Park Service
USDI, USGS, National Wildlife Health Center
USDOE, Lawrence Livermore National Laboratory

Territory and Sovereign Agency Members (2)

North Mariana Island
Navajo Nation

International Animal Health Agencies (4)

Australia
Canada
Mexico
New Zealand
ABOUT USAHA (continued)

Allied Industry Organizations (39)
- Alpaca Owners & Breeders Association
- American Association of Avian Pathologists
- American Association of Bovine 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 Cervid Alliance
- American Dairy Goat Association
- American Farm Bureau Federation
- American Goat Federation
- American Horse Council
- American Sheep Industry Association
- American Veterinary Medical Association
- Association of American Veterinary Medical Colleges
- Association of Fish & Wildlife Agencies
- Battelle Memorial Institute
- Exotic Wildlife Association
- Holstein Association USA, Inc.
- International Lama Registry
- Livestock Exporters Association, USA
- Livestock Marketing Association
- National Aquaculture Association
- National Association of State Public Health Veterinarians
- National Bison Association
- National Cattlemen’s Beef Association
- National Chicken Council
- National Dairy Herd Information Association, Inc.
- National Institute for Animal Agriculture
- National Milk Producers Federation
- National Pork Board
- National Pork Producers Council
- National Renderers Association
- National Turkey Federation
- North American Deer Farmers Association
- North American Elk Breeders Association
- Professional Rodeo Cowboys Association
- US Poultry & Egg Association

District Delegates
Northeast: S. Klopp; E. Zirkle
North Central: V. Green; H. Hill
South: L. O. Lollis; A. G. Rosales
West: W. Sauble; H.M. Richards

Individual Members: 807
Life Members: 118
Student Members: 132
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      AAVLD President’s Remarks – T. McKenna
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A. Officers

2012-2013 Executive Committee

Front row (from left): David Marshall, NC, Immediate Past President; David Meeker, VA, President; Stephen Crawford, NH, President-elect. Back row (from left): Boyd Parr, SC, Third Vice President; David Schmitt, IA, Second Vice President; Bruce King, UT, First Vice President; Annette Jones, CA, Treasurer.
## B. USAHA Board of Directors, 2013

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<thead>
<tr>
<th>Name</th>
<th>Affiliation</th>
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<tr>
<td>Jim</td>
<td>Kistler American Assoc. of Veterinary Laboratory Diagnosticians</td>
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<td>Robert</td>
<td>Gerlach Alaska Dept. of Environmental Cons.</td>
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<td>Tony</td>
<td>Frazier Alabama Dept. of Agriculture</td>
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<td>Pat</td>
<td>Long Alpaca Owners &amp; Breeders Assoc.</td>
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<td>Eric</td>
<td>Gingerich American Assoc. of Avian Pathologists</td>
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<td>Chris</td>
<td>Ashworth American Assoc. of Bovine Practitioners</td>
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# I.B. USAHA BOARD OF DIRECTORS

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<td>Jamie Jonker</td>
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Barbara Martin, IA  David Zeman, SD
### USAHA/AAVLD Committee on Environment and Toxicology

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**Vice Chair:** Tim Evans, MO

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### USAHA/AAVLD Committee on Food and Feed Safety

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<td>Arthur Layton</td>
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Julie Gard, AL  
Chester Gipson, MD  
Tony Good, OH  
Cathleen Hanlon, GA  
Robert Hilsenroth, FL
I. USAHA COMMITTEES

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<th>Committee on Infectious Diseases of Cattle, Bison, and Camelids</th>
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<td>Chair: James Evermann, WA</td>
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| Chris Ashworth, AR                | Diane Kitchen, FL               |
| Charlie Broaddus, VA              | John Lawrence, ME               |
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| Del Hensel, CO                    | Ben Smith, WA                   |
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| Dennis Hughes, NE                 | Nick Striegel, CO               |
| David Hunter, MT                  | Rodney Taylor, NM               |
| Annette Jones, CA                 | Susan Tellez, TX                |
| Paul Jones, AL                    | Robert Temple, OH               |

Import-Export, cont’d
I. C. USAHA COMMITTEES

Infectious Diseases of Cattle, Bison and Camelids, cont’d

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Committee on Infectious Diseases of Horses
Chair: Andy Schwartz, TX
Vice Chair: Katherine Flynn, CA

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Paul Brennan, IN  
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Gary Brickler, CA  
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William Brown, KS  
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James England, ID  
J Amelita Facchiano, TX  
Kathy Finnerty, MA  
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Donald Hoenig, ME  
Joseph Huff, CO  
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Livestock Identification, cont’d

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Sherrill Davison, PA
Barbara Determan, IA
Francois Elvinger, VA
### I. USAHA COMMITTEES

#### NAHLN, cont’d

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#### Committee on Nominations and Resolutions

Chair: David Meeker, VA

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I. C. USAHA COMMITTEES

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Richard Gast, GA  G. Donald Ritter, DE
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Eric Gonder, NC  John Sanders, WV
Jean Guard, GA  Joni Scheftel, MN
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Elizabeth Krushinskie, DE  Scott Wells, MN
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Tsang Long Lin, IN
Edward Mallinson, MD

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**Vice Chair:** Cheryl Miller, IN

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| Kristine Petrini | Cheryl Miller | Beth Carlson, ND  
|                  |            | John Clifford, DC  
|                  |            | Thomas Conner, OH  
|                  |            | Walter Cook, WY  
|                  |            | Stephen Crawford, NH  
|                  |            | Linda Detwiler, NJ  
|                  |            | Nancy East, CA  
|                  |            | William Edmiston, TX  
|                  |            | Anita Edmondson, CA  
|                  |            | Dee Ellis, TX  
|                  |            | Keith Forbes, NV  
|                  |            | Michael Gilsdorf, MD  
|                  |            | Carl Heckendorf, CO  
|                  |            | Linda Detwiler, NJ  
|                  |            | Mary Lis, CT  
|                  |            | Jim Logan, WY  
|                  |            | Michael Marshall, UT  

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|                   |            | John Clifford, DC  
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|                   |            | William Edmiston, TX  
|                   |            | Effingham Embree, Jr., IL  
|                   |            | Chester Gipson, MD  
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|                   |            | Paul Jones, AL  
|                   |            | Don Knowles, WA  
|                   |            | Eileen Kuhlmann, MN  
|                   |            | James Leafstedt, SD  
|                   |            | Howard Lehmkuhl, IA  
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|                   |            | Michael Marshall, UT  
|                   |            | Shirley McKenzie, NC  
|                   |            | Cheryl Miller, IN  
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|                   |            | Jewell Plumley, WV  
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|                   |            | Stephen White, WA  
|                   |            | Nora Wineland, MO  
|                   |            | David Winters, TX  
|                   |            | Cindy Wolf, MN  

### Committee on Sheep and Goats
**Chair:** William Edmiston Jr., TX  
**Vice Chair:** Don Knowles, WA

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<thead>
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<th>Chair/Chairperson</th>
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| William Edmiston Jr | Chuck Massengill | Scott Bender, AZ  
|                   |            | Deborah Bender, AZ  
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|                   |            | Michael Marshall, UT  
|                   |            | Cheryl Miller, IN  
|                   |            | Ronald Miller, PA  
|                   |            | Jeffrey Nelson, IA  
|                   |            | Charles Palmer, CA  
|                   |            | Kris Petrini, MN  
|                   |            | Suelee Robbe-Austerman, IA  
|                   |            | Paul Rodgers, WV  
|                   |            | Joan Dean Rowe, CA  
|                   |            | Mo Salman, CO  
|                   |            | A. David Scarfe, IL  
|                   |            | William Shulaw, OH  
|                   |            | Diane Sutton, MD  
|                   |            | Peter Timm, CA  
|                   |            | Stephen White, WA  
|                   |            | Margaret Wild, CO  
|                   |            | Ellen Mary Wilson, CA  
|                   |            | William Wilson, KS  
|                   |            | Nora Wineland, MO  
|                   |            | David Winters, TX  
|                   |            | Cindy Wolf, MN  

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### Committee on Program

**Chair:** Stephen Crawford, NH

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<tr>
<td>Lisa Becton</td>
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### Committee on Transmissible Diseases of Poultry and Other Avian Species

**Chair:** Dale Lauer, MN  
**Vice Chair:** Sarah Mason, NC

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### Transmissible Diseases of Poultry & Other Avian Species, cont’d

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<tr>
<th>Donna Kelly, PA</th>
<th>Charles S Roney, GA</th>
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### Committee on Transmissible Diseases of Swine

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Vice Chair: Lisa Becton, IA

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I. C. USAHA COMMITTEES

Transmissible Diseases of Swine, cont’d

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Sam Hines, MI                       Harry Snelson, NC
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Jennifer Koeman, IA                 Brad Thacker, MD
Elizabeth Lautner, IA               Beth Thompson, MN
James Leafstedt, SD                 Susan Trock, GA
Donald Lein, NY                     Paul Ugstad, NC
Tsang Long Lin, IN                  Lucie Verdon, CAN
Bret Marsh, IN                      Liz Wagstrom, DC
Chuck Massengill, MO                Patrick Webb, IA
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Jerome Niefeld, KS                  Nora Wineland, MO
Jim Niewold, IL                     Paul Yeske, MN
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I. C. USAHA COMMITTEES

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Velmar Green, MI
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I. C. USAHA COMMITTEES

Tuberculosis, cont’d

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Jill Bryar Wood, TX
Ching Ching Wu, IN
Stephanie Yendell, MN
Marty Zaluski, MT
Glen Zebarth, MN

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Richard Winters, Jr., TX
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Peregrine Wolff, NV
Mary Wood, WY
Marty Zaluski, MT
Glen Zebarth, MN
II. 2013 Annual Meeting Proceedings
   A. USAHA/AAVLD President’s Reception and Dinner
   B. USAHA/AAVLD Plenary Session
   C. USAHA/AAVLD Scientific Posters, Papers and Abstracts
   D. USAHA Membership Meetings
   E. Committee Reports
   F. Other Reports
A. USAHA/AAVLD President’s Reception and Dinner

INVOCATION

Bruce King

MEMORIAL SERVICE

Stephen Crawford

Colleagues, let us take a moment this evening to humbly pause in our busy lives to remember those that have served with us over the years, but will not be with us this evening because of their passing. Let us keep in mind that life is fragile, but also enjoy the memories, contributions and fellowship that we share that are no longer with us. We wish for strength to their families and friends, and that we carry forward their dedication in the work we do here.

Please take a moment and reflect on these individuals as I read their names:

Hugo Medina, Minnesota
John Shook, Pennsylvania
Keith Flanagan, Florida
George Winegar, Michigan
Lowell Barnes, Indiana

Please join me in a moment of silent prayer in remembrance of these deceased members. Amen.
Ms. Karen Ross, Secretary of the California Department of Food and Agriculture (CDFA) welcomed attendees to the Annual Meeting.

Ms. Ross was appointed Secretary of the California Department of Food and Agriculture on January 12, 2011 by Governor Edmund G. Brown Jr. Secretary Ross has deep leadership experience in agricultural issues nationally, internationally, and here in California. Prior to joining CDFA, Secretary Ross was chief of staff for U.S. Agriculture Secretary Tom Vilsack, a position she accepted in 2009. Before her time at the United States Department of Agriculture, Secretary Ross served more than thirteen years as President of the California Association of Winegrape Growers (CAWG), based in Sacramento. During that same period she served as the Executive Director of Winegrape Growers of America, a coalition of state winegrower organizations, and as Executive Director of the California Wine Grape Growers Foundation, which sponsors scholarships for the children of vineyard employees. Among Secretary Ross’ many achievements at CAWG was the creation of the nationally-recognized Sustainable Winegrowing Program, which assists wine grape growers in maintaining the long-term viability of agricultural lands and encourages them to provide leadership in protecting the environment, conserving natural resources, and enhancing their local communities.
II. A. USAHA/AAVLD PRESIDENT’S RECESSION AND DINNER

INVITATION TO KANSAS CITY

Linda Hickam

Dr. Linda Hickam, Missouri State Veterinarian, highlighted Missouri and Kansas City, the host location for the 2014 USAHA/AAVLD Annual Meeting.
II. A. USAHA/AAVLID PRESIDENT’S RECEPTION AND DINNER

DINNER SPONSORS’ RECOGNITION

Kevin Maher
GlobalVetLink, LC

Kirk Adams
Life Technologies
II. A. USAHA/AAVLD PRESIDENT’S RECEPTION AND DINNER

USAHA PRESIDENT’S REMARKS

David Meeker

I want to tell all of you what a great honor for me it’s been to serve as President of USAHA. It’s been the highlight of my long career in animal agriculture. My first meeting was in 1986, then with the National Pork Producers Council.

I’d like to thank Ben Richey, our very excellent and hard-working Executive Director, and his assistant Kelly Janicek. Thanks also to our current Executive Committee, Drs. Stephen Crawford, Bruce King, David Schmitt, Boyd Parr, Annette Jones and David Marshall. Five years goes by pretty fast.

I’d also like to thank past Executive Committees for their work, planning and foresight. Rich Breitmeyer, Don Hoenig, Steve Halstead, Bill Hartmann have been a pleasure to work with. I appreciate the foundation built before we got here that has led to a very strong and vibrant association to maintain our relevance and responsiveness. We’ve embarked on a strategic planning process, which will be led by Dr. Bruce King; very soon you will receive a member survey.

And finally, I’d like to thank my wife Beatriz, whose unwavering love, support and wisdom keep me straight, presentable and organized. I love you.

Thank you all for being here, for contributing to this great organization, and for giving me the opportunity to serve as your president.
Dr. Thomas McKenna provided his thoughts on the 2013 Annual Meeting, serving as AAVLD President from 2012-2013. He became Director of the Wisconsin Veterinary Diagnostic Laboratory (WVDL) in March 2007. Before becoming WVDL Director, Dr. McKenna was the Director of the foreign animal disease diagnostic laboratory (FADDL). Located on Plum Island, FADDL is the only location in the United States where many of the infectious foreign animal disease agents can be studied. At FADDL, Dr. McKenna oversaw the diagnosis of exotic livestock diseases, coordinated the treatment and testing for imported livestock and animal products, trained veterinarians in the recognition and diagnosis of foreign animal diseases, and supervised the North American Foot-and-Mouth Disease Vaccine Bank. McKenna joined FADDL in 1995 having completed a PhD in Microbiology from University of California – Davis (UCD). In addition to his PhD, he holds a B.S. in Business and Economics from Lehigh University in Bethlehem, PA., a B.S. in Biological Science from the University of Alaska, Fairbanks, and a DVM from UCD.
II. A. USAHA/AAVLDD PRESIDENT’S RECEPTION AND DINNER

RECOGNITION OF 2013 SPONSORS
David Meeker and Tom McKenna

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Good evening. It is an honor to represent APHIS Administrator Kevin Shea this evening in presenting this year’s APHIS Administrator’s Award. Kevin sends his regrets and also his regards. After the last couple weeks of ongoing tumult in Washington, I’m particularly appreciative of the opportunity to be with you all in this beautiful, serene city.

No one is honored for what he or she has received in life, but rather for what they have given back to society.

APHIS bestows the Administrator’s Award at this annual meeting to recognize and honor one individual for lifetime accomplishments in the field of animal health. Although the award is conferred upon one individual, it represents the deep appreciation we at APHIS have for the outstanding work done by USAHA and AAVLD members collectively every day as our partners in protecting animal health in our Nation.

This evening we honor Dr. James A. Roth, who is, among many other things, a Distinguished Professor in the College of Veterinary Medicine at Iowa State University (ISU).

ISU has been and remains central in Jim’s life, first as a student and now as a distinguished professor. Of course, ISU’s appeal has held sway over so many notable veterinarians in our Nation’s history. In fact, more USDA buildings and structures are named after prominent ISU alumni than those from any other university [e.g., Seaman Knapp arch between Whitten and South building].

Some of you may know that ISU was also where the first cooperative agricultural extension program was launched. And the university can also lay claim to being where the first electronic digital computing device, the Atanasoff–Berry Computer (ABC), was invented [between 1937 and 1942].

Jim received his D.V.M. from ISU in 1975, and then went into private veterinary practice for a few years.

However, in 1977, the gravitational pull of academia drew Jim back to ISU as a faculty member, while he worked to complete his M.S. degree. In 1981, Professor Roth achieved his Ph.D. in Veterinary Microbiology/Immunology at ISU.

Perhaps Jim’s affection for Iowa stems from the State’s agricultural vitality. Jim grew up on a grain-livestock farm; his family had a cow-calf-feedlot, farrow-to-finish swine, and layers and broilers.

He and his wife Jeanne still have a small acreage just outside of Ames, where he enjoys mowing the large lawn and playing with the grandchildren, and where they also maintain an extensive garden. I understand they enjoy sharing its abundance with both ISU colleagues and the local “Plant a Row for the Hungry” program.
II. A. USAHA/AAVLD PRESIDENT’S RECEPTION AND DINNER

Rumor has it that Jim still putts around on the two-cylinder John Deere tractor that his grandfather bought back in 1959, which Jim began driving when he was eight years old. That gives some indication of just how remarkable Jim is.

In addition to his professorial cap, Jim wears many other hats. Among his accomplishments:

- He has ably served as a member on a number of national bio-security advisory panels;
- He has testified before Congress on numerous important bio-defense, and zoonotic disease issues;
- He has published more than 200 peer-reviewed articles; and
- Jim served as President of the American College of Veterinary Microbiologists from 2004 to 2008.

Jim is currently President of Transboundary Animal Biologics, Inc., a not-for-profit corporation that works to enhance the availability of veterinary biologics for transboundary diseases.

But among Jim’s countless contributions to the animal health profession, from our perspective at APHIS, his work as Executive Director of the Institute for International Cooperation in Animal Biologics (IICAB) and Director of the Center for Food Security and Public Health really stands out. These two grant-funded organizations are internationally recognized for their development and delivery of animal health and emergency response information.

The IICAB, founded in 1995 as a joint collaboration of USDA and ISU, concentrates on educational efforts and facilitating international communication and harmonization related to the availability, safety, and efficacy of veterinary biologics.

The IICAB, together with APHIS’ Center for Veterinary Biologics (CVB) and National Veterinary Services Laboratories (NVSL), serves as the OIE Collaborating Center for the Diagnosis of Animal Disease and Vaccine Evaluation in the Americas.

For 13 years, Jim has collaborated with CVB to host the joint CVB/IICAB Veterinary Biologics Training Program. The effort had humble beginnings: Jim and the CVB Directors brought folding chairs to a potluck event at his farm to help welcome the international attendees to Iowa and the training program. Since then, the Veterinary Biologics Training Program has grown considerably and has now hosted more than 2,100 attendees from 89 different countries and is recognized as a significant OIE Training Program.

IICAB’s Web site is also an excellent source of information on specific animal diseases. The Compendium of Veterinary Vaccines for Transboundary Animal Diseases produced by IICAB contains roughly 830 vaccine entries for 150 manufacturers, covering 95 countries and 41 transboundary diseases.

I would be remiss if I didn’t also highlight Jim’s work as the Director of the Center for Food Security and Public Health (CFSPH), which was founded
II. A. USAHA/AAVLD PRESIDENT’S RECEPTION AND DINNER

in 2002 as a collaboration of Federal and State officials, academia, and industry.

The Center, in conjunction with industry and academic partners, has developed Secure Food Supply Plans for eggs, turkeys, milk, and pork, which are designed to help provide business continuity in the face of a foreign animal disease outbreak. The Safe Food Supply Plans are funded by APHIS' National Center for Animal Health Emergency Management (NCAHEM).

CFSPH also develops all the educational material and modules for the APHIS National Veterinary Accreditation Program, and produces a range of materials for use of those who respond in an animal health emergency.

Jim, we recognize your many past accomplishments, and we thank you for all the work you continue to do. Please come up now and receive your well-deserved award.

I would ask all of you to now join me in congratulating Dr. James Roth: winner of the 2013 APHIS Administrator Award. Thank you.

James Roth accepts the 2014 APHIS Administrator's Award.
Dr. Jerry Saliki is a board-certified veterinary virologist, professor of infectious diseases, diagnostician and Director of the Athens Veterinary Diagnostic Laboratory at the University of Georgia. He obtained his DVM from the University of Liège, Belgium in 1984. After pursuing a one-year diploma program in tropical veterinary medicine at the Institute for Tropical Medicine in Antwerp, Belgium he returned to his native Cameroon and served as a research scientist at the Cameroon Institute of Animal Research from 1985 - 1989. From 1989 - 1993, he underwent PhD training at Cornell University, during which he undertook his doctoral research on peste-des-petits ruminants and rinderpest viruses at the Plum Island Animal Disease Center. From 1993 - 2005 he served as Head of the Virology / Serology at Oklahoma Animal Disease Diagnostic Laboratory in a tenure track position during which he rose through the academic ranks at Oklahoma State University to full professor in 2005. That same year, he moved to the University of Georgia and served as Head of the Virology/Serology section of the Athens Veterinary Diagnostic Laboratory, where he has also served as Laboratory Director since 2007. Dr. Saliki’s research interests center on the development of improved diagnostic assays for a variety of diseases; he has published over 100 papers. In addition to his role in providing diagnostic services for domestic animals for the past 25 years, Dr. Saliki has also built a highly reputed marine mammal diagnostic program during the last 15 years. For the past 10 years he has served the AAVLD and the scientific community at large as editor-in-chief of our flagship publication, the Journal of Veterinary Diagnostic Investigation. In that role, he took the journal into the digital age and also built its reputation as top-tier international journal. Notably, he implemented online submission/peer review process and online publishing of the journal. He also strengthened the peer review process by identifying and appointing scientists from across the world to serve on the journal’s editorial board.
Gary Anderson joined the Kansas State Veterinary Diagnostic Laboratory (KSVDL) as director in 2005, after numerous years in private industry where he was involved in diagnostics and vaccine research and development. The first five years of his career were at the University of Nebraska-Lincoln where he had diagnostic and research responsibilities and was promoted to Associate Professor. He holds a BS in Microbiology from South Dakota State University, a DVM and MS (veterinary pathology) from Kansas State University, and a PhD in Comparative Pathology from the University of California-Davis. He also participated in an NIH-sponsored training program in anatomic pathology during his graduate studies in Davis. Dr. Anderson is a professor in the Department of Diagnostic Medicine and Pathobiology in the College of Veterinary Medicine at Kansas State University. He has been a member of the AVMA and American Association of Veterinary Laboratory Diagnosticians (AAVLD) throughout his career and served on the Executive Board as Vice-President, President-Elect and President (2010) of the AAVLD. Dr. Anderson has served numerous AAVLD and USAHA committees over the years and currently is co-chairing the joint Diagnostic Laboratory and Veterinarian Workforce Development Committee and the Strategic Planning Committee. He has served on the National Animal Health Laboratory Network (NAHLN) Methods Technical Working Group since its inception and currently serves as co-director of the NAHLN Coordinating Council. Priorities for Dr. Anderson have included strengthening the NAHLN, working toward the development of an adequate supply of well-trained veterinary diagnosticians for the future, and pressing the application and practice of One Health relevant to animal health. Diagnostic medicine provides a pivot point for so many of the critical issues in animal health: antimicrobial resistance, food safety and security, foreign animal disease (FAD) surveillance, and detection of high-consequence diseases (FAD, zoonotic and endemic). Diagnostics play a vital role in animal welfare where surveillance and quick turnaround yield information that enhances effective management of animal populations. Anderson is proud to be a member of the diagnostic medicine community, USAHA and AAVLD.
USAHA recently established an award to recognize our federal partners who may work closely with USAHA members on a regular basis. The USAHA Federal Partnership Award is designated for the recognition of a federal employee that has demonstrated commendable service to the betterment of animal health in the United States. Candidates can be employed at any level of an Official Federal Agency Member of USAHA. The candidate should exemplify partnership with states and industry stakeholders through leadership, expertise and/or other accomplishments. The recipient need not be a member of USAHA, but have a positive impact on animal health related to the work of USAHA.

This year, we would like to honor an individual that exemplifies these characteristics.

Our Federal Partnership awardee for 2013 is an individual that has spent much of his career in the regulatory field. Following graduation from Kansas State University in 1977, he entered private mixed animal practice in Kansas and Missouri for nine years. From there he went to the Texas Animal Health Commission, before joining USDA-APHIS in 1989. After a couple years in Louisiana, he was assigned to the Kansas area office in 1993.

Our honoree is well-recognized across the country, particularly for his work in brucellosis, taking part in RB51 vaccine trials. He is also a mainstay as a presenter for the Brucellosis Epidemiology training courses and mentor for one-on-one training required for designated brucellosis epidemiologists from other states and Mexico. He has been a member of the United States Animal Health Association including the Brucellosis Committee’s Scientific Advisory Sub-Committee since 1996. He has also served on numerous Station and Program State reviews as well as tuberculosis and brucellosis reviews of several Mexican states.

He is a Foreign Animal Disease Diagnostician and has participated in numerous emergency details through the years including; California Tuberculosis Response 2008; New Mexico Tuberculosis Response 2007; Minnesota Tuberculosis Response 2006; Washington State BSE Response 2004; Exotic Newcastle Disease Outbreak – Serving five details in California
and Nevada. I think many of those involved with these outbreaks will attest to his expertise and dedication in serving on these details.

He led the Laboratory Systems Issue Group during the Animal Health Safeguarding Review response, working with State, Federal and AAVLD partners to develop action plans that addressed the Review Recommendations pertaining to the National Animal Health Laboratory Network and laboratory accreditation. He has been on numerous surveillance and diagnostic testing workgroups with state and federal partners.

He continues today as the Kansas Designated Epidemiologist for the cooperative disease programs. Those that have worked with him know him for his willingness to help at the drop of a hat. And perhaps some of you have even sampled some of his fine wine, a personal passion of his.

So without further delay, it is my honor to present Dr. Donald Evans with the 2013 USAHA Federal Partnership 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 Executive Committee has selected a distinguished individual this year for the Medal of Distinction, from among several excellent nominations. We are very grateful for each submission.

This year’s honoree is a celebrity, if there is such a thing, to USAHA and AAVLD, being a member since 1983 and current Lifetime Member. He has worn many hats within USAHA, and throughout his career. From professor, researcher, director, president, chairman...the list goes on...he is a man of many talents...talents he has willingly offered to these organizations.

To quote from his nomination, I think it captures the persona of our awardee very well:

“He is a very passionate person; passionate for the many causes he believes in, passionate about his home state, passionate about bringing colleagues together for the betterment of each other, and passionate about his red wine. He has encouraged countless individuals to become members of USAHA, lauding the benefits of both what the organization can do for them and what they can offer the organization. He has reached out to individuals from different agencies, corporations and other groups - putting them together to achieve success for each others' interests. He knows just about everyone in USAHA and other public health associations and is constantly trying to get everyone to help each other by supporting their strengths. He has in some way, touched most of the members of USAHA either by inviting them to join the organization, soliciting their services for the organization, or working beside them during his many years of membership.”

This year’s honoree is Dr. Don Lein.

Don is a 1957 graduate of Cornell University, hailing from the State of New York. He’s remained tied to his dairy farm roots, but has expanded his
II. A. USAHA/AAVLD PRESIDENT’S RECEISSION AND DINNER

expertise and contributions to many animal health arenas. Since coming out of private practice in 1965, he has held several positions with Cornell University. Notably, he was the associate director of the New York State Diagnostic Laboratory from 1980 until 1987. He was the laboratory’s director until 2000, and came back again in 2001. I think this speaks to his dedication to answer the call to come out of retirement.

This commitment is also evident by his participation on advisory committees and councils for the Food and Drug Administration’s Center for Veterinary Medicine, the National Association of State Departments of Agriculture, and the American Veterinary Medical Association’s Council on Public Health, Regulatory and Military Services. This in addition to his endless committee work within USAHA, and other allied industry organization.

Probably the most distinguishing leadership title he holds is the only individual to serve a president of both USAHA and AAVLD. He continues his contributions today, advocating for Johne’s Disease and Public Health, which have continued to drive the work of USAHA in those areas. His time dedicated to USAHA is nearly endless through the years. I can go on all evening on his accomplishments and service, but I think best it is time to recognize our 2013 Medal of Distinction awardee, Dr. Don Lein.

We are pleased to present you with this award – with the amount of time you’ve contributed to USAHA and animal health, I had to wonder if you’ve found a secret to stopping time in order to do all that you’ve done in your career?

Congratulations, Dr. Lein.
Charlie Hatcher, Tennessee State Veterinarian (l) presents William Hartmann with the 2013 National Assembly Award for his dedicated work in animal health.

Dr. William (Bill) Hartmann graduated from the University of Minnesota (U of M), College of Veterinary Medicine in 1978. After four years in practice, he returned to the U of M where he completed a pathology residency in the Veterinary Diagnostic Laboratory and received his Master’s Degree in Veterinary Anatomic Pathology. He joined the U.S. Department of Agriculture, Veterinary Services as a Veterinary Medical Officer in 1985.

In 1988 he joined the Minnesota Board of Animal Health as a senior veterinarian in charge of ruminant disease programs. Hartmann was appointed Board of Animal Health executive director and state veterinarian in 2001. Under his direction, the Board has detected and fought against diseases such as chronic wasting disease, influenza in poultry and bovine tuberculosis. Hartmann served as USAHA Treasurer in addition to numerous committee leadership roles.
II. B. USAHA/AAVLD Plenary Session
“100 Years of the Virus Serum Toxin Act and Beyond (VSTA)”

The VSTA Act 1913-2013: Intent, Innovations and Impact - Dr. Rick Hill, USDA-APHIS-VS4

The Economics of Vaccination: Why Do We Vaccinate? - Dr. John M. Hardham, Zoetis, International Federation of Animal Health

Rational Development of FMD Virus Vaccines - Dr. Bryan Charleston, Pirbright Institute

Autogenous Vaccines: Isn’t This Why VSTA Was Established? - Dr. John A. Smith, Fieldale Farms

Gap Analysis for High Consequence Diseases - Dr. Luis Rodriguez, USDA-ARS

Future of vaccines: beyond existing regulatory diseases - Dr. Cyril Gay, USDA-ARS
II. B. USAHA/AAVLD PLENARY SESSION

THE VIRUS-SERUM-TOXIN ACT 1913-2013: INTENT, INNOVATIONS, AND IMPACT

Richard E. Hill, Linda Schlater, Mark P. Pagala, Javaraiah Srinivas
Center for Veterinary Biologics, Veterinary Services, APHIS, USDA

“Vaccination” has been spotlighted as one of the top 10 medical discoveries of all time and 2013 marks the 100th year that the USDA has been licensing and permitting quality animal biologics (which includes vaccines). Federal regulation of veterinary biological products in the United States began with the 1913 passage of the Virus- Serum-Toxin Act (VSTA). The law was passed to establish standards and control the importation of products into the U.S. and the interstate distribution of products, while safeguarding against worthless, dangerous, contaminated, and/or harmful veterinary biological products. In the time leading up to the VSTA, Foot and Mouth Disease outbreaks in the northeastern U.S., contaminated and dangerous hog cholera “remedies and cures”, and food safety concerns as portrayed in Upton Sinclair’s novel The Jungle were the news of the day. Such events led to the passage of consumer protection laws such as the Pure Food and Drug and the Federal Meat Inspection Acts of 1906, as well as legislation for both human and veterinary biological products. August 5, 1913, marked the issuance of the first veterinary biological product license for hog cholera serum; within a year approximately 120 licensed products were available for dogs, horses, cattle and pigs. In comparison, today there are nearly 1900 licensed veterinary biological products for the prevention, diagnosis, or treatment of over 215 different diseases in 38 species of animals. Along the way, innovations in vaccinology and veterinary medicine have led to the availability of a wide variety of different types of products and vaccination technologies (e.g. RNA, DNA, and Chimera vaccines, recombinant vectored vaccines with companion diagnostics, cancer vaccines, plant-cell derived, and needleless administration), as well as production methods (e.g., cell culture, bioreactors/fermenters, hybridomas). This presentation will provide a snapshot of the issues that led to the passage of the VSTA a century ago, and highlight the innovations and impacts that veterinary biological products have had on animal health in the United States and the world.
II. B. USAHA/AAVLD PLENARY SESSION

THE ECONOMICS OF VACCINATION: WHAT IS BEHIND THE DEVELOPMENT AND USE OF VACCINES?

John M. Hardham
Global Biologicals Research, Zoetis

Narrative: There are many complex and inter-related factors that drive the discovery, development, licensure, and use of vaccines in the United States. The veterinary vaccine business in the US is a ~$1.3 Billion a year business, representing approximately 25% of the global biological market. The USDA-Center for Veterinary Biologicals regulates the development and use of biological products in the U.S. and licenses approximately 60 new vaccine products each year. The process by which animal health companies discover and develop vaccines will be discussed along with the factors considered for new product concept initiation decisions. Animal health companies invest in a broad portfolio of products in an attrition-based fashion in order to meet regulatory requirements for product licensure. The process of bringing a single product to the market often takes 7-10 years, of which more than 50% will fail. The profit realized from a single product on the market supports broad-based research and development on multiple other products that may or may not make it to market. For veterinarians and producers, the drivers of the decision to utilize USDA approved vaccines as part of a herd health program includes an analysis of the health and economic impact of disease on the animal population. The development and utilization of vaccines plays an important role in protecting the health of both humans and animals as well as safeguarding the U.S. food supply.
Current foot-and-mouth disease (FMD) virus vaccines are highly effective at inducing protective immunity in cattle. A single low microgram dose in adjuvant can generate protection from disease (though not necessarily infection) within 4-5 days. Vaccination is currently reliant on the use of inactivated virus produced in large-bioreactors in high containment facilities; their set-up and running costs, limit the global production capacity. Storage and supply are further constrained by the poor vaccine stability at ambient temperatures. Thus, on several grounds the current vaccine manufacturing situation is unsatisfactory and developments that increase the options available for FMD vaccine production are urgently required. We have performed proof-of-principle experiments for a vaccine produced from non-infectious cultures. The implementation of methods to produce non-infectious FMDV capsids as vaccines, outside of high containment facilities, would significantly lower costs, improve production capacity and eliminate the risks associated with infectious virus during vaccine production. Also, the absence of non-structural proteins from the vaccine antigen means companion Differentiating Infected from Vaccinated Animals (DIVA) diagnostic tests will provide greater certainty of discriminating between vaccinated and infected animals. In addition, our initial work has demonstrated that a non-infectious source of virus capsids allows sequence manipulation to address the issue of antigen stability. X-ray crystallography shows the mutant and wild-type capsids to be essentially the same structure as virus. Implementation of improvements in vaccine stability would reduce the quantity of antigen required per vaccine dose, mainly by reducing losses during production and improving the shelf life of the formulated product. Cattle vaccinated with wild-type and stabilized recombinant capsids showed sustained virus neutralization titres and protection from challenge 34 weeks after immunization. In summary, combined with new tests to facilitate pre-clinical/ pre-transmission diagnosis, these new rapidly deployable recombinant vaccines support a “vaccine to live policy”.

II. B. USAHA/AAVLD PLENARY SESSION

AUTOGENOUS VACCINES: ISN’T THIS WHY VSTA WAS ESTABLISHED?

John A. Smith
Fieldale Farms Corporation

Narrative: Only 0.25% of all doses of animal vaccines, bacterins, and vaccine/bacterin combinations produced in U.S.-licensed establishments in 2012 were classified as autogenous products. Nevertheless, autogenous vaccines and bacterins are increasingly important adjuncts to health maintenance and food safety in the integrated broiler, turkey, and egg industries in the U.S. Almost 11% of all animal bacterins produced in these establishments in 2012 were classified as autogenous products, confirming the importance of autogenous products in this category. The need for autogenous products seems to be increasing; the corresponding figure for autogenous production ten years ago (2002) was 0.18% of all production. There are four main factors driving this need: increasingly rapid evolution of the pathogens (possibly driven in part by large-scale industrial production); changes in the host (in which amazing increases in productive capacity have correspondingly increased the impact of infectious diseases); new management priorities (particularly an increased emphasis on reducing antimicrobial usage and on improving food safety on the farm); and changes in the vaccine industry (particularly consolidation and costs of research and development) and regulatory processes themselves. The U.S. regulations governing the manufacture of autogenous vaccines in 9 CFR 113.113 have served the veterinary profession, the livestock industries, and the regulatory agency well, but the needs of the modern commercial poultry industry should prompt a re-examination of these processes. The need to protect practitioners, clients, and the public from worthless or harmful products, the risks associated with “less-than-fully-licensed products”, and the considerable benefits to be gained from autogenous products must be carefully balanced. The current structure of the integrated poultry industries has greatly reduced the likelihood of an unscrupulous manufacturer foisting a worthless product on an unsuspecting or uneducated user; the data-driven nature of these businesses has greatly decreased the likelihood that a non-efficacious (or harmful) product would go undetected or be tolerated for long; and the large-scale, integrated nature of the businesses requires that both geographical and temporal limits on application need to be interpreted liberally. Our common goals should be to produce autogenous biologicals that are pure and safe and that meet the challenges of emerging or localized diseases in a modern industry, within a regulatory framework that maintains adequate regulatory control while recognizing the current structure and needs of that industry.
II. B. USAHA/AAVLD PLENARY SESSION

USING GAP ANALYSIS TO DRIVE THE SELECTION OF NEW VACCINE TECHNOLOGIES FOR HIGH CONSEQUENCE DISEASES

Luis L. Rodriguez
Foreign Animal Disease Research Unit, Plum Island Animal Disease Center
Agricultural Research Service

Narrative: High consequence animal diseases are complex problems with multiple facets that require specific fit-for-purpose control and eradication strategies. These strategies typically include diagnostics, vaccines, surveillance, biosecurity, animal control, disinfection and disposal of animals. In order to devise the appropriate strategies, it is crucial to know the nature of the disease, its ecology, life cycle, biology and pathogen-host interactions. Gap analysis is an important tool to guide the development of disease countermeasures, as the process helps identify and characterize the threat associated with the disease agent, its epidemiology and the host response to infection and vaccination. Importantly this process identifies the existing countermeasures, including available diagnostics and vaccines, and ranks them in terms of their applicability to disease control and eradication. This information helps emergency veterinary services decide what materials they should include in their stockpile. However, one of the most relevant and consequential aspects of gap analysis is to determine what needs are not being fulfilled by current technologies, what knowledge gaps are there preventing the development of more effective countermeasures and finally what countermeasure technologies are at the laboratory bench level or early development level. This allows veterinary authorities to reach back in the developmental pipeline in order to do strategic investment and move forward those promising countermeasures to a level of development that will make them more appealing for industry to invest and convert these technologies into products that could be added to disease control strategic stockpiles. This process also identified products that could be in global control and eradication efforts, with the potential of offsetting R&D investment with access to global markets in endemic settings. We will illustrate how gap analysis has been used to guide research and development efforts toward the development of countermeasures against two diseases: classical swine fever and foot-and-mouth disease in swine. We will discuss the success and challenges encountered in the process of selecting the best available countermeasures, and when these are not available, developing fit-for-purpose countermeasures.
FUTURE OF VACCINES IN BIODEFENSE AND DISEASE CONTROL PROGRAMS

Cyril G. Gay
Animal Production and Protection, Office of National Programs
Agricultural Research Service

Narrative: Vaccines represent the single most cost-effective countermeasure to respond and mitigate disease outbreaks. In addition, their effective use in disease control programs is paramount to global food security and the safe production of livestock, poultry, and the rapidly expanding aquaculture sectors. Moreover, the threat of emerging zoonotic diseases has renewed interest in the use of animal vaccines as an integral component of biodefense. But are veterinary vaccines up to the challenge? Have tangible advancements been made in the field of veterinary vaccinology? Are there new technologies driving the discovery of new vaccines that will fundamentally change the way we approach the stockpile of veterinary vaccines, prepare for disease outbreaks, and implement disease control programs? This presentation outlines some of the new technologies in the research pipeline, and provides specific examples of new vaccines under development for some of the most important diseases that threaten animal agriculture and the livelihood of people worldwide.
II. C. USAHA Joint Scientific Session Papers, Abstracts, and Posters

1. Papers and Abstracts

Analysis of Breath Volatile Organic Compounds as a Screening Tool for Disease Detection: Preliminary Studies — Jack Rhyan, Pauline Nol, Randal Stahl, Christine Ellis, Matthew McCollum, Hossam Haick, Kurt VerCauteren, M.D. Salman

Bovine Viral Diarrhea Virus (BVDV) in Postweaned Calves in a Feedlot after Vaccination and from Fatal Respiratory Cases: Isolation and Differentiation of Modified Live Viral (MLV) BVDV and Field Strains — Robert Fulton, Julia Ridpath, John Neill, Lurinda Burge, Blake Wilson, Casey Maxwell, D. Step

Comparison of the Ability of a Novel Umbilical Dip, Super7+™ Navel Dip, Verses that of 7% Tincture of Iodine to Desiccate the Umbilical Remnant in Neonatal Holstein Dairy Calves — Julie Gard, Soren Rodning, Debra Taylor, Sue Duran, Brad Fields, Robin Farrell, Misty Edmondson, Megan Schnuelle, Teri Hathcock, Elizabeth Reed, Rebecca Woodall, Alfred Bearden

Designing a Mobile Application for Field Use on Dairies Experiencing a Toxicologic Event — Steven Gallego, Hailu Kinde

Detection of Bovine Tuberculosis Antibody Response in Sensitized Cattle using the IDEXX M. bovis Antibody Test — Jeffrey Nelson

Development and Evaluation of a Blocking Enzyme-Linked Immunosorbent Assay and Virus Neutralization Assay to Detect Antibodies to Viral Hemorrhagic Septicemia Virus (VHSV) — Anna Wilson, Tony Goldberg, Susan Marcquenski, Wendy Olson, Frederick Goetz, Paul Hershberger, Lucas Hart, Kathy L. Toohey-Kurth

Equine and Bovine Fluorosis Attributable to High-Fluoride Well Water in Southern California — Stephanie Ostrowski, Robert Poppenga, Francisco Uzal, Larry Kelly

Iatrogenic Chlorate Poisoning in Three Beef Cows — Steven Gallego, John Tahara, Bruce Hoar, Asli Mete, Birgit Puschner

Immune System Development in Captive Alaskan Reindeer (Rangifer tarandus) — Zoe Purtzer, Gregory Finstad, Carla Willetto, Sophia Papageorgiou, Antony Bakke
II. C. 1. PAPERS AND ABSTRACTS

Impact of Blood Sample Storage Time and Temperature on Detection of Bovine Tuberculosis Antibodies using the IDEXX M. bovis Antibody Test — Jeffrey Nelson

Isolation of Aurantimonas altamirensis, a Brucella canis-like Bacterium from a Canine Testicle — Thomas Reilly, Michael Calcutt, Laura Wennerdahl, Fred Williams, Timothy Evans, Irene Ganjam, William H. Fales

Pathologic Lesions and Pathogenesis of Percutaneous Infection of CD-1 Mice with Western Equine Encephalitis Virus (WEEV) — Tawfik Aboellail, Aaron Phillips, Ann Powers, Kenneth Olson, Amber Rico

Resources for Collecting and Accessioning Single Bulk Milk Samples from Every Commercial Dairy Farm in New York State — Belinda Thompson, Paul Virkler, Elizabeth Lussier, David Smith

Salmonella Dublin Herd Bulk Tank Seroprevalence of New York Dairy Farms — Belinda Thompson, Paul Virkler, Elizabeth Lussier, Diane Kilts, David Smith, Bettina Wagner

Serodiagnosis of Equine Leptospirosis by ELISA using Four Biomarkers — Cuilian Ye, Weiwei Yan, Patrick L. McDonough, Sean P. McDonough, Yung-Fu Chang

Use of a Bovine Viral Diarrhea (BVD) Management Tool: BVD CONSULT — Brad White, Robert Larson, Dale M. Grotelueschen, Sherri Merrill, David Smith, Dan Givens, Richard Randle

Validation of a Field-Deployable POCKITTM Nucleic Acid Detection System for Specific and Sensitive Point-of-Need Detection of Equine Influenza Virus (H3N8) — Udeni BR Balasuriya, Ashish Tiwari, Ashley Skillman, Bora Nam, Li-Juan Ma, Pai-Chun Yang, Alison Lee, Simon Chung, Hsiao Fen Grace Chang, Thomas Wang
II. C. 1. PAPERS AND ABSTRACTS

ANALYSIS OF BREATH VOLATILE ORGANIC COMPOUNDS AS A SCREENING TOOL FOR DISEASE DETECTION: PRELIMINARY STUDIES

Jack C. Rhyan¹, Pauline Nol¹, Randal S. Stahl¹, Christine K. Ellis¹, Matthew McCollum¹, Hossam Haick², Kurt VerCauteren¹, M.D. Salman³

¹National Wildlife Research Center, United States Department of Agriculture, Animal and Plant Health Inspection Service, Fort Collins, CO;
²Department of Chemical Engineering and Russell Berrie Nanotechnology Institute, Technion – Israel Institute of Technology, Haifa, Israel;
³Animal Population Health Institute, Colorado State University College of Veterinary Medicine and Biomedical Sciences, Fort Collins, CO

Narrative: Unique volatile organic compounds (VOCs) or unique patterns of VOCs in the breath have been associated with certain neoplasms and diseases in humans. Additionally, sera from animals with brucellosis and Johnes disease have been found to have distinguishing VOCs. We conducted two limited pilot experiments to examine the breath of animals exposed to or infected with Mycobacterium bovis and one study of animals exposed to or infected with Brucella abortus. In all studies, samples were collected in a sorbent (TenaxR) and analyzed with gas chromatography/mass spectrometry (GC/MS) and, in two studies, an electronic nose that utilizes a series of nanoparticle sensors (NaNose™). The first experiment involved the collection of breath samples from ten culture or PCR positive cattle and four negative cattle from a dairy naturally infected with M. bovis in southern Colorado and from 13 negative cattle from two dairies in northern Colorado. GC/MS analysis identified two VOCs associated with infection and two with health. The NaNose™ identified all infected cattle with 21% false positives in the controls. The second experiment sampled the breath of 16 animals experimentally-infected with M. bovis (eight with strain 97-1315 and eight with strain 10-7483) and seven controls. GC/MS analysis differentiated infected from control animals and distinguished between animals infected with the different strains. In the third experiment, we collected breath samples from 20 B. abortus seropositive and 17 seronegative bison. GC/MS detected different patterns of VOCs in seropositive and negative bison. The NaNose™ identified all but two seropositive animals with no false positives. Results of these pilot studies are promising. If this technology proves successful, potential applications include screening of individual animals, and wild populations for the presence of specific diseases.
II. C. 1. PAPERS AND ABSTRACTS

**BOVINE VIRAL DIARRHEA VIRUS (BVDV) IN POSTWEANED CALVES IN A FEEDLOT AFTER VACCINATION AND FROM FATAL RESPIRATORY CASES: ISOLATION AND DIFFERENTIATION OF MODIFIED LIVE VIRAL (MLV) BVDV AND FIELD STRAINS**

Robert W. Fulton¹, Julia F. Ridpath⁴, John Neill⁴, Lurinda J. Burge¹, Blake Wilson³, Casey Maxwell³, D. L. Step²

¹Veterinary Pathobiology, Oklahoma State University, Stillwater, OK;  
²Veterinary Clinical Sciences, Oklahoma State University, Stillwater, OK;  
³Animal Sciences, Oklahoma State University, Stillwater, OK;  
⁴National Animal Disease Center, USDA, Ames, IA

**Narrative:** Viral infections are important etiologies in bovine respiratory disease cases. Calves at stocker/feedlot entry usually receive modified live viral (MLV) vaccines containing *Bovine herpesvirus-1* (BoHV-1), *Parainfluenza- 3 virus* (PI3V), *Bovine viral diarrhea virus* (BVDV), and *Bovine respiratory syncytial virus* (BRSV). In a 2012 study, 516 head arrived over a one-week interval from six sale barns in the state by a single buyer. Calves received a five-way BRD MLV BoHV-1, PI3V, noncytopathic (NCP) BVDV1a and 2a, BRSV vaccine at processing. There were 343 calves treated for BRD (66.5%) and 332 head treated in the first 21 days. Of 516 calves, 72 died with 68 respiratory cases (12.2% of 516). There were 15 sentinel calves monitored for viruses with nasal swabs (NS) and serologic testing after arrival. Nasal swabs and respiratory tissue homogenates were inoculated onto MDBK and HRT monolayers. Viruses were confirmed in cultures by PCR for BVDV, PI3V, BRSV, and *Bovine coronavirus* (BoCV). BVDV isolates were subtyped and positives compared to MLV strains. BVDV and BoCV serology was performed using paired samples. There were 12 of 15 sentinels (80%) between days (d) 9-11 after vaccination with MLV NCP BVDV1a in NS. One calf's NS was positive for PI3V and BRSV. All sentinels seroconverted to BVDV1a and 7 of 15 (46.7%) to BoCV. There were 37 tissue sets available for virus isolation from calves dying from d 8 to d 47. Lungs from nine calves were positive for NCP BVDV1: 7 MLV NCP BVDV1a and 2 BVDV1b. Lungs from four calves were PI3V positive, one BRSV, and one BoCV. The shipments had one persistently infected BVDV calf. This study found multiple viruses from post-weaned calves within 1-2 weeks after MLV vaccination. MLV vaccine strains should be differentiated from field strains. Viral genome sequences of MLV vaccines should be available permitting PCR and sequencing. In this study MLV NCP BVDV1a vaccine strain was recovered indicating viral shed in nasal swabs and tissues from dying calves.
II. C. 1. PAPERS AND ABSTRACTS

COMPARISON OF THE ABILITY OF A NOVEL UMBILICAL DIP, SUPER7+™ NAVAL DIP, VERSES THAT OF 7% TINCTURE OF IODINE TO DESICCATE THE UMBILICAL REMNANT IN NEONATAL HOLSTEIN DAIRY CALVES

Julie A. Gard¹, Soren P. Rodning², Debra Taylor¹, Sue Duran¹, Brad Fields³, Robin Farrell⁴, Misty Edmondson¹, Megan Schnuelle¹, Teri Hathcock¹, Elizabeth Reed¹, Rebecca Woodall¹, Alfred Bearden¹

¹Clinical Sciences, Auburn University, Auburn, AL; ²Animal Science, Auburn University, Auburn, AL; ³Agriculture and Industries, Alabama State Department, Montgomery, AL; ⁴School of Nursing, Troy University, Troy, AL

Narrative: Reduction of naval infections through appropriate management including naval dipping is beneficial to the calf and the producer and is reported to decrease naval infection rates from 20-28% to 5-14%. Obviously, naval dipping is of great importance but obtaining tincture of iodine has become problematic. It has become necessary to develop other products that can be utilized to dry the umbilicus and assist in the prevention of navel infections. Therefore, the aim of this study was to evaluate an alternative to 7% tincture of iodine, Super7+™ Navel Dip. A total of a 100 neonatal Holstein heifers were utilized in this study. Fifty calves were dipped with Super7+™ Navel Dip immediately following calving and 50 were dipped with 7% tincture of iodine. The umbilicus and the umbilical remnant of all calves were evaluated 48 hours following dipping and at least a 1 cm segment of umbilical remnant was removed and placed in a labeled airtight container. All samples were analyzed within six hours of sampling and in 12 hour increments until the samples contained less than 10% moisture. A serum sample was collected from each calf within 48 hours of birth and tested for total protein and specific gravity. Upon evaluation, the umbilical remnants of all calves were completely desiccated by 60 hours following calving. Of the remnants dipped with 7% tincture of iodine 58% and 42% were desiccated by 48 hours and 60 hours, respectively. Of the remnants dipped with Super7+™ Navel Dip 88% and 12% were desiccated within 48 hours and 60 hours, respectively. Dipping with Super7+™ Navel Dip increased the percentage of calves having a desiccated umbilicus by 30% over that of tincture of iodine. Additionally, the umbilical remnants of all calves utilized in this study had no evidence of infection in the calves having a low total protein (less than 5.0 g/dL). The range of total protein was 4.5 to 7.2 g/dL and the range of specific gravity was 1.032 to 1.048. Additionally, there was no evidence of dermal irritation around the skin surrounding the umbilicus or any other area that may have contacted Super7+™ Navel Dip. Super7+™ Navel Dip appears to be superior to tincture of iodine in its ability to more quickly desiccate the umbilical remnant. Hence, Super7+™ Navel
II. C. 1. PAPERS AND ABSTRACTS

Dip appears to function competently as a navel dip and is a viable alternative to 7% tincture of iodine.
II. C. 1. PAPERS AND ABSTRACTS

DESIGNING A MOBILE APPLICATION FOR FIELD USE ON DAIRIES EXPERIENCING A TOXICOLOGIC EVENT

Steven Gallego¹, Hailu Kinde²

¹Toxicology, California Animal Health and Food Safety Laboratory System, University of California, Davis, CA; ²California Animal Health and Food Safety Laboratory System, University of California, San Bernardino, CA

Narrative: Large scale toxic events on dairies can be difficult emotionally and financially. Many of the pathologies that affect animals manifest themselves over predictable time frames; conversely, toxic events can appear quite suddenly and unexpectedly. Severity of toxic signs can range from nonclinical to clinical. Mortality rates can vary, but in today’s concentrated animal feeding units, high mortalities can be devastating. In addition to the potential disruption of milk shipped and cows lost, a toxic event also presents a possible food safety and public health issue that potentially erodes consumer confidence. Quick and accurate assessment of a toxic event is crucial for the health of both the animals and people consuming products derived from affected animals. The objective of this paper is to describe a smartphone or tablet downloadable app designed to assist field personnel encountering a toxic event. Currently, there are no apps available to veterinarians for food animal diagnostics. Using data from the California Animal Health and Food Safety (CAHFS) Laboratory System, a mobile app was designed to assist veterinarians to diagnose the most common causes of large scale toxic events on California dairies. This app provides practitioners an opportunity to harness the power of the web to address a toxic event. Using the app design program Mobione from Genuitec, an app was constructed with “list” menus linked to abridged descriptions of the most common toxins and toxicants encountered by California’s dairy cattle, guidance for sample collection and tests selection, shipping information, critical food safety information, carcass disposal information, relevant literature about the suspected toxic agent and a quiz section provided for self-assessment. Additionally, this app provides direct phone contact with expert advice from CAHFS, university and California Department of Food and Agriculture personnel for real time field support. Such an app can help resolve a toxic event rapidly and confidently, minimize suffering or losses of animals, mitigate risk of public health/food safety issues, and bolster consumer confidence in California’s dairy industry.
II. C. 1. PAPERS AND ABSTRACTS

DETECTION OF BOVINE TUBERCULOSIS ANTIBODY RESPONSE IN SENSITIZED CATTLE USING THE IDEXX M. BOVIS ANTIBODY TEST
Jeffrey T. Nelson
USDA-APHIS-VS National Veterinary Service Laboratory (NVSL) Ames, IA

**Narrative:** The Veterinary Services bovine tuberculosis (TB) program staff is in the process of evaluating new serologic tests that detect antibodies specific to *Mycobacterium bovis* in cattle. Several studies in cattle have shown that levels of antibodies developed during bovine TB infection increase after stimulation by the tuberculin injection administered as part of routine TB skin testing. Collecting information on the formation and decline of this antibody response over time will be helpful to identify a “best time to collect” serum samples in order to detect cattle that may be truly infected with *M. bovis* but have a negative skin test or negative gamma interferon response. Heparinized blood and serum samples were collected from cattle sensitized to bovine TB and avian TB prior to any tuberculin stimulation and then at nine, 16, and 23 days after injection. Samples were also collected at four week intervals after tuberculin injection for six months to determine the length of the stimulation effect. It was noted that antibody levels increased as measured on the IDEXX *M. bovis* Ab test on both bovine TB and avian TB sensitized cattle and peaked between nine and 16 days after tuberculin injection. This time period may be optimal to collect blood samples after tuberculin injection to detect cattle that may truly be infected with *M. bovis*. 
DEVELOPMENT AND EVALUATION OF A BLOCKING ENZYME-LINKED IMMUNOSORBENT ASSAY AND VIRUS NEUTRALIZATION ASSAY TO DETECT ANTIBODIES TO VIRAL HEMORRHAGIC SEPTICEMIA VIRUS (VHSV)

Anna E. Wilson¹, Tony L. Goldberg¹, Susan Marcquenski², Wendy Olson³, Frederick Goetz⁴, Paul Hershberger⁵, Lucas Hart⁵, Kathy L. Toohey-Kurth⁶

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Narrative: Viral hemorrhagic septicemia virus (VHSV) is the target of surveillance by many state and federal agencies in the U.S. Currently, detection of VHSV relies on virus isolation and only indicates current infection status. A serological method is required to ascertain prior exposure; however, no blocking ELISAs for detection of antibodies to VHSV have been reported. Here, we report the development of two serologic tests for VHSV that are non-lethal, rapid, and species-independent: a virus neutralization assay (VN) and a blocking enzyme-linked immunosorbent assay (ELISA). Serum was collected from 34 uninfected fish (VHS negative group) and 28 fish that survived VHS virus infection (VHS positive group). The VN did not detect neutralizing antibodies in the serum of any of the 34 fish in the VHSV negative group, demonstrating the test specificity was 100%. The VN detected neutralizing antibodies in the serum from 12 of 28 fish in the VHS positive group, indicating the sensitivity of the test was 42.9%. The anti-nucleocapsid blocking ELISA did not detect non-neutralizing VHSV antibodies in the serum of 30 of the 34 fish in the VHS negative group, indicating a specificity of 88.2%. Non-neutralizing antibodies were detected in the serum of 27 of the 28 fish in the VHS positive group, indicating the test sensitivity was 96.4%. Used in parallel, the VN and ELISA correctly identified all survivors of VHSV infection and unexposed fish. Our VN and ELISA are valuable tools for assessing exposure to VHSV in fish and should improve detection and surveillance efforts for both wild and commercial fish populations.
II. C. 1. PAPERS AND ABSTRACTS

EQUINE AND BOVINE FLUOROSIS ATTRIBUTABLE TO HIGH-FLUORIDE WELL WATER IN SOUTHERN CALIFORNIA

Stephanie R. Ostrowski¹, Robert H. Poppenga², Francisco Uzal³, Larry H. Kelly⁴

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⁴Veterinary Services, Lomita, CA

Narrative: Dental and skeletal fluorosis adversely impacts health, productivity, and quality of life for millions of people and their livestock throughout the world. However in North America, cases of fluoride (F) toxicosis in horses and cattle are only rarely recognized or described; most published case reports pre-date 1980. Dental lesions are the most sensitive and clinically useful indicator of excess exposure to F. Horses and beef cattle raised on southern California desert ranches were observed to have lesions consistent with dental fluorosis. Nearby municipal drinking water is de-fluoridated to <4 ppm (mg/L) in compliance with EPA and USPHS safe drinking water standards. Samples obtained from livestock water sources on Ranch X had 12-14 ppm (mg/L) F, more than three times the concentration in municipal drinking water. Two locally-raised horses (A, 16 yr. gelding; B, 9 yr. mare) and a 4 yr. old beef cow (Cow C) were evaluated for dental fluorosis. Horse A and Cow C had consumed Ranch X water (12-14 ppm F) throughout their lives; Horse B was raised nearby and consumed de-fluoridated municipal water (<4 ppm F). Lesions consistent with published standards for dental fluorosis (pitted, hypoplastic, and stained enamel) affected the incisor teeth of Horse A and Cow C. Post mortem samples of urine, bone, and incisor teeth from all three animals were submitted for toxicological analysis. Tooth samples from Horse A and Cow C measured 1700 and 2400 ppm F, respectively; (normal population reference values, 400-1200 ppm). Analysis of multiple samples of dry fat-free bone measured 2600-4200 ppm F for Horse A, and 5300-5800 ppm F for Cow C. Based on reference values of 3000-5000 ppm (bone) for fluorosis, these results are diagnostic. Analytical results for tooth and bone samples from Horse B (130-920 ppm F) did not exceed published normal values. Other potential sources of excess dietary F which were considered include rock phosphate-based mineral supplements, and forages (e.g., hay) fertilized with high-fluoride rock phosphate. Routine use of commercial mineral supplements was ruled out, but no data was available to evaluate the F content of commercial forages consumed by these animals throughout their lifetimes. As a micronutrient, F has a very
II. C. 1. PAPERS AND ABSTRACTS

narrow margin of safety; the F concentration in Ranch X livestock drinking water is 6-7 times higher than the 2 ppm currently recommended by the National Academy of Science and the U.S. EPA. Lifetime exposure to 12-14 ppm F was sufficient to cause both dental and skeletal fluorosis in the two animals submitted from Ranch X. These findings potentially have broader implications regarding high F in livestock drinking water as a limitation to animal health and livestock production in southern California.
II. C. 1. PAPERS AND ABSTRACTS

IATROGENIC CHLORATE POISONING IN THREE BEEF COWS
Steven Gallego¹, John Tahara¹, Bruce Hoar³, Asli Mete¹, Birgit Puschner¹, ²

¹California Animal Health and Food Safety Laboratory System, Davis, CA; ²Molecular Biosciences, School of Veterinary Medicine, Davis, CA; ³Western Institute for Food Safety and Security, Davis, CA

Narrative: Ingestion of experimental sodium chlorate in food animal species as a pre-slaughter feed supplement for reducing fecal Enterobacteriaceae shedding has become the focus of food safety investigations. Poultry, swine, large and small ruminant chlorate feeding trials have shown 100 to 1000 fold reductions of Escherichia coli 0157:H7 and Salmonella typhimurium. However, ingestion of chlorate in excess of 1 g/kg bodyweight can cause death in cattle. Ironically, ruminants appear to crave the taste of chlorate salts when given access. A group of ten 2-3 year old Angus cows previously pastured were moved into a pen and offered grass hay and water ad libitum. Sodium chlorate was added to two water tanks at an intended concentration of 10.6 g/L (equivalent to 8.3 g sodium chlorate/L water). Three of the ten cows, weighing 390, 485, and 526 kg, were found dead approximately 18 hours later. The remaining seven cows appeared clinically unaffected. All three cows, and hay and water samples, were submitted to the California Animal Health and Food Safety Laboratory for diagnostic work-up. Gross findings included firm gas distention and severe bloat, brown colored blood, and brown discoloration of all organs. Other than moderate erythrophagocytosis, no histological lesions were present. A sensitive ion chromatography method was developed for the simultaneous detection of chlorate, chloride and nitrate in gastrointestinal contents, feed, liver, kidney and ocular fluid. Chlorate concentrations were as follows: 360, 280, and 330 mg/L in aqueous humor; 720, 630, and 790 mg/kg (wet weight) in rumen contents; 130, 76, and 140 mg/kg (wet weight) in kidneys; 900 mg/kg (as fed) in hay; and 8,600 and 28,000 mg/L in two separate water samples. The livers contained no chlorate at the method detection limit of 30 mg/kg. The chlorate concentrations in the three cows were consistent with overexposure to chlorate. Assuming a water consumption of 19 L/day (5 gallons), the cows ingested 1.4, 1.1, and 1.1 g/kg of chlorate respectively from the high chlorate-containing water source. The reported oral lethal dose of chlorate in cattle is 1 g/kg body weight. While the use of sodium chlorate has great promise to decrease the number of pathogens in the slaughtering environment, caution must be taken to avoid potentially lethal overexposure. Results from this case investigation provide critical data for future monitoring and interpretation of tissue chloride, and chlorate concentrations.
IMMUNE SYSTEM DEVELOPMENT IN CAPTIVE ALASKAN REINDEER
(RANGIFER TARANDUS)
Zoe Purtzer1, Gregory L. Finstad2, Carla Willetto3, Sophia Papageorgiou4,
Antony C. Bakke1

1Pathology, Oregon Health and Science University, Portland, OR;
2High Latitude Research, University of Alaska, Fairbanks, AK;
3Center for Research Services, University of Alaska, Fairbanks, AK;
4School of Veterinary Medicine, University of California, Davis, CA;

Narrative: Reindeer (Rangifer tarandus) have evolved in high latitude
ecosystems and their immune systems may differ from species that have
evolved in more temperate climates. In order to understand the impact of
new and emerging diseases on an individual species, it is important to
characterize their immune systems to establish baseline numbers for calves
and adult reindeer. The purpose of this study was to illustrate how the
immune system develops, functions and modulates over time. Our study
consisted of calves (n=47) and adult groups ranging from 1-12 years old
(n=84). Blood was collected by venipuncture; mononuclear cells isolated,
incubated with fluorescent monoclonal antibodies and analyzed by flow
cytometry. The monoclonal antibodies used to identify cell subpopulations
based on plasma membrane proteins included: CD45 (all white blood cells),
CD4 (T-helper), CD8 (T-cytotoxic), CD45RO (memory), CD62L (lymph node
homing), IgM (B-cells) and MHCII (activated T-cells and monocytes). Our
study revealed multiple changes in lymphocyte subpopulations during
maturation of the immune system. The fraction of CD4+ T cells increases
with age until the animals are >2 years old (calves = 28.5% vs. 2 yo = 34.1%,
p<0.001). The fraction of CD8+ T cells dips slightly at one year of age, but
then returns to the previous level (calves = 19.6% vs. yearling = 16.5%,
p=0.02). In calves, 69.6% the CD4+ T cells are naive, but this drops to 48.7% in
6-12 yo adults. Conversely, the effector and senescent T cell groups
increase significantly with age (calf = 13.2% vs. 6-12 yo = 47.6%, p<0.001).
B-cells produce antibody in response to infections and increase with age,
possibly due to antigen exposure (calves = 12.1% vs. 6-12 year old = 18.1%,
p=0.01). Monocytes are important early responders to infection acting as
antigen presenting cells. They were relatively higher in calves (44.8%), and
decrease with age to a level of 32.8% in 6-12 year old adults (p=0.01). To
further characterize response to infection, we studied animals before and
during episodes of clinical infection. In the majority of cases, CD8+ T-cells
increased during infection leading to an inverted CD4/CD8 ratio. The fraction
of B-cells also increases significantly. Understanding the maturation and
function of lymphocyte subpopulations may assist future research to
elucidate how reindeer will respond to new and emerging diseases.
IMPACT OF BLOOD SAMPLE STORAGE TIME AND TEMPERATURE ON DETECTION OF BOVINE TUBERCULOSIS ANTIBODIES USING THE IDEXX M. BOVIS ANTIBODY TEST

Jeffrey T. Nelson
National Veterinary Services Laboratory, USDA, Ames, IA

Narrative: Rapid sample submission of blood or serum samples after collection is thought to be critical to obtain results that are minimally affected by degradation during storage and shipping to the laboratory for testing. It is also theorized that once blood is collected from an animal, antibodies will degrade if the serum remains on the clot for an extended time period. Blood was collected in red top blood tubes from cattle sensitized to bovine or avian tuberculosis. Serum was harvested from tubes the day it was collected and subsequently at 1, 2, 3, 4, 7, and 14 days after collection and storage at 4°C, 23°C, and 37°C on the clot. The serum samples harvested from the various tubes were analyzed using the IDEXX M. bovis Ab Test. The results of the project demonstrated that the antibody levels that the IDEXX M. bovis Ab test detected remained consistent even when the serum was harvested after an extended storage time or when the sample was subjected to different storage temperatures. These data suggest that sample handling or shipping issues should not affect the results of blood samples being analyzed by the IDEXX M. bovis Ab test if they are tested within two weeks of being collected.
II. C. 1. PAPERS AND ABSTRACTS

ISOLATION OF AURANTIMONAS ALTAMIRESIS, A BRUCELLA CANIS-LIKE BACTERICIUM FROM A CANINE TESTICLE

Thomas J. Reilly, Michael J. Calcutt, Laura Wennerdahl, Fred Williams, Timothy Evans, Irene K. Ganjam, William H. Fales

Veterinary Medical Diagnostic Laboratory, University of Missouri, Columbia, MO

Narrative: Aurantimonas altamirensis is a Gram-negative cocccobacillary organism recovered from aquatic environments and infrequently reported as a clinical isolate in human medicine. Since the first description of the species in 2006, a limited number of case reports have been published, including isolation from blood, pleural fluid, contact lenses, lens cleansing solution, and trauma-induced corneal ulcers; the clinical-relevance, however, remains uncertain. Here we report the isolation of A. altamirensis from testicular tissue (obtained at time of castration) of a two year old Border Collie presenting with fever, sore toes, and scrotal swelling. The bacteriologic culture, plated on Blood Agar MacConkey, and Brucella agar (incubated in the presence of 5% CO2) resulted in light bacterial growth on the latter medium after ~2-3 days incubation. The smooth 2-3 mm diameter colonies were nonhemolytic, KOH and oxidase positive, Gram-negative cocccobacilli and were weakly agglutinated when tested with anti-Brucella canis antiserum. Like B. canis, the isolate was also found to be urease positive though significantly delayed (~60 min) compared to those of the urease-enriched (~1-5 min) Brucellae species (canis and suis). When subjected to the Trek Diagnostic Gram-negative AP80/Sensititre Aris 2X automated microbial identification system, the isolate was identified as Psychrobacter phenylpyruvicus. While the tissue was also found upon histopathological examination to harbor Blastomyces dermatitidis, it was deemed essential, given the presumptive isolation and identification of B. canis from the patient to empirically exclude this canine pathogen from further diagnostic consideration. The isolate was subjected to 16S rRNA sequencing and found to be 100% identical over 1152 base pairs with Aurantimonas altamirensis, an organism originally discovered in the microbial wall growth in the Spanish cave of Altamira. The rRNA sequence was 91% identical to those derived from B. canis. Although previously reported as an environmental and human isolate, this communication represents the first reported isolation from a veterinary specimen and while of unknown clinical significance with respect to the etiology of the infection, it highlights the critical importance in this case to unambiguously identify the microbe for diagnostic, epidemiological, infection control and public health purposes.
II. C. 1. PAPERS AND ABSTRACTS

PATHOLOGIC LESIONS AND PATHOGENESIS OF PERCUTANEOUS INFECTION OF CD-1 MICE WITH WESTERN EQUINE ENCEPHALITIS VIRUS (WEEV)

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¹Colorado State University, Fort Collins, CO; ²Division of Vector-Borne Infectious Diseases, Centers for Disease Control, Fort Collins, CO

Narrative: Western equine encephalitis (WEE) virus (Alphavirus; Togaviridae) is a mosquito-borne virus that is capable of causing severe encephalitis in humans and equids. Although some aspects of the pathogenesis have been elucidated for other alphaviruses, the mechanism of WEE neuroinvasion largely remains elusive. A model describing the pathogenesis of neurovirulent, firefly luciferase (FLUC)-expressing WEE McMillian strain (McM), following respiratory exposure, has been recently developed in outbred CD-1 mice at Colorado State University (CSU). A percutaneous model requiring re-engineering of the viral construct to increase transgene stability has also been successfully produced at CSU. After inoculating ten outbred CD-1 mice in the foot pad with 10⁴ PFU of WEE.McM.FLUC, daily whole body plus ex vivo imaging at the time of euthanasia of affected mice was conducted. Luciferase activity indicates a consistency of the distribution of the viral antigen in the inoculated leg and CNS of infected mice. Local reaction of multifocal panniculitis, myositis and rare perineuritis is observed in the ipsilateral foot. Neuronal necrosis and multifocal lymphocytic to neutrophilic meningoencephalitis corresponding to the areas of virus bioluminescence is further confirmed via immunohistochemistry using a monoclonal antibody against WEE. The most affected areas are concentrated at the floor of the brain mainly in the mid brain and cerebellar peduncle early in the infection (nine animals) with rare involvement of the olfactory bulb and cerebrum (one animal) late in the course of the disease. Control animals show neither bioluminescence nor pathology in the inoculated leg or central nervous system (CNS). The data indicate that, following the initial viremia, the virus enters the CNS in 72-108 hours post inoculation (PI) via fenestrated capillaries at sites where blood-brain barrier is naturally absent. These areas are namely the area of postrema, median eminence, neurohypophysis, pineal body, subfornical organ, commissural organ and supraoptic crest. Luciferase activity can persist in some mice up to 25 days PI. Mapping of the CNS lesions in relation to the viral antigen is crucial to understand the pathogenesis of alphaviruses neuroinvasion in general and WEE encephalitis in specific.
RESOURCES FOR COLLECTING AND ACCESSIONING SINGLE BULK MILK SAMPLES FROM EVERY COMMERCIAL DAIRY FARM IN NEW YORK STATE

Belinda S. Thompson\textsuperscript{1}, Paul Virkler\textsuperscript{1}, Elizabeth A. Lussier\textsuperscript{2}, David Smith\textsuperscript{3}

\textsuperscript{1}Population Medicine and Diagnostic Sciences, Cornell University - Animal Health Diagnostic Center, Ithaca, NY;
\textsuperscript{2}AHPIS - VS, United States Department of Agriculture, Albany, NY;
\textsuperscript{3}Division of Animal Industry, New York State Department of Agriculture and Markets, Albany, NY

Narrative: The control of contagious diseases of high consequence such as foot and mouth disease requires accurate classification of herds as either infected or uninfected. In the dairy industry in the U.S., it has been proposed that bulk tank milk sample screening by regulatory agencies for either pathogens or antibodies may be a useful tool for accurately classifying herd infection status. Additionally, this classification of herds of animals has been included in planning for the maintenance of movement of perishable dairy products for human consumption in the cooperative industry initiative called the Secure Milk Supply. It will be important for state and federal animal health officials and industry planners to understand the effort required to collect and handle appropriate specimens to achieve the goal of classifying herds accurately. We solicited, collected, transported and accurately accessioned individual bulk milk samples from approximately 5,100 commercial dairy herds in New York State for a disease prevalence study during the period from January 15, 2013 to May 30, 2013. Samples were obtained by a trained technician visiting the laboratories of the milk processors where individual bulk tank samples are subjected to milk quality testing. Cooperating processors were notified in advance and agreed to participate with sample collection. While the time frame for collection was over several months, the intent was to actually measure the number of visits and the time required to collect a single sample from every bulk milk tank. Since repeat sampling was not the intent of the project, repeat visits to processing plants represent the effort to follow up and collect samples not available during prior visits. A total of approximately 215 hours and 32 trips were required to communicate with processing plants, visit them, collect samples, and deliver them to the diagnostic laboratory. Samples representing 4,896 herds (95\%) out of a reported 5,152 total New York commercial dairy herds were collected. Problems associated with sample collection and matching with herds included herds with multiple bulk milk tanks not being consistently identified with bar coding conventions between the various processors, not all samples being bar coded, no single central list of producers and the codes used to identify their bulk tank samples, hard copy rather than electronic lists of producers to determine which herd or tank
samples were missing. In addition, samples crossing state lines complicated sample collection and contributed to the failure to sample every herd.
II. C. 1. PAPERS AND ABSTRACTS

**SALMONELLA DUBLIN HERD BULK TANK SEROPREVALENCE OF NEW YORK DAIRY FARMS**

Belinda S. Thompson¹, Paul Virkler¹, Elizabeth A. Lussier², Diane Kilts¹, David Smith³, Bettina Wagner¹

¹Population Medicine and Diagnostic Sciences, Animal Health Diagnostic Center, Cornell University, Ithaca, NY;
²APHIS-VS, United States Department of Agriculture, Albany, NY;
³Division of Animal Industry, New York State Department of Agriculture and Markets, Albany, NY

**Narrative:** *Salmonella* Dublin (SD) is a serotype of *Salmonella* that is host-adapted to develop persistent carrier infections in subclinical bovines. It can cause serious disease outbreaks with high morbidity and mortality in young stock, and abortions or morbidity and mortality in older cattle. There are also food safety concerns related to SD, a zoonotic pathogen that can cause serious human illness or death. A high morbidity and mortality outbreak has been associated with people consuming unpasteurized milk, and it is identified as one of the top three *Salmonella* serotypes found in beef products, notably ground beef. It also has the potential to infect and cause serious illness in cattle care workers exposed to infectious excretions of SD-infected cattle. Prevalence data at the individual cow level or at the herd level is not available for dairy or beef cattle in the U.S. A commercial SD ELISA test was validated for testing serum, individual milk samples or bulk tank milk for the presence of anti-SD antibodies in bovine samples. Identity blinded bulk tank samples from a single milk pick-up were solicited from milk processors for all New York State bovine dairy herds licensed to sell milk commercially. Samples were collected between January 15 and May 30, 2013. The samples were tested using the SD ELISA assay. Preliminary analysis of the data for SD seropositivity indicates a single-sample seropositive herd prevalence of less than 1% with close to 100% of herds represented.
SERODIAGNOSIS OF EQUINE LEPTOSPIROSIS BY ELISA USING FOUR BIOMARKERS

Cuilian Ye¹, Weiwei Yan¹, Patrick L. McDonough¹, Sean P. McDonough², Yung-Fu Chang¹

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²Biomedical Sciences, Cornell University, Ithaca, NY

Narrative: Leptospirosis caused by Leptospira spp. is one of the most common zoonosis in the world. In a previous study, we have developed an indirect ELISA for the diagnosis of equine leptospirosis (development of an ELISA using recombinant LigACon4-7.5 as antigen for the diagnosis of equine leptospirosis, CVI, in Press). In this study, we have applied four outer membrane proteins, LipL21, LoaL22, LipL32 and LigACon4-8 of L. interrogans to evaluate their potential to be used as antigens for the diagnosis of equine leptospirosis. We have evaluated with equine sera (n=130) that were microscopic agglutination test (MAT)-negative and sera (n=176) that were MAT-positive to the five serovars that most commonly cause equine leptospirosis. The sensitivity and specificity of ELISA were 84.09% and 70.45% when using LipL21; 78.41% and 56.82% when using LoaL22; 77.84% and 64.02% when using LipL32, and 82.39% and 64.77% when using LigACon4-8, respectively compared to MAT. In conclusion, we have developed an indirect ELISA utilizing a recombinant LipL21, LoaL22, LipL32 and LigACon4-7.5 as diagnostic antigens for equine leptospirosis. This ELISA assay was found to be sensitive, specific and concurred with the results of the standard MAT.
II. C. 1. PAPERS AND ABSTRACTS

USE OF A BOVINE VIRAL DIARRHEA (BVD) MANAGEMENT TOOL: BVD CONSULT

Brad White\textsuperscript{1}, Robert Larson\textsuperscript{1}, Dale M. Grotelueschen\textsuperscript{2}, Sherri Merrill\textsuperscript{1}, David Smith\textsuperscript{3}, Dan Givens\textsuperscript{4}, Richard Randle\textsuperscript{5}

\textsuperscript{1}Clinical Sciences, Kansas State University, Manhattan, KS; \textsuperscript{2}Great Plains Veterinary Educational Center, University of Nebraska, Clay Center, NE; \textsuperscript{3}Pathobiology and Population Medicine, Mississippi State University, Starkville, MS; \textsuperscript{4}College of Veterinary Medicine, Auburn University, Auburn, AL; \textsuperscript{5}Veterinary and Biomedical Sciences, University of Nebraska, Lincoln, NE

\textbf{Narrative:} Bovine viral diarrhea (BVD) virus infection is responsible for a variety of economically important syndromes in beef herds. The cattle industry and veterinary profession have made significant efforts in recent years to control BVD based on research that has provided a more complete understanding of the epidemiology of BVD, enhanced availability of diagnostic tests for detecting persistently infected (PI) cattle, and incorporation of biosecurity and biocontainment principles into control strategies. BVD CONSULT (Collaborative, Online, Novel, Science-based, User-friendly, Learning, Tool) is an internet-based decision tool, designed to aid development of BVD control programs for cow-calf herds. The BVD CONSULT organizes available BVD control recommendations based on available research into a user-friendly interactive format to develop BVD prevention and control programs customized for individual herds that emphasizes key management decisions that impact the success of these programs. BVD CONSULT was designed to mimic a conversation between a veterinarian and a producer by asking if the producer is willing and able to perform specific management practices that will aid in prevention or control and eradication of BVD. After clicking on “yes” or “no” to each question, an appropriate response is given based on the choices that have been made, followed by another question. A printable report is available at the end of the tool which records the choices that were made and the responses that were given. BVD CONSULT can be found at the website, www.bvdinfo.org which contains information about BVD from peer-reviewed articles as well as white papers and popular press articles.
VALIDATION OF A FIELD-DEPLOYABLE POCKIT™ NUCLEIC ACID DETECTION SYSTEM FOR SPECIFIC AND SENSITIVE POINT OF NEED DETECTION OF EQUINE INFLUENZA VIRUS (H3N8)

Udeni BR Balasuriya¹, Ashish Tiwari¹, Ashley Skillman¹, Bora Nam¹, Li-Juan Ma², Pai-Chun Yang², Alison Lee², Simon Chung², Hsiao Fen Grace Chang², Thomas Wang²

¹Maxwell H. Gluck Equine Research Center, Veterinary Science, University of Kentucky, Lexington, KY; ²GeneReach USA, Lexington, MA

Narrative: Equine influenza (EI) is an acute, highly contagious viral respiratory disease of equids. Currently, *Equine influenza virus* (EIV) subtype H3N8 continues to be the most important equine respiratory pathogen of horses in many countries around the world. The need to achieve a rapid diagnosis and to implement effective quarantine and movement restrictions is critical in controlling the spread of EI. Here we describe and validate a novel, inexpensive, user-friendly assay based on insulated isothermal PCR (iiPCR) method on the POCKIT™, a field-deployable device, for point-of-need detection of EIV-H3N8 in clinical samples. Limit of detection with a 95% probability (LoD95%) was determined using in-vitro transcribed (IVT) RNA. A published real-time RT-PCR (rRT-PCR) was used as the reference method. Ten-fold serial dilutions of RNA extracted from the H3N8 strain A/equine/Miami/63 were used to compare the detection limits of the EIV-H3N8 iiPCR on POCKIT™ with the reference rRT-PCR assays [Lu Z, Chambers TM, Boliar S, et al: 2009, Development and Evaluation of One-Step TaqMan Real-Time Reverse Transcription-PCR Assays Targeting Nucleoprotein, Matrix, and Hemagglutinin Genes of Equine Influenza Virus J. Clin. Microbiol. 47:3907-3913]. Equine clinical samples were randomized and tested blinded in the validation study. LoD95% for the EIV-H3N8 iiPCR on POCKIT™ assay was determined to be approximately ten copies of IVT RNA. An exclusivity study using closely related influenza viruses suggested high pathogen exclusivity for the established assay. A validation study using 72 equine clinical samples (nasal swabs) demonstrated that sensitivity and specificity of EIV-H3N8 iiPCR on POCKIT™ are equivalent to those of the reference method. EIV-H3N8 iiPCR on POCKIT™ assay could serve as an easy field-deployable tool for rapid, specific and sensitive point-of-need detection of EIV-H3N8.
II. D. USAHA Membership Meetings
II. D. USAHA MEMBERSHIP MEETINGS

USAHA MEMBERSHIP LUNCHEON AND MEETING
MONDAY, OCTOBER 21, 2013
Stephen Crawford, Presiding
for David Meeker

Sponsor’s Welcome was provided by Joanne Maki, Merial Ltd.

Treasurer’s Report
Annette Jones, Treasurer
Presented by David Schmitt

The United States Animal Health Association continues to operate on a sound financial basis. We finished the 2012-13 fiscal year slightly better than we anticipated with a net income of $10,349 (which is $7,639 better than budgeted net income). Considering that the USAHA management team controls a $375,000 budget, they did another excellent job of managing revenue and costs throughout the year.

During fiscal year 2013, the Association earned $12,381 in interest which was accrued or reinvested into CD and Money Market reserve positions. The Association’s net worth on June 30, 2013 was $1,258,023.

The Audit committee met Sunday October 20, 2013, reviewed the fiscal year 2013 Statement of Financial Position and found that all financial affairs of the Association are in order.

State of the Association
David L. Meeker

It’s never a dull moment in the animal health world. While we fortunately have not had any major outbreaks of foreign animal diseases this year, there have been plenty of challenges. There’s the new porcine epidemic diarrhea virus (PEDv), and the old and vexing problems of brucellosis and tuberculosis. There are the everyday challenges of population medicine and keeping herds healthy and efficient. It’s very important that everyone involved, from industry to veterinarians to regulators, keep up to date on technologies, exchange information, engage in joint planning and strategies, and most importantly, get to know and communicate with one another—that’s why we put so much effort in planning the annual meeting and convention. The program chairs and committees have done a superior job this year in organizing a meeting you’ll want to attend.

Your USAHA officers and staff do much more during the year than plan for the very important annual convention. The Executive Committee and Executive Director, Ben Richey, keep in continuous contact with USDA-APHIS, follow up an action items in the USAHA resolutions, and keep a watchful eye on political developments concerning animal health begging for
II. D. USAHA MEMBERSHIP MEETINGS

scientific input. While the federal government in Washington D.C. seems dysfunctional and certainly gets a big share of negative press, there are many good, sincere people trying their best to do their job. The animal health field seems blessed with a very high percentage of these people, both in and out of government. Sometimes a letter of support for a staff appointment or a letter supporting funding of critical programs is all we can do, but these actions do make a difference.

I believe USAHA is in very good shape. Good work done by a long string of strong leadership has resulted in top notch management, governance structure and member involvement. The association’s operations have been effective and efficient over the recent years and have reacted well to changes in society, technology, economics and industry structure. Much of this was made possible by a well-developed strategic plan done five years ago. USAHA will soon start the process again to make sure we are on the right path to keep up the momentum. We have appointed a strategic planning task force, chaired by Bruce King, and this task force will go through several steps of information gathering, member conversations, brainstorming, and planning to culminate in a rollout of a new strategic plan at the annual meeting in 2014 in Kansas City. Watch for opportunities to participate in surveys and other venues to make sure your ideas are heard.

It’s as important now as it ever has been in 116 years to participate in USAHA and to attend the USAHA/AAVLD Annual Meeting. Our coordinated efforts of veterinarians, industry, regulators, diagnosticians, and others are essential to meet the increasing demand for safe, secure, nutritious, wholesome, and plentiful food.

Report of the Committee on Nominations

David T. Marshall

The action of the Report of the Committee on Nominations will take place at 2:05 p.m., on October 23, 2013, during the Membership Meeting. The 2013-2014 Nominations are:

OFFICERS

PRESIDENT…………………………………….. Stephen K. Crawford, Concord, NH
PRESIDENT-ELECT………………………….. Bruce L. King, Salt Lake City, UT
FIRST VICE-PRESIDENT……………………… David D. Schmitt, Des Moines, IA
SECOND VICE-PRESIDENT…………………… Boyd H. Parr, Columbia, SC
THIRD VICE-PRESIDENT………………………… Barbara C. Determan, Early, IA
TREASURER………………………………….. Annette M. Jones, Sacramento, CA
II. D. USAHA MEMBERSHIP MEETINGS

DISTRICT DELEGATES

NORTHEAST.................. Spangler “Buzz” Klopp, DE; Bruce Akey, NY
NORTH CENTRAL.................. Velmar Green, MI; Howard Hill, IA
SOUTH......................... L. “Gene” Lollis, FL; A. Gregario Rosales, AL
WEST............................. Bill Sauble, NM; H. M. Richards, III, HI

The following committee chairs were recognized for their service by Stephen Crawford:

• William Edmiston, Jr., Committee on Sheep and Goats, 2009-2013
• James Evermann, Committee on Infectious Diseases of Cattle, Bison and Camelids, 2009-2013
• Tony Forshey, Committee on Livestock Identification, 2009-2013
• W. Kent Fowler, Committee on Infectious Diseases of Horses, 2009-2013
• Paul Gibbs, Committee on Foreign and Emerging Diseases, 2009-2013
• Julie Helm, Committee on Transmissible Diseases of Poultry and Other Avian Species, 2009-2013
• N. James Maclachlan, Committee on Bluetongue and Related Orbiviruses, 2009-2013
• Charles Palmer, Committee on Scrapie, 2009-2013
• John Fischer, Committee on Wildlife Diseases, 2012-2013

With no further business, the meeting was adjourned.
II. D. USAHA MEMBERSHIP MEETINGS

USAHA MEMBERSHIP MEETING
WEDNESDAY, OCTOBER 23, 2013
Stephen K. Crawford, Presiding

The Second Membership Meeting was called to order by Dr. Stephen Crawford, in the absence of President David Meeker.

Report of the Action of the Committee on Nominations
David T. Marshall

OFFICERS
PRESIDENT.............................. Stephen K. Crawford, Concord, NH
PRESIDENT-ELECT......................... Bruce L. King, Salt Lake City, UT
FIRST VICE-PRESIDENT.................... David D. Schmitt, Des Moines, IA
SECOND VICE-PRESIDENT............... Boyd H. Parr, Columbia, SC
THIRD VICE-PRESIDENT............... Barbara C. Determan, Early, IA
TREASURER.................................. Annette M. Jones, Sacramento, CA

DISTRICT DELEGATES
NORTHEAST..............................Spangler “Buzz” Klopp, DE; Bruce Akey, NY
NORTH CENTRAL............................Velmar Green, MI; Howard Hill, IA
SOUTH................................. L. “Gene” Lollis, FL; A. Gregario Rosales, AL
WEST.................................. Bill Sauble, NM; H. M. Richards, III, HI

Whereas a motion to approve the nominations was made, seconded and approved without dissent.
II. D. USAHA MEMBERSHIP MEETINGS

Passing the Presidential Gavel
David T. Marshall, for David L. Meeker

Immediate Past President David Marshall (l) presents incoming President Stephen Crawford with his president’s gavel.

President’s Address
Stephen K. Crawford

Thank you very much. I’d like to start with an introduction of our new third vice president, a position I was in not too long ago, Barb Determan, representing the National Pork Producers Council. I would invite you to introduce yourself to her for those of you that don’t know her. With that said, I am humbled and honored. If I can be honest here, when I listen to the members and representatives that are award winners at this meeting and piece together stories of everyone, maybe I’m even a little embarrassed to be standing here. You are a remarkable group, and I am truly humbled, and I will do my utmost to uphold the trust and confidence that you have put in me. USAHA has earned and upholds the position as the place to go for solving animal health issues. We have regulators, we have industry, we have academics here, each whom bring their particular expertise and perspectives. It’s worked for 117 years, and it’s my greatest hope for this year not to change that, not to flub it up at all. I do want to give you three brief things that we’re going to work on in the next year.

First, due to the work of my predecessors and their tremendous efforts and the work of our exceptional staff, USAHA is on sound financial footing. That allows us to deal with some systemic shocks, such as we have had this year with attendance being down due to the federal shut-down. After this meeting we’ll have to do some after-action financial analysis to determine exactly what it means, but we want to have this so we can put in some thoughtful measures for budgeting and planning for next year.
II. D. USAHA MEMBERSHIP MEETINGS

Second, you’ve heard throughout the week we’ll be launching a strategic planning process, under the very able leadership of Dr. Bruce King – thank you Bruce for taking that on. We had yesterday pushed out a membership survey, and we will have that to you in a number of formats. A fact from New Hampshire, its legislature is the third largest elected body in the English-speaking world. That’s in a state of 1.4 million people. For good or bad, it gives everyone in the State of New Hampshire the opportunity, when they see something wrong with their government, to change their state. And I would ask each of you to channel your inner New Hampshire and complete that survey. That will inform what we are doing here, down the road. So take an active role, please. Be an active participant, not just a recipient of the outcome.

Third, my personal opinion is, and I have shared this with many of you, we can only be improved as an organization by more participation from individual producers; farmers, ranchers, sale barn owners, etc. If you look at our 2010 proceedings, we had only six student members that year. The Executive Committee (EC) took on a project that year with the partnership of Valerie Ragan and the Center for Public and Corporate Veterinary Medicine to expand our student membership. If you look at the 2012 proceedings, we had 87 student members. This year, as Ben has provided the number of 118 student members. In three years we have gone from six to 118, I think by any measure that is pretty astounding success of a program. That student model may not apply directly to our producer membership, but we want to work to find a model that will work. I think we need those folks that are working every day with livestock and poultry to have a say.

And finally, I will close with this. My dad taught me when I was young that we’re given two eyes, two ears and one mouth. And we would all do well to use them in that proportion. So though I’m not the chattiest, I’m always willing to listen. I would encourage you to talk to me, talk to fellow EC members with your thoughts and concerns. Thank you for your confidence and trust. I do appreciate it.

Recognition of Immediate Past President
David T. Marshall

It is my pleasure to honor Dr. David Meeker as immediate Past President of USAHA. While it’s difficult to do while he’s not here, we have presented him with his plaque and pin as he is on his way to his own annual meeting with the National Renderers Association. It’s been great to work with him. As the allied industry representative I have had the opportunity to work with both he and Jim Leafstedt, and it’s incredible what he brings to USAHA. Dr. Meeker was quiet – not a guy that liked to hear himself talk, and he was very practical and pragmatic. If we started to get into a death-by-committee situation, he would always refocus and center us and keep us out of the
II. D. USAHA MEMBERSHIP MEETINGS

weeds. I always appreciated that about him. With that, I know he sends his regrets that he can’t be here. I would like to ask everyone for a round of applause for his service. Thank you Dr. Meeker.

David Meeker

Executive Director’s Report
Benjamin D. Richey

As we enter the final stages of the meeting, I thank everyone for their hard work over the past several days.

Total registrations are approximately 1,040. While the total is not close to our previous numbers, we are fortunate to be strong in spite of the federal shut down that limited their participation. We are thankful to Dr. Clifford and his staff for bringing who they could to provide presentations and direct interaction and also for working with us to conference many other of our federal partners remotely.

I would also like to thank our chairs for their extra effort in dealing with the agenda adjustments and continuing to deliver strong programs.

This meeting would not happen without the hard work of many people, Kelly and Linda continue to carry much of the weight to make sure everyone has what they need this week. I am grateful to Dr. Jones for offering a few of her staff, they have been outstanding. Of course Kim Sprout is invaluable to us this week in the resolutions process; I know Dr. Marshall and his committee benefit greatly from her skills. And of course I want to recognize Karen Conyngham again for her work throughout the year on the news alerts; she continues to do an excellent job with those.

The Executive Committee has kept me very busy in the past year, which is a blessing for job security, but more importantly, the vision, knowledge and dedication of this group is rewarding to be a part of.
II. D. USAHA MEMBERSHIP MEETINGS

It’s unfortunate Dr. Meeker couldn’t be here for part of the meeting, but it makes me appreciate the time that he and the entire EC devotes to USAHA on top of already busy schedules. Let’s thank Dr. Crawford for stepping up this year to fill his shoes.

I look forward to the coming year with Dr. Crawford at the helm, and welcome Barb Determan to our officer team. With the great leadership that Drs. King, Schmitt, Parr and Jones offer, USAHA is in good hands.

As always, if there is anything that we as staff can do for you, don’t hesitate to ask. Thank you.

Report of the Committee on Nominations and Resolutions*

David Marshall

The Report of the Committee on Resolutions is approved by consent calendar. Chair Marshall reported a total of 34 resolutions submitted by Committees for 2013. Marshall read through each resolution as reviewed by the Committee. The following resolutions were recommended to be combined by the Committee:

- 1 and 5
- 3 and 20
- 7 and 14
- 17 and 18

It was moved and seconded to combine these resolutions, and approved by the membership.

The following resolutions were held for review, with action indicated:

- Resolution 3 combined with 20; Approved
- Resolution 21, Approved
- Resolution 34, Not Approved.

All other resolutions were approved by consent calendar by the Membership.

With no further business, the Membership Meeting was adjourned.

*The full report of the Committee on Nominations and Resolutions is included in these proceedings, Section E.
II. E. COMMITTEE REPORTS
REPORT OF THE USAHA/AAVLD COMMITTEE ON ANIMAL EMERGENCY MANAGEMENT

Chair: Nick Striegel, CO
Vice Chair: Heather Simmons, TX

John Adams, VA; Bruce Akey, NY; Kelli Almes, KS; Gary Anderson, KS; Joan Arnoldi, WI; Marianne Ash, IN; Lyndon Badcoe, WA; Tom Baker, CAN; Deanna Baldwin, MD; Karen Beck, NC; Tammy Beckham, TX; Lisa Becton, IA; Amanda Bernhard, TX; Melissa Berquist, TX; Dannelle Bickett-Weddle, IA; Patricia Blanchard, CA; Richard Breitmeyer, CA; Becky Brewer-Walker, AR; Gary Brickler, CA; Charlie Broadus, VA; William Brown, KS; Suzanne Burnham, TX; Heather C. F. Case, IL; Nancy Chapman, MD; Gregory Christy, FL; Neville Clarke, TX; Matt Cochrane, TX; Leslie Cole, OK; Stephen Crawford, NH; Tarrie Crnic, KS; Debbie Cunningham, OK; Glenda Davis, AZ; Ignacio dela Cruz, MNP; Leah Dorman, OH; Brandon Doss, AR; Cheryl Eia, IL; Dee Ellis, TX; Francois Elvinger, V A; Betsy Flores, VA; James Foppoli, HI; W. Kent Fowler, CA; Mallory Gaines, DC; Tam Garland, TX; Cyril Gay, MD; Robert Gerlach, AK; Michael Gilksdorf, MD; Linda Glaser, MN; Patricia Godwin, KY; Sue Goetz, WI; Timothy Goldsmith, MN; Larry Granger, CO; Kristin Haas, VT; Charles Hatcher, TN; Greg Hawkins, TX; Carl Heckendorf, CO; Julie Helm, SC; Kristi Henderson, IL; Jan Hershensonhouse, CA; Rick Hill, IA; Donald Hoenig, ME; Guy Hohenhaus, MD; Lindsey Holmstrom, TX; Floyd Horn, MD; Jesse Hostetter, IA; Holly Hughes-Garza, TX; Pamela Hullinger, CA; Carla Huston, MS; Annette Jones, CA; Karen Jordan, NC; Patrice Klein, MD; Paul Kohrs, WA; Charlotte Krugler, SC; Michael Langford, NY; Elizabeth Lautner, IA; Kerry Leedom Larson, IA; Randall Leavings, IA; Tsang Long Lin, IN; Mary Lis, CT; Eric Liska, MT; Frank Liu, MN; Francine Lord, CAN; Barbara Martin, IA; Sarah Mason, NC; Chuck Massengill, MO; Paul McGraw, WI; David Meeker, VA; Shelley Mehlendorf, VT; Jessica Meisinger, IA; Samia Metwally, NY; Gay Miller, IL; Janice Mogan, IA; Alfred Montgomery, MD; Lee Myers, GA; Yvonne Nadler, IL; Cheryl Nelson, KY; Sandra Norman, IN; Dustin Oedekoven, SD; Kenneth Olson, IL; Claudia Osorio, MD; Stephanie Ostrowski, AL; Kristy Pabilonia, CO; Elizabeth Parker, ITA; Roger Parker, TX; William Parker, GA; Boyd Parr, SC; Virginia Pierce, MD; Jewell Plumley, WV; Barbara Porter-Spalding, NC; Morgan Radford, CAN; Jeanne Rankin, MT; Tom Ray, NC; Renate Reimschuessel, MD; M. Gatz Riddell, Jr., AL; Kay Riddell, AL; Paul Rodgers, WV; Keith Roehr, CO; James Roth, IA; John Rowden, CA; Mo Salman, CO; John Sanders, WV; A. David Scarfe, IL; Joni Schefte1, MN; Mark Shearer, IA; Jack Shere, NC; Gary Sherman, DC; Heather Simmons, TX; Kathryn Simmons, DC; Marilyn Simunich, ID; David Smith, NY; Julia Smith, VT; Tom Smyle, ON; Harry Snelson, NC; Rosemary Speers, VA; Diane Stacy, LA; Nick Striegel, CO; Darrel Styles, MD; Manoel Tamassia, NJ; Rodney Taylor, NM; Todd Tedrow, SD; Belinda Thompson, NY; Jimmy Tickel, NC; Peter Timoney, KY; Hana Van Campen, CO; Jesse Vollmer, ND; Liz Wagstrom, DC; Sherrilyn Wainwright, ITA; Patrick Webb, IA; Steve Weber, CO; Brad Williams, TX; John Williams, MD; Ellen Mary Wilson, CA; Gwen Zellen, CAN.
The Committee met on Saturday, October 19, 2013, at the Town and Country Hotel, San Diego, California, from 8:00 a.m. to 1:00 p.m. There were 54 members and 44 guests present. At the beginning of the meeting, the mission statement for the Committee on Animal Emergency Management (CAEM) was reviewed and responses to 2012 resolutions were read. Eleven presentations were heard, one of which was a time-specific paper.

**Time-Specific Paper**

James Roth, Center for Food Security and Public Health, Iowa State University presented a time-specific paper on the Secure Food Supply Plans to Protect Animal Agriculture and the Food Supply in and FAD Outbreak. The paper, in its entirety, is included at the end of this report.

**Presentations**

**USDA-APHIS-VS National Center for Animal Health Emergency Management (NCAHEM) Projects and Planning Update**

Lee Myers, USDA-APHIS-Veterinary Services (VS), National Center for Animal Health Emergency Management (NCAHEM)

Dr. Lee Myers provided the update from the USDA-APHIS National Center for Animal Health Emergency Management on behalf of Dr. Jonathan Zack, Director of Preparedness and Incident Coordination. Myers focused her comments on the VS reorganization plan, the VS training and exercise initiative, and new countermeasures within the NVS.

Myers explained that the VS reorganization will become effective in early November, 2013. This is a few weeks later than originally anticipated but with recent events and the need to restore regular operations; it was prudent to postpone implementation. Once VS begins operating in the new structure, it will take time for VS and stakeholders alike to fully acclimate to the new structure, and work out all the details and business processes. The guiding principles of the reorganization are to align the organizational structure with the VS 2015 vision and New Perspective goals, consolidate business activities by functional area to provide more streamlined services, optimize the structure to meet the demands of strategic objectives and declining budgets, and strategically align resources to ensure efficiency. The new structure aligns VS mission operations by creating four strategically focused organizational units: National Import Export Services; Science, Technology and Analysis Services; Surveillance, Preparedness, and Response Services (SPRS); and Program Support Services that will provide foreign animal disease technical training through the VS Professional Development Staff.

The new SPRS unit will focus on a broad spectrum of animal health centered on each of the major animal health commodity groups as VS budget line items are configured. The SPRS structure will be comprised of Animal Health Centers, the National Preparedness and Incident Coordination Center, the SPRS Logistics Center (which will house the NVS), the One Health Coordination Center, and the six geographical Districts. Each District will utilize
a District-wide approach to services and a variety of District Teams led by Assistant District Directors (ADDs). This will ensure SPRS can most effectively utilize its resources while meeting the needs of State Animal Health Officials and other external stakeholders. The ADDs will serve as the primary point of contact for State Animal Health Officials, ensure cooperative programs are effectively implemented, engage stakeholders, and supervise the animal health staff within assigned States. Key services in the SPRS unit will be:

- Animal health incident management
- Commodity business planning
- Disease program, surveillance, and animal disease traceability policy setting and administration
- Emergency preparedness
- Epidemiologic investigations and tracing
- Veterinary accreditation
- Veterinary stockpiling

Customer service is important to VS and all personnel will be diligently working to ensure that customer needs are met during the transition to the new structure.

Myers reviewed the new VS training and exercise (T&E) initiatives which began in May 2013. A VS T&E planning team conducted the premier T&E planning workshop in July 2013 and developed a draft VS T&E strategy and multi-year plan. The purpose of a multi-year plan according to the Federal Homeland Security Exercise and Evaluation Program is to translate strategic goals and priorities into specific T&E activities, and to coordinate and de-conflict all of these activities on a schedule. The VS T&E planning team identified specific priorities, objectives, and specific events for the next three years. Once approved by VS leadership, the VS T&E plan will be implemented beginning in Fiscal Year 2014. The VS T&E planning team is expected to continue its initiatives, expand the team to include more stakeholders external to VS, and conduct annual T&E planning workshops.

Myers then reviewed recently acquired countermeasures within the NVS. New countermeasures support cold chain management, animal handling, and emergency transport. Myers also emphasized that NVS contractors are receiving hands-on, field training to enhance capabilities for response support services. She highlighted the future NVS exercise partners and reviewed the status of State, Tribe, and Territory NVS planning.
Current Vaccinology Considerations in North American Foreign Animal Disease Events – Implications for Foot-and-Mouth Disease (FMD) Preparedness and Response
Gay Miller, University of Illinois

Key Considerations for Vaccination
The importance of the disease under consideration relates to many factors. FMD is among the diseases of highest concern. “… Its importance to mankind is confirmed by the fact that FMD virus (FMDV) was the first animal virus discovered…” FMD was one of the first diseases for which vaccines were developed. Over time, we have realized “… vaccines are very useful as part of an eradication campaign in countries where FMDV is enzootic… these vaccines are not ideally suited to control outbreaks in disease-free countries…” Thus, there is a need for new FMD vaccines (Mason and Grubman).

There are three main formulations used in inactivated FMD vaccine manufacturing: high potency vaccines (used for emergencies); oil-emulsion conventional vaccines (used for routine control), and aluminum hydroxide vaccines (used in cattle). Ideal characteristics for emergency use FMD vaccines include that they provide rapid onset of protective immunity, broad cross-protection across serotypes, have lifelong duration of immunity, have a stable and long shelf life, are DIVA compatible and have thermal stability, prevent infection, have no requirements for high manufacturing biocontainment, have short withdrawal periods for slaughter, and can be rapidly modified to include emerging strains (Rodriguez and Gay). The standard held by the USDA for emergency use vaccines is to administer high quality, high potency (6PD$_{50}$) vaccines which provide a wider spectrum of immunity and also rapid onset of protection (OIE).

Vaccines can only be effective after administration. In the case of FMD vaccine, use is controlled by the federal government. It would not be economically appropriate to administer vaccine prior to an outbreak in a country such as the U.S. where the probability of introduction of the disease is low (Miller et al, 2012), and for a disease like FMD with such a large number of different serotypes. Also, vaccine administration can complicate surveillance during an outbreak; thus, controlling its use is appropriate.

Aspects of FMD Vaccination – Where is the U.S. in terms of capability?
Homeland Security Presidential Directive Number 9 mandated the formation of the National Veterinary Stockpile (NVS). The NVS is to have critical veterinary resources available for delivery to animal disease outbreaks within 24 hours.

FMD vaccination is a critical veterinary resource. FMD vaccination can be delivered within 24 hours of a decision to vaccinate, but this timing is only achievable because the decision to vaccinate takes time. It takes time to assess the ground situation and the effectiveness of initial containment measures which will most likely be movement controls and depopulation of infected premises. FMD vaccine would generally not be deployable in the U.S. within 24 hours of identification of a known positive animal.
The funding USDA has and is receiving is insufficient to provide adequate FMD vaccine stockpiles. An outbreak of FMD which occurred in a higher livestock dense area such as Iowa and which was not contained rapidly with stamping out could quickly outstrip the emergency FMD vaccine stockpiles, just as what happened with the outbreak in Korea. The Korean outbreak depleted the banks of FMD vaccines from around the world in order to vaccinate a population roughly half the size of Iowa. For an outbreak in Iowa, with over 20 million hogs and approximately four million cattle, the number of doses of vaccine used could easily exceed 50 million in a very short time just to vaccinate at risk animals in Iowa.

There is no magic spigot to access FMD vaccines; insufficient vaccination capacity limits the ability of the U.S. to be able to effectively respond with a vaccination strategy should that be the response choice made by USDA. Also, the USDA has decreased the veterinary field force over the last several years, further limiting response capabilities. Indeed, a modeling study in Minnesota revealed that government vaccination teams in Minnesota could only vaccinate 50 herds per day, far fewer than the number and speed which could be and need to be vaccinated. Large scale vaccination (1,500 herds per day) can be met using producer/private practitioner vaccination teams (Miller et al, 2013).

Most potential U.S. Incident Commanders were in favor of a vaccination response within two weeks of identifying the first case in a relatively small FMD outbreak occurring in the Midwest (Parent, Miller, & Hullinger). The case for vaccination has been building over the last decade beginning with the use of vaccination in Uruguay, Argentina, and The Netherlands (2001), and most recently with outbreaks in Japan (2010) and South Korea (2011). In all of these countries, vaccination was used after the initial strategies of stamping-out, and movement controls failed to contain the spread of FMD.

What does recent research tell us?

Ideally vaccines are used that are immunologically matched with the field strain causing an outbreak. However, new variants of disease develop and it takes many months to produce a new vaccine matching a newly emerged strain. Under such circumstance, knowledge of the potential use of related and/or immunodominant vaccines strains can be valuable (Sarangi, et al.). At least for FMDV type A, high potency vaccines can induce protection even against heterologous challenge (Brehm, et al).

Vaccination was used in the FMD epidemic in Japan (Muroga et al). Similar to the 2001 U.K. outbreak, epidemiological investigations revealed that FMD had been introduced approximately one month prior to detection. Farms awaiting livestock destruction exceeded 100 over a two week period during the peak of the epidemic; it was with this circumstance that the government decided to implement emergency vaccination in all cattle and pigs. The epidemic occurred in an area with high cattle and pig density, increasing speed of FMD spread and making choice of suitable burial sites difficult.

The economic impact of FMD is higher overall in FMD endemic countries (total global visible production losses and vaccination costs U.S. $6.5-21 Billion/year) than in FMD-free countries which have outbreaks (>U.S. $1.4
Billion/year). The estimated number of vaccines used per year worldwide is 2.35 billion doses, with China administering 68% of all doses administered. In many countries and regions, all animals are vaccinated on average more than once per year (Knight-Jones & Rushton).

**Implications for Preparedness and Response**

The U.S. needs a plan for vaccine distribution, and vaccine administration. This plan needs to outline vaccination priorities (by species and circumstance). How vaccine will be distributed goes well beyond NVS delivery to distribution sites. Vaccine distribution plans need to include distribution to sites that are accessible (via communication and delivery) by the individuals who will be responsible for vaccine administration. Interestingly, vaccination in the recent FMD outbreak in Japan gave priority to pigs over cattle, with vaccination proceeding from the zone perimeter inwards (Muroga et al).

The U.S. needs models and scenario analyses which analyze and determine the appropriate timing to implement vaccination, and which identifies epidemiological aspects revealing when an outbreak cannot be easily or economically contained with stamping-out (Miller and Parent). So-called epinomic optimization models (Carpenter et al) are perhaps best at meeting such needs.

“Emergency vaccination is an effective control strategy for FMD epidemics in densely populated livestock areas, but results in a six-month waiting period before exports can be resumed, incurring severe economic consequences for pig exporting countries.” (de Vos et al). Their model results indicated that resuming exports after the six-month waiting period (based on OIE guidance) does not reduce the probability (relative to a one-month or three-month waiting periods) that processed carcasses are derived from FMD-infected pigs if the area was declared FMD-free incorrectly. Stated another way, the risk of exporting an infected carcass is no higher with a one-month waiting period than with a six-month waiting period.

The U.S. needs to use a vaccinate-to-live policy whenever possible. Stamping-out, a common approach in eradicating diseases in the past, can prevent many animals from entering the food chain even when they are not affected by the disease, resulting in an enormous wastage of animal protein. The implications of this are becoming less politically and socially acceptable. Compared to depopulation of vaccinates, a vaccinate-to-live policy will delay return to FMD-free status as designated by the OIE. However, the real impact on time for resumption of trade is unknown. It is likely that trade barriers will prevent U.S. exports for a significant period of time following an FMD outbreak.

**References**


Knight-Jones TJD & Rushton J. 2013. The economic impacts of FMD – What are they, how big are they and where do they occur?. *Prev Vet Med* in press.


OIE. 2012. Chapter 2.1.5. Foot and Mouth Disease. Available at: http://www.oie.int/fileadmin/Home/fr/Health_standards/tahm/2.01.05_FMD.pdf


**Planning for an FMD Outbreak Response in California: Vaccination and Beyond...**

Lisa Quiroz, California Department of Food and Agriculture

This presentation provides an overview of the critical steps necessary for developing and executing emergency animal disease response strategies such as Foot and Mouth Disease (FMD) vaccination. Three critical components of FMD strategy development are discussed: pre-event planning, increased awareness, and collaboration. A significant amount of pre-event planning is required to develop and ultimately execute an effective FMD vaccination strategy. In California, the planning has focused on a vaccine distribution and delivery strategy for the dairy industry. Planning for this approach has involved private veterinarians and the dairy industry. Initially the plan was to engage private vendor cold storage logistics companies and private practitioners to distribute vaccine to premises while on-farm dairy personnel would be used to
administer vaccinations. An on-site validator would stay on the premises during vaccination to ensure proper cold chain and that animal identification is applied and/or captured and submitted to the Incident Command. This approach was tested during a California field level operational exercise focused on delivery of FMD vaccine to the dairy industry. Lessons learned from the exercise are highlighted. Many of the exercise after action items are being addressed through current preparedness initiatives. One after action item identified the need to integrate private third party cold chain vendors for vaccine cold storage, repackaging and distribution. The California Department of Food and Agriculture (CDFA) recently launched a project, working with the National Veterinary Stockpile, to explore this strategy and determine the scope of services that would be necessary to secure private vendor cold storage and distribution services. Another project focuses on development of an FMD vaccination decision matrix and criteria for prioritizing vaccinates. There is a great need for increased awareness when planning for a new disease response strategy like FMD vaccination. We must train our field response staff on these newly developed strategies and test their capabilities to execute our plans. We must engage industry. We continue working with industry representatives to develop Secure Milk Supply producer and processor level business continuity plans for milk movement, establishing biosecurity guidelines and encouraging pre-certification levels to expedite movement permits during response. In California we began with engaging the dairy industry, but we must now branch out to other industries to socialize our response strategies and plan for their unique circumstances. Collaboration with other states and our Federal partners is critical. We need to engage other States in our planning so that we can learn from their experiences and perspectives. We cannot do this planning in a bubble because the decision to vaccinate affects us all. There are many factors and considerations to be taken into account when selecting a response strategy in the face of an FMD outbreak. While each event will be unique, working through and discussing approaches by state or region in advance of an event should put us in a position to make better informed and timely decisions in a real event.

2012 Research Overview: Effective FMD Outbreak Communication
Cindy Cunningham, National Pork Board

A U.S. outbreak of Foot and Mouth Disease (FMD), no matter the size, could ultimately threaten the entire U.S. economy, as well as pose serious animal health consequences and negatively impact trade and commerce. Controlling FMD, or eradicating it if an outbreak did occur, will require cooperation among those in agriculture, tourism and commerce as well as coordination among private industry groups and the government.

For nearly 12 years, communication and issues management specialists from Dairy Management Inc. (DMI), the Beef Checkoff through the National Cattlemen’s Beef Association (NCBA), the National Pork Board supported by the National Pork Producers Council and the American Sheep Industry Association (ASI) have worked together as the FMD Cross-Species
Communications team. Working closely with the U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), the team drives FMD crisis communications response preparation and educates industry stakeholders to help ensure a unified response in the event of an U.S. outbreak.

The team recently conducted consumer research, which included focus groups and a national survey, to understand consumer knowledge of FMD and gain feedback and acceptance on consumer key messages to use if an outbreak did occur. In addition, a special emphasis was placed on understanding consumer awareness and perceptions of livestock vaccination.

Lessons Learned - In the event of an outbreak, quick, consistent and accurate communication will be imperative to instilling consumer confidence in the safety of milk and meat.

According the team’s consumer research, 85 percent of consumers believe they have heard of FMD, but research also shows public awareness and understanding of FMD is limited, and confusion between FMD and other animal diseases and human ailments, such as Hand, Foot and Mouth Disease, is common. In fact, according to the research, 49 percent of survey respondents believed small children can contract the disease. These recent findings reinforce the need for ongoing, proactive communication and consumer education.

In terms of messaging, consumers responded best to messages that were relevant and compelling, show collaboration between the industry and government, and provide evidence and credible sources, resonated the most with consumers. Audiences also expressed interest in more information and details on the disease, its impact, and international landscape and also want reassurance that there is collaboration and a plan in place.

Implementing Action - The FMD Cross-Species Communications Team continues to make strides in coordinating industry response and promoting collaboration among agricultural groups to better prepare for an FMD outbreak. Understanding the research findings and feedback from consumers has helped to improve the plan and approach and has led to the recent approval of the messaging track by the USDA for use during the event of an outbreak. Through various initiatives and activities, the team works to continuously strengthen relationships among industry and the ability to reduce consumer confusion and instill confidence in the safety of the meat and milk.

Regional Agrosecurity Alliances Panel Discussion
Mike Starkey, Minnesota Department of Agriculture
Susan Dixon, Iowa Homeland Security and Emergency Management Department
Greg Christy, Florida Department of Agriculture
Charlotte Krugler, South Carolina Department of Agriculture
Kristin Hass, Vermont Agency of Agriculture

MSP - The Multi-State Partnership for Security in Agriculture (MSP) has provided a platform for regional collaboration of food and agriculture security
issues for ten years. The Iowa Homeland Security Department along with nine
Midwestern states established the Partnership in 2003 and it has expanded to
15 states in 2013 (Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan,
Minnesota, Missouri, Nebraska, New Mexico, North Dakota, Ohio, Oklahoma,
South Dakota, and Wisconsin). Iowa Homeland Security and Emergency
Management continue to this day as the coordinating agency.

The value of the MSP projects and collaboration efforts are based on the
understanding that a major food or agriculture emergency would not respect
state boundaries and that cooperation and collaboration would benefit all
states. The following is a list of the MSP projects over the past ten years:

- Risk/Crisis Communications Workshops
- Animal Disease Message Maps
- Media Resources Pocket Guide
- Food, Crop, Animal Disease Plan Templates
- National Business Continuity Workshops
- Euthanasia/Carcass Disposal Demonstration
- Equipment/PPE Response Cache (72 hours)
- Incident Management Teams
- Stop Animal Movement Exercise (KS/OK)
- National Agriculture Security Symposium
- All-Hazards Preparedness Guide for Producers
- Critical Infrastructure Assessments
- National Veterinary Stockpile Exercises
- Crisis communications/Social Media Training
- Just-In-Time Training Modules
- Emergency Movement Control

The MSP will continue to fulfill its mission to...collaborate to benefit
member states, coordinate risk communications, maximize resource sharing
and minimize duplication of effort by:

- Developing and sustaining core capabilities;
- Assessing and reducing critical infrastructure risk; and
- Sharing preparedness opportunities for natural and high consequence
incidents that may impact the food and agriculture sector.

SAADRA - The Southern Agriculture and Animal Disaster Response
Alliance (SAADRA) was organized in the spring and summer of 2006.
Following the devastation from Hurricane Katrina, Mississippi had received
assistance for the coordination of animal/agriculture response efforts by
incident management teams from Florida, North Carolina and Georgia. Dr.
Brigid Elchos of Mississippi and Mr. Don Hamilton of Georgia recognized a
need for southern states to collaborate in emergency preparedness efforts to
help one another in future events, and instigated the development of an
alliance based on the template provided from Midwestern friends in the Multi-

Members of SAADRA represent state-level emergency managers who
work in the offices of the state animal health official, state departments of
agriculture, state emergency management and state educational institutions with animal agriculture components. The group does not receive funding and is managed on an interactive volunteer basis and led by Co-Chairs who help to maintain member communication concerning issues of interest to states regarding the safety and health of citizens, food systems, agriculture infrastructure, animals, and economy.

SAADRA projects to date have included the development and sharing of state guidelines and plans; joint initiatives for food and agriculture critical infrastructure protection; and participation in each other’s state animal/agriculture exercises as players, evaluators and observers. An ongoing project is to develop and maintain state inventory lists of EMAC-able resources. SAADRA members adapted the FEMA 508-1 document to develop guidelines for Type I through Type III teams that can be useful in our states for animal/agriculture emergency response.

Whenever possible SAADRA is pleased to join forces with members of the other regional groups to leverage each other’s strengths and ideas.

SAADRA’s founding member states are Alabama, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, and Texas. In recent years the group welcomed Arkansas, Virginia and West Virginia.

NESAASA - The New England States Animal Agricultural Security Alliance (NESAASA) is an interactive regional collaboration of the states of Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island and Vermont. NESAASA’s mission is to strengthen all-hazard response capabilities through alliances with the public, animal and animal agriculture industries, relevant private sector organizations, academia, and all levels of government.

NESAASA was organized as a result of a USDA-APHIS-VS supported regional Foot and Mouth Disease (FMD) exercise held in July 2008. The After Action Report generated from that exercise highlighted the need to develop regional capacity and capability and to embark on business continuity planning on behalf of New England’s dairy industry. The ensuing NESAASA-development effort resulted in signature of the organization’s Charter by the six New England Governors in July, 2010. The primary participants in the organization include the State Animal Health Officials (SAHO) of each member state and the area veterinarian in charge (AVIC) and Area Emergency Coordinator (AEC) for the USDA-APHIS-VS Region 1 office. Additionally, public and private stakeholders within any of the participating states as identified by the respective state’s governor, commissioner of agriculture, or emergency planning director or designee may be invited to participate in specific initiatives.

The overarching goal of NESAASA is to support and develop regional National Incident Management System (NIMS)-compliant standards, processes, and capacity through collaborative planning, preparedness, mitigation, response, and recovery efforts that help to ensure the safety, health and security of the regional food and animal and animal agriculture sector infrastructure and economy. NESAASA seeks to enhance New England
regional animal and animal agriculture emergency preparedness and response to all hazards including chemical, biological, radiological and nuclear (CBRNE) incidents and natural disasters.

NESAASA’s most intensive project to date has focused on clarifying regional fluid milk movement and processing variables, and on developing a regional continuity of operations plan for the New England dairy industry. This project includes the creation of a dairy farm readiness rating for use during a Foot and Mouth Disease (FMD) outbreak impacting the New England region. This tool can be utilized by state and federal animal health officials to facilitate the permitted intra- and interstate movement of fluid milk produced by farms located in a Control Zone that meet a minimum biosecurity score. NESAASA has utilized the expertise of a federally funded contractor for project implementation and has partnered with the National Center for Foreign Animal and Zoonotic Disease (FAZD) for data storage and password-protected access and manipulation. Research performed to date supports the fact that the economic losses associated with an FMD outbreak impacting New England can be minimized tremendously through regional border controls of milk movement rather than state controls of the same. The deliverables for the New England SMS project and supporting documents may be viewed by visiting the NESAASA website at http://nesaasa.weebly.com.

Other NESAASA priorities established in 2010 include the sharing of emergency management resources and information, the support of state and regional training and exercises and of EMAC deployment of agricultural and animal response resources, and the enhancement of crisis and risk communication. Project development to support these priorities is ongoing. NESAASA participants will be updating the organization’s strategic plan during 2014 in order to ensure that its ongoing projects serve the region’s animal agricultural industries in the best manner possible.

NESAASA participants recognize the importance of regional collaboration and are willing to share best management practices and lessons learned with other regional alliances to better serve agricultural industry constituents on a larger scale.

Response to the Explosion in West, Texas
Amanda Bernhard, Texas Animal Health Commission

On April 17, 2013 fertilizer plant exploded in the town of West, Texas. Fourteen local responders were lost, a number of homes destroyed and citizens injured. The Texas Animal Health Commission will present animal issues encountered during the response, response procedures, lessons learned, as well as improvements to Texas’ animal response resources. The full presentation is available on the Committee page at www.usaha.org.
Carcass Disposal: GIS Toll for Pre-Identifying Burial Sites
Priscilla Fitzmaurice, Centers for Epidemiology and Animal Health (CEAH), USDA-APHIS-VS

Proper disposal of animal carcasses during animal emergencies is an important consideration for both livestock production facilities and smaller producers. Natural disasters such as blizzards, floods, tornadoes, hurricanes, and the increased potential for human-caused agro-terrorism events often require the timely burial of animal remains as a means of disposal. In addition, animal disease outbreaks may necessitate the burial of animals adjacent to livestock facilities if removal of animal mortalities outside of established quarantine zones is prohibited. As part of a proactive approach, emergency disposal plans should ideally identify potential burial locations well in advance of an animal emergency.

Because of its rural nature and the large number of livestock operations, Morgan County in northeastern Colorado was chosen for this initial site suitability study. Environmental Systems Research Institute’s (ESRI) ArcGIS 10.1 software with Spatial Analyst extension was used in the analysis to ascertain potential burial locations and to assess the total suitable land acreage in Morgan County that would be appropriate for this method of carcass disposal. As a result, a burial suitability map identifying highly suitable, moderately suitable, and unsuitable areas for livestock burial was produced in addition to a written methodology that can be readily applied by geospatial experts at the state or local levels to develop burial suitability maps for their areas of concern.

Criteria for the Morgan County suitability study were established by the Colorado Department of Agriculture (CDA) and the Colorado Department of Public Health and Environment (CDPHE). Excluded from burial consideration were areas that might adversely affect public or environmental health, would likely create trench excavation issues, or pose potential challenges to land reclamation. These included areas within a specified distance from rivers, streams, lakes, ponds; near any type of well; with steep topographic slopes; near residential or urban areas; within sight of roads and highways; or with unfavorable soils. It should be noted that individual criteria and setback distances are not static and will vary according to regulations or best practices for carcass burial designated by each county or state. Moreover, these parameters could change during the course of an emergency.

Datasets used in the analysis were obtained from various online data sources. All data are publicly available and were downloaded free of charge. Raster overlay and vector overlay methods were individually applied in the analysis and in developing the final burial suitability map. In preparing for state or local emergencies, either a raster- or a vector-based approach could be used by geospatial experts to create similar suitability maps. Choice of methodology would depend on individual preference.

Results of this suitability analysis indicate that more than half of the total acreage in Morgan County is considered unsuitable for the burial of livestock mortalities. If additional exclusionary criteria are considered such as burial on
state lands or on private lands other than those of the affected owners, the suitable acreage available is substantially decreased. Moreover, many concentrated animal feeding operations are located close to the South Platte River which bisects the county from west to east and with the towns of Fort Morgan and Brush sited along this agricultural belt, suitable areas for carcass disposal are further restricted.

An on-site suitability assessment is in the planning phase for Morgan County to test the accuracy of these maps in the field. A similar site suitability map for adjacent Weld County will then be developed as parameters are further refined from the Morgan County field evaluation.

**AgConnect – Strengthening Ag Preparedness**

Tammy Beckham, National Center for Foreign Animal and Zoonotic Disease Defense (FAZD)

Good data are critical to effectively understand, manage, treat, and respond to infectious diseases and enhance animal, human, and environmental health; however, accurate, meaningful data are often difficult to obtain and can be overwhelming to analyze. To help address this challenge, the FAZD Center has developed AgConnect, a suite of customizable data-sharing products designed to enhance real-time situational awareness for emerging, zoonotic, and/or transboundary animal diseases.

The AgConnect technology integrates authoritative information into a single, easy-to-use format that empowers real-time collection, distribution, and analysis of biosurveillance, veterinary diagnostic, emergency response, and business continuity data. The system is capable of integrating data from multiple sources, such as practitioner clinical observations (through iPad-based application); laboratory diagnostic test results (through linkages to state d-labs); animal production information (such as weight gain or water/feed consumption); third party data sets (e.g., Metafarms, USAHerds); and wildlife, geographical, and environmental/climate data. These data are integrated in to a common operational picture and synthesized in to a new product that is greater than the sum of any of the individual pieces to provide animal health officials with the information they need to monitor and respond to disease outbreak emergencies.

The end result is a sophisticated system that serves as a central point to monitor disease events, thus enabling efficient risk analysis and effective program design for disease intervention and control strategies. The FAZD Center is currently piloting the AgConnect suite of tools in four states to solicit feedback on requirements for use, visual displays, data integration, and other capabilities needed to support daily use by state animal health officials. By improving data collection capabilities and integrating information from multiple disparate sources, AgConnect provides a more comprehensive view of animal health over space and time to aid in early disease detection or monitor changes in animal health status, and thus promote more effective and efficient animal health emergency management.
Committee Business:

One resolution was submitted by Committee members and it was adopted— National FMD Preparedness Working Group. The meeting was adjourned at approximately 1:15 p.m.
Secure Food Supply Plans (SFS) are a new approach to emergency response. The SFS Plans are designed to provide business continuity for animal agriculture and associated industries in the face of a foreign animal disease (FAD) outbreak. These Plans are being developed by federal and state officials, livestock producers, animal disease experts, and other stakeholders with the assistance of academic partners.

The three overarching goals of a foreign animal disease (FAD) response are to detect, control and contain the FAD as quickly as possible; eradicate the FAD using strategies that seek to protect public health and stabilize animal agriculture, the food supply and the economy; and provide science- and risk-based approaches and systems to facilitate continuity of business for non-infected animals and non-contaminated animal products.

There are a number of enormous challenges for control of FADs in the U.S. Traditional response approaches rely on quarantine, stop movement and stamping out. Those approaches are simply not feasible in a large outbreak today because:

- There are larger concentrations of animals in production units
- Extensive movement of animals occurs both within states and between states
- There is a high probability that an FAD will spread between states prior to diagnosis
- There are not enough responders and equipment to depopulate premises with thousands of animals in a timely manner
- The environmental impact of disposal of thousands of animal carcasses must be considered
- The public will not accept mass destruction of animals
- Impacts on food security
- Animal welfare concerns

In addition, there is a wide diversity of animal agriculture production systems in the U.S. ranging from producers with a few animals to very large production units that rely on frequent movement of animals. For example, a production unit could have 5,000 dairy cows or 70,000 dairy calves. Some swine facilities have more than 20,000 sows. There may be 2.5 million laying hens in one location. These large production units rely heavily on movement of animals, animal products, and feed. There are more than a million swine in transit each day and 94,000 cattle sent to slaughter each day. Foreign animal disease emergency response plans must accommodate all sizes of production
units and take into consideration the extensive movement of animals and products.

The overall goals of the Secure Food Supply Plans are to avoid interruptions in animal/animal product movement to commercial processing from farms with no evidence of infection during a foreign animal disease outbreak; provide a continuous supply of safe and wholesome food to consumers; and maintain business continuity for producers, transporters, and food processors through response planning.

The Secure Food Supply Plans are based on current capabilities and will evolve as science, risk assessments and new capabilities develop. Each plan includes:

- Voluntary pre-outbreak preparedness components such as biosecurity and training on sample collection, and herd health monitoring
- Biosecurity, surveillance, epidemiology questionnaires, data management, movement permits
- Risk assessments (completed and in process)
- Non-binding guidelines: Final decisions will be made by responsible officials during the outbreak
- Outreach and training pre and post outbreak

**Novel Approaches to FAD Response Proposed in Secure Food Supply Plans:**

- Voluntary biosecurity practices implemented prior to an outbreak (and audited) will facilitate issuing movement permits during an outbreak.
- Herd health monitoring (Active Observational Surveillance (AOS)) by producers or employees should be a key early warning for FMD infection and a condition for receiving a movement permit.
- The plans for responding to a foot and mouth disease (FMD) outbreak change with the magnitude and duration of the outbreak.
- At the beginning of an FMD outbreak it is recommended that pigs in transit that originated from the Control Area be allowed to return to their premises of origin, or to proceed to their intended destination without stopping at state borders.
- At the beginning of an FMD outbreak it is recommended that all pigs at the packing plant, and on their way to the packing plant, which pass Food Safety and Inspection Service (FSIS) inspection be processed and allowed to enter the food chain.
- Milk from farms not known to be infected should be sent to processing if biosecurity performance standards are implemented and accepted by the incident commander.
- Stamping out should be discontinued and infected animals should be allowed to recover and return to productivity in a large regional or national FMD outbreak.
• Acceptable uses should be found for milk from FMD infected dairy herds in a large regional or national FMD outbreak.
• In an FMD outbreak involving a large portion of the U.S., the emergency response should transition to a long-term disease control program.
• Daily real time reverse transcription (RRT) polymerase chain reaction (PCR) testing of oropharyngeal swabs collected and submitted by the producer should be a key component for movement of eggs, turkeys, and broilers in an highly pathogenic avian influenza (HPAI) Control Area.
I. Secure Egg Supply Plan

The Secure Egg Supply (SES) Plan promotes food security and animal health through continuity of market planning for a Highly Pathogenic Avian Influenza (HPAI) outbreak. This plan makes specific science- and risk- based recommendations that emergency decision makers (such as Incident Commanders) can use to rapidly decide whether to issue or deny permits for the movement of egg industry products during an HPAI outbreak. In addition, these recommendations effectively manage the risk of HPAI transmission to naïve premises. Through the integrated implementation of the SES Plan components, this plan provides a high degree of confidence that egg industry products moved into market channels do not contain HPAI virus. The SES Plan is based on current research and practice in fields including virology, flock husbandry, epidemiology, and risk-assessment.

II. Secure Turkey Supply Plan

The goal of the Secure Turkey Supply Plan is to facilitate business continuity for the turkey industry during an outbreak of HPAI. The objective is to obtain permission from federal and state regulatory authorities to transport a) turkey eggs from a breeder farm to a hatchery; b) turkey poults from the hatchery to a brooder house; c) immature turkeys from a brooder house to a finishing house; and c) mature turkeys from a finishing house to a processing plant. The goal is to obtain movement permits for turkey eggs and live turkeys from non-infected premises within 48 hours after a Control Area has been established.
III. Secure Broiler Supply Plan
The Secure Broiler Supply Plan (SBS) Plan provides guidance for moving hatching eggs and broiler industry products, within, out of, and into an HPAI Control Area. The SBS Plan includes surveillance guidelines (including diagnostics, mortality production parameters, and sampling), risk assessments, biosecurity measures, and permit guidance. Product-specific guidance is provided for hatching eggs, day-old chicks, broilers to market, and other broiler industry products.

Response to Foot and Mouth Disease
Secure Milk Supply Plan:
The goals of the Secure Milk Supply Plan are to avoid interruptions in raw milk movement from dairy farms (with no evidence of infection) in an FMD Control Area to commercial processing; provide a continuous supply of wholesome milk and milk products to consumers; and maintain business continuity for dairy producers, haulers, and processors. Because of regional differences in production and processing practices, the SMS is being developed at both national and regional levels.

Response to Multiple FADS
Secure Pork Supply Plan:
The Secure Pork Supply (SPS) Plan addresses four FADs including FMD, classical swine fever, African swine fever, and swine vesicular disease. The goal of the SPS Plan is to develop procedures that pork producers, processors, and Federal and State agencies all agree are feasible to allow for the safe movement of animals from farms in an FAD control area to harvest channels or other production sites as long as they have no evidence of disease.

Additional Resources:
www.cfsph.iastate.edu/Secure-Food-Supply/
secureeggsupply.com
securemilksupply.org
securepork.org
securebroilersupply.com

USDA Foreign Animal Disease Preparedness and Response Plans (FAD PReP):

Decision Support Tools:
Classification of Phases and Types of an FMD Outbreak and Response are designed to facilitate development of adaptable response and business continuity plans: http://www.cfsph.iastate.edu/pdf/phases-and-types-of-an-fmd-outbreak

Herd Health Monitoring (Active Observational Surveillance) Training Materials
formalizes the daily observation of clinical signs on farm to increase the likelihood of detecting FMD: http://securemilksupply.org/Assets/SMS_active-observational-surveillance.pdf

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The Committee met on 20 October 2013 at the Town and Country Hotel, San Diego, California, from 3:00 p.m. to 5:31 p.m. There were 40 members and 12 guests present. The Committee proceeded with the following items as listed on the agenda.

National List of Reportable Animal Disease
Stanley Bruntz, USDA-APHIS-VS-CEAH

The information was presented via telephone. An update of NAHRS status was given. The 2012 annual report of NLRAD will be reported soon. New re: NAHRS, there is a process of implementing e-authentification to logging information. They are continuing to work on on-line training modules and case definitions. The next focus is to work on all 50 states to ensure participation. A potential action is the UM&R will need to be updated as it is currently outdated and that will require input from CAHSIS. NLRAD is moving forward.

State Animal Laboratory Messaging Service (SALMS)
Bruce Akey, Cornell University

SALMS hopes to improve communication across laboratories. Cornell has built the system. They have 10 active accounts – SC laboratory (which uses USA LIMS). Router does not care what type of info system used. Just uses HL7 message format (the one that was established for the NAHLN) for messaging back and forth. Labs have to register with the SALMS to get access to the Router. Building messaging with practice management software
is on the horizon. This is just a router. It doesn’t keep data. It just moves messages through it and keeps a log of the message but not the content. SAHO databases use USA HERDS data management system and this SALMS works with that. This is a free service. Contact Bruce Akey to become a participant. The participant’s LIMS just has to be able to send a receive messages. The hope is that SALMS provides a messaging hub to all the different spokes out there.

Subcommittee on Information Standards Update
Sara Ahola and Michael McGrath, co-chairs, provided the subcommittee report, which is included at the end of this Committee report.

STARS (Sample Tracking and Reporting System) an automated exchange of case data between Laboratory Information Systems in Australian government veterinary laboratories.
James Watson, Veterinary Investigation Leader, Australian Animal Health Laboratory

Australia has seven independent state animal health systems. The states run their own laboratories. There was a need for a unified LIMS system across the country and increase communication away from manual modes of communication between the state labs and the Australian Animal Health Laboratory. STARS (Sample Tracking and Reporting System) was developed as an automated exchange of case data between Laboratory Information Systems in Australian government veterinary laboratories. The goal was better tracking of data and test results while keeping client confidentiality. Also the states were reluctant to share the data with other states and the national government. In Phase 1 of the STARS project, they engaged stakeholders and the concept of STARS was developed. A Web portal was developed for submitting tests, tracking results and even proficiency testing. In Phase 2 of the STARS project, funding from the Australian Biosecurity Intelligence Network funded the further development and proof of concept testing of STARS. In addition to the web portal for specimen and test logging and tracking, a web service was develop to receive and send messages from the system to the different labs. Now in STARS Phase 3, they are continuing to develop the system and hope to include non-state labs or systems, such as international labs, quarantine stations, researchers, international agencies (such as WHO or OIE) and emergency/incident management. So, in Australian surveillance there is the national Animal Health Information System which is manual submissions and a restricted data set. There is also MOULD – Making Optimum Use of Laboratory Data – which will upload data via STARS. Eventually the goal is to integrate data systems present a single view. 2 FTE were used during the active part of the system (Phase 2)
Update on National Animal Health Monitoring System (NAHMS)
Bruce Wagner, USDA-APHIS-VS-CEAH

Dr. Wagner’s presentation was delivered by telephone. NAHMS update (by fiscal year) FY2013 now a statistical “unit” under the Confidential Information Protection Statistical Efficiency Act (CIPSEA) and so the information can now only be used for statistical purposes and they have pledged confidentiality for all contributors. None of the information gathered by NAHMS can be used for regulatory issues by VS. Activities in FY2013 – updating NASS, data collected so far includes the Poultry Layer Study on Salmonella Enteritidis, the PEDv study with AASV and U of MN, and the Dairy Herd Improvement Association Data and they get monthly information from them to do ongoing monitoring of dairy cow health. The established a Economic and Epidemiologic Modeling Unit that is now fully functional that supports disease outbreak preparedness, apply animal disease model, enhances animal disease modeling tools, and training and outreach to international partners. There are available on the NAHMS website the National Studies on Sheep and Cattle Feedlot 2011, Swine and Layers data collection was done in 2012, and starting 2014 studies on Dairy captive cervids, and captive bison. Also completed the Dairy Heifer Raiser study, the Urban Chick Ownership in Four US Cities Study, the Poultry Botulism Study, and the PEDV study with the AASV. In Development are additional studies on PEDV, Equine Herpes Myeloencephalopathy (EHM), and Antimicrobial Use and Resistance. Ongoing monitoring is being done on Somatic Cell Count, information from 2.5 mil cows (about 30% of US cows). Epidemiologic and Economic Modeling group has starting working on models for FMD. Also looked at a model from New Zealand (Interspread Plus ®) that looks at FMD and how it could be further spread by feral swine. In FY 2014 – they will report on the swine and layer data, they will start the bison and cervid data collection, they’ll look at doing something for equine, drug use, and epidemiological studies on PEDV and EHM will continue.

Committee Business

In old business, the response from APHIS on the SALMS resolution from 2012 (combined 6-11) was presented to the group.

In new business, the specific data standards needed on the eCVI and CVI are still debatable. How detailed do they need to be to meet the CVI. No new resolutions will be generated from the Committee.

The Committee will await the subcommittee report on the eCVI strands and then the parent committee will respond.

And additional update was provided, notifying members that swine industry will be a part of an Enhanced Passive Surveillance pilot project just like other breed groups have done with the Foreign Animal Zoonotic Diseases Center (FAZD).
REPORT OF THE COMMITTEE

REPORT OF THE SUBCOMMITTEE ON INFORMATION STANDARDS
Sara Ahola and Michael McGrath, Co-chairs

Attempting to control all these different Electronic health certificates (eCVIs) that were rapidly appearing on the marketplace. So, there was a need for standardization and smooth communication. State, Federal, Private-sector and academia were involved.

For the eCVIs – the common language was XML for data conversion. The subcommittee set up a website for input by the subcommittee members and so progress was made. Now the focus is on the details such as reporting of test data, enumeration of sex-type of the animal (castrated vs. intact for example). Next steps for this subcommittee is to come to agreement on the known issues, test the schema between systems, launch the schema to interested parties. NOTE these are VOLUNTARY guidelines, the free market will decide which guidelines are followed. The subcommittee will seek input (in two weeks or so) from the committee as a whole and will reach out via email or other.
REPORT OF THE COMMITTEE ON ANIMAL WELFARE

Chair: Gail Golab, IL
Vice Chair: Belinda Thompson, NY

Joan Arnoldi, WI; Chris Ashworth, AR; James Averill, MI; George Badley, AR; Deanna Baldwin, MD; Paul Brennan, IN; Gary Brickler, CA; William Brown, KS; Tom Burkgren, IA; Beth Carlson, ND; James Carroll, MO; Leslie Cole, OK; Stephen Crawford, NH; Glenda Davis, AZ; Ria de Grassi, CA; Ron DeHaven, IL; Linda Detwiler, NJ; Leah Dorman, OH; Dee Ellis, TX; J Amelita Facchiano, TX; Kathy Finnerty, NY; Betsy Flores, VA; W. Kent Fowler, CA; Nancy Frank, MI; Mallory Gaines, DC; Marion Garcia, WV; Julie Gard, AL; Robert Gerlach, AK; Eric Gingerich, IN; Chester Gipson, MD; Gail Golab, IL; Eric Gonder, NC; Chelsea Good, MO; James Grimm, TX; Kristin Haas, VT; Thomas Hagerty, MN; Thomas Hairgrove, TX; Rod Hall, OK; Steven Halstead, MI; William Hare, MI; Charles Hatcher, TN; Bill Hawks, DC; Julie Helm, SC; Linda Hickam, MO; Robert Hilsenroth, FL; Sam Hines, MI; Heather Hirst, DE; Donald Hoenig, ME; Ken Horton, TX; Danny Hughes, AR; Dennis Hughes, NE; John Huntley, WA; Annette Jones, CA; Dena Jones, DC; Jamie Jonker, VA; Karen Jordan, NC; Donna Kelly, PA; Diane Kitchen, FL; Patrice Klein, MD; Michael Kopp, IN; Daniel Kovich, VA; Eileen Kuhlmann, MN; Mary Lis, CT; Janet Maass, CO; Bret Marsh, IN; David Marshall, NC; Chuck Massengill, MO; David Meeker, VA; Antone Mickelson, WA; L Devon Miller, IN; Julie Napier, NE; Gene Nemechek, NC; Sherrie Niekamp, IA; Sandra Norman, IN; Dustin Oedekoven, SD; Elizabeth Parker, ITA; Boyd Parr, SC; Kris Petrini, MN; William Pittenger, MO; Jewell Plumley, WV; John Ragan, MD; Herbert Richards, HI; M. Gatz Riddell, Jr., AL; Kay Riddell, AL; Keith Roehr, CO; Bill Sauble, NM; Shawn Schafer, ND; David Schmitt, IA; Dennis Schmitt, MO; Stacey Schwabenlander, MN; Andy Schwartz, TX; Kathryn Simmons, DC; Harry Snelson, NC; Diane Stacy, LA; Philip Stayer, MS; Bruce Stewart-Brown, MD; Nick Striegel, CO; Scott Stuart, CO; Paul Sundberg, IA; Manoel Tamassia, NJ; Robert Temple, OH; Mary Kay Thatcher, DC; Belinda Thompson, NY; Beth Thompson, MN; Brad Thurston, IN; Alberto Torres, AR; Bob Tully, KS; Charles Vail, CO; Liz Wagstrom, DC; Jennifer Walker, TX; Patrick Webb, IA; Gary Weber, MD; Ellen Wiedner, FL; Norman Willis, ON; Ellen Mary Wilson, CA; Josh Winegarner, TX; Nora Wineland, MO; Richard Winters, Jr., TX; Cindy Wolf, MN; Ernest Zirkle, NJ.

The Committee met on October 23 at the Town and Country Hotel, San Diego, California, from 8 a.m. until noon. There were 59 members and 40 guests present. After the Chair called the meeting to order at 8:00 a.m., the final agenda was approved, activity during the past year was summarized, and operational procedures were reviewed. Members were referred to the USAHA website to review the 2012 resolutions and responses. The Chair introduced the first speaker for the session.
Coalition for a Sustainable Egg Supply Research Project Update
Joy Mench, Center for Animal Welfare, University of California—Davis

The Coalition for a Sustainable Egg Supply project was initiated by a diverse group of stakeholders to provide science-based information about the sustainability of three different types of egg production systems: conventional cage, aviary and enriched colony. Data on food affordability, egg quality and safety, hen health and well-being, worker health and safety, and environmental impacts were collected on a commercial farm in the Midwest that has these three systems. Preliminary results from the first flock cycle of the project were presented.

Why Foals Don’t Gallop in Utero: Studies in Transition of Fetal Consciousness with Potential Implications for Animal Welfare and Human Neonatal Health
John Madigan, Department of Medicine and Epidemiology and Director, International Animal Welfare Training Institute, School of Veterinary Medicine, University of California—Davis

The transition of consciousness at birth has important welfare implications for late-stage pregnancy and the neonatal period. Maternal- and fetal-derived neurosteroids affect pain perception, behavior, and adaptation to extra-uterine life. We recently discovered failures of transition of consciousness in ill neonatal foals. The potential implications for the health and welfare of the equine and other species including (possibly) human infants were discussed.

How Do We Know They Hurt? Nonverbal Cues and Pain Scales for Animals
Sheilah Robertson, Animal Welfare Division, American Veterinary Medical Association, Schaumburg, IL

Pain can only be treated if we look for I and recognize it. In animals, pain is what we say it is and because animals are non-verbal and cannot self-report, it is our duty to understand how they express pain. Research studies indicate that the most accurate way to measure pain in animals is based on behavior. In many species detailed ethograms have been developed comparing normal behavior with that seen during a painful event and these can be assigned numerical values. These pain scoring tools remove the influence of opinion, bias and subjectivity that have been used in the past.

Update on the ISO Animal Welfare Initiative
Craig Morris, Agricultural Marketing Service, USDA

Recent activity and decisions regarding ISO TC 34/WG 16 efforts toward an ISO technical standard on animal welfare applied to food producing animals were described. On July 15, 2013, a NWIP was approved and that NWIP is now being considered by the entire TC with voting to close on November 22, 2013.
ANIMAL WELFARE

Committee Business:
The business meeting followed the last presentation and the presence of a quorum was confirmed. Two resolutions were introduced.

After discussion, the first resolution was approved by the Committee to be transmitted to the Board of Directors that “The United States Animal Health Association supports passage of the Prevent All Soring Tactics (PAST) Act, H.R. 1518/S. 1406.” The concern prompting the resolution was that 40 years after passage of the Horse Protection Act in 1970, and its amendments in 1976, soring continues. As USDA’s ability to detect it has improved, methods used to sore horses have become more creative and deceptive. The PAST Act seeks to eliminate the soring of horses by improving USDA’s enforcement capabilities and strengthening penalties against violators. Specifically, H .R. 1518/S. 1406:

- Makes the actual act of soring, or directing another person to cause a horse to become sore, illegal, whereas the original HPA only bans showing, transporting or auctioning/selling a horse that is sore, not the actual practice.
- Prohibits the use of ‘action devices’ (e.g., boots, collars, chains, rollers, or other devices that encircle or are placed on the lower extremity of the leg of a horse) on any leg of Tennessee Walking Horses, Spotted Saddle Horses, or Racking Horses at horse shows, exhibitions, sales or auctions and bans weighted shoes, pads, wedges, hoof bands, or other devices (often referred to as ‘performance packages’) that are not used for protective or therapeutic purposes. These devices may facilitate soring (action devices) or may assist in avoiding its detection (performance packages). The American Association of Equine Practitioners and the American Veterinary Medical Association jointly called for a ban on the use of action devices and performance packages in the training and showing of Tennessee Walking Horses in 2012.
- Increases civil and criminal penalties for violations, and creates a penalty structure that requires a horse to be disqualified for increasing periods of time based on the number of violations.
- Allows for permanent disqualification from the show ring after three or more violations.
- Requires the USDA (rather than the current structure of horse industry self-regulation that has proven unsuccessful for more than 40 years) to license, train, assign and oversee inspectors to enforce the HPA.
- Amendments to the HPA proposed in the PAST Act are consistent with recommendations made by the AAEP in its 2008 white paper, “Putting the Horse First: Veterinary Recommendations for Ending the Soring of Tennessee Walking Horses,” and are supported by the AAEP, the AVMA, and the American Horse Council, as well as numerous other horse industry, veterinary, and animal protection organizations, and horse industry professionals. As of October 16, 2013, the House bill had more than 200 cosponsors and the Senate version had 18.
Resolution two, that “The United States Animal Health Association opposes the roping or lassoing of any equine by the legs (‘horse tripping’) during sport or entertainment, and during training and practice for such events. The Association calls on all public officials, as well as leaders within the rodeo industry, equine industry, veterinary medicine, and animal protection to find effective ways to eliminate this activity in the United States,” was likewise approved for transmission to the Board of Directors after discussion and an amendment (amended verbiage is provided). The concern prompting the resolution is the practice of roping the front or hind legs of a galloping horse, on foot or horseback—causing it to trip and come crashing to the ground—for the purposes of entertainment or sport. This inhumane activity is practiced in 3 of the 9 events typically held in a charreada or Mexican-style rodeo. Tripping is intentional and points are awarded for dropping the horse. The three events that include horse tripping are:

- Piales en lienzo—roping of the hind legs of a horse
- Manganas a pie—tripping or felling of a horse from on foot
- Manganas a caballo—tripping or felling a horse from horseback.

The intentional tripping of horses for sport or entertainment has been prohibited by the Professional Rodeo Cowboys Association (PRCA) and the National Professional Rodeo Association at their sanctioned events, and by the film and television industries, as monitored by the American Humane Association (“No Animals were Harmed”). Horse tripping differs from the popular rodeo event of calf roping because the high center of gravity of horses, and their longer legs and faster speed, creates more potential for injury, whereas the center of gravity for cattle is lower, they move more slowly and have sturdier limbs. Reported injuries include lacerations, dislocated joints, fractured bones and teeth and neck and shoulder injuries. Additional concerns have been expressed that the horses used for these rodeos are underfed and overused, repeatedly roped until lame, sometimes with rope burns down to the bone.

Horse tripping has been banned in eleven U.S. states. Other states have chosen to address this activity through the use of existing, less specific animal cruelty statutes. Unfortunately, this activity continues.

The resolution expresses opposition to horse tripping and calls on those with potentially the greatest influence to act to get this activity stopped. The resolution further respects variation by locale, organization and stakeholder need(s) by allowing flexibility in selecting the approach that may be most effective for each situation.

The Committee on Animal Welfare adjourned at 12:00 p.m..
REPORT OF THE USAHA/AAVLD COMMITTEE ON AQUACULTURE
Chair: Kevin Snekvik, WA
Vice Chair: Lester Khoo, MS

Marilyn Blair, ID; Deborah Brennan, GA; Stan Bruntz, CO; Beverly Byrum, OH; Nancy Chapman, MD; Debbie Cunningham, OK; Fred Cunningham, MS; Koren Custer, WV; Ria de Grassi, CA; James Foppoli, HI; Nancy Frank, MI; Richard French, NH; Suzanne Gibbons-Burgener, WI; Betsy Hart, AR; Jerry Heidel, OR; Donald Hoenig, ME; John Huntley, WA; Donna Kelly, PA; Lester Khoo, MS; Bruce King, UT; Kathy Kurth, WI; Scott Leach, CO; Anne Lichtenwalner, ME; Tsang Long Lin, IN; Fernando Mardones, CA; Otis Miller, MD; Regg Neiger, SD; Jenee Odani, HI; Lanny Pace, MS; Charles Palmer, CA; Kris Petrini, MN; Nicholas B.D. Phelps, MN; James Roth, IA; John Sanders, WV; A. David Scarfe, IL; Tara Schnell, WI; Kevin Snekvik, WA; Robert Temple, OH; John Williams, MD; Norman Willis, CAN.

The Committee met on October 20, 2013 at the Town and Country Hotel, San Diego, California, from 12:30 to 5:30 p.m. There were 9 members and 8 guests present. Dr. Snekvik gave the introductions.

USDA-APHIS VS Updates
Lee Ann Thomas (for Janet Whaley) USDA-APHIS VS

USDA APHIS Veterinary Services - Aquaculture Update. The VS Aquatic Animal Health Program has made progress on several key recommendations in the National Aquatic Animal Health Plan (NAAHP). These include establishing an agency advisory committee (Subcommittee on Aquatic Animal Health), moving forward with a laboratory network (a NAHLN approach) and developing an IT infrastructure (APHIS Surveillance Collaboration services) to support aquatic animal health surveillance data. A summary of recent activities is below:

Subcommittee on Aquatic Animal Health (SAAH) – We continue to work with the SAAH (Federal Advisory Subcommittee). The primary focus of this advisory group is to provide guidance on implementing the National Aquatic Animal Health Plan (NAAHP). Their most recent recommendations are as follows:

- APHIS should utilize the current National Animal Health Laboratory Network (NAHLN) with an understanding that appropriate state and federal funding are necessary.
- APHIS should work collaboratively with industry, State, and Tribal stakeholders to develop a new national model for fish health regulation under the National Aquatic Animal Health Plan.
- APHIS should pursue zonation to facilitate international and interstate movement per the Plan.

Aquatic Animal Health Laboratory Network – Pursuit to the direction provided by the SAAH, VS is moving forward with an initiative that will add aquatic diagnostic testing under the NAHLN. We will employ a three phased approach to implement this testing.
• Phase I – In Fall 2013, we will invite participating NAHLN laboratories to add protocols for VHS and infectious salmon anemia (ISA) testing to their repertoire in this phase.

• Phase II – In 2014, we will reach out to other Federal and State non-NAHLN laboratories (e.g., US Fish and Wildlife laboratories) and to private aquatic animal health testing laboratories about applying to the NAHLN. In addition, training opportunities will be offered to the non-NAHLN laboratories on meeting NAHLN requirements including details of administering quality management systems.

• Phase III – In 2015+, we will continue to add aquatic pathogen testing protocols based on a prioritized need.

**Multi-agency Infectious Salmon Anemia (ISAV) Surveillance Project in the Pacific Northwest** – We are continuing with the two year surveillance project for ISAV in wild and farmed salmon in the Pacific Northwest (as directed by Congress in amendment #893 of House Resolution (HR) 2112).

- Year One - sampling complete (wild and farmed); testing nearly complete for WA and AK. No ISAV findings.
- Year Two – sampling is underway; testing pending funding.

**APHIS Viral Hemorrhagic Septicemia (VHSV IVb) Policy in the Great Lakes** – Since the issuance of a Federal Order in 2006 that restricts the movement of 28 species of fish out of 8 Great Lakes state, no VHSIVb has been found on any aquaculture facilities. However, VHSV IVb continues to be reported in wild fish with the last report in May 2013 in 4 fish (2 gizzard shad, 1 yellow perch and 1 freshwater drum) from a fish kill in New York. APHIS is completing a risk assessment to help inform our decision about the need to maintain the APHIS Emergency Federal Order.

**Reorganization of USDA-APHIS-VS**
Lee Ann Thomas (for Drs. Joyce Bowling-Heyward and Peter Merrill) USDA-APHIS-VS

Dr. Thomas covered the drivers and guiding principles for the reorganization with gave the resulting VS structure which includes Surveillance, Preparedness and Response Services (SPRS), National Import/Export Services (NIES) and Science, Technology and Analysis (STAS). She also explained the key services that each of these sub-groups will provide. A key aspect of the reorganization is the formation of the 6 districts including their individual NIES Service centers which covers the entire country including Puerto Rico.

**Canadian Import Requirements for US Aquatic Animals**
Lee Ann Thomas (for Drs. Joyce Bowling-Heyward and Peter Merrill), USDA-APHIS-VS

Dr. Thomas provided the time line for the implementation of these regulations. She mentioned that USDA-APHIS certifies live animals for culture,
ornamental, research, live and dead cultured animals for Food servicers/retail use or further processing and aquatic products for bait and animal feed. NOAA Seafood Inspection Program certifies wild aquatic animal and all live mollusks for food services/retail use or further processing. She covered the key live aquatic animals that require the health certificates. Of importance is that there are no requirements for movement of tilapia. Health certificates must be issued by Category II APHIS-accredited veterinarian. She strongly suggested reviewing International Regulations (IREGS) (http://www.aphis.usda.gov/regulations/vs/iregs/animals/animal_canada.shtml) which would include the list of regulated species, animal export health certificates and instructions on how to complete these certificates. Diagnostic testing must be conducted at APHIS-approved laboratories (http://www.aphis.usda.gov/animal_health/lab_info_services/downloads/ApprovedLabs_Aquaculture.pdf)

Aquatic Animal Drug Approval Partnership (AADAP) Program: An Integral Partner for Aquaculture
Lester Khoo, Mississippi State University
The Aquatic Animal Drug Approval Partnership (AADAP) program is an integral component for the aquatic drug approvals. It manages the compassionate Investigational New Animal Drug (INAD) program that allows access to drugs/chemicals which would be unavailable otherwise to those involved in aquaculture. Animal safety and drug efficacy data generated through the INAD program has assisted in the drug approvals as well as extended label claims. AADAP is also a data generating partner for drug approvals and is an important resource for disseminating information on aquatic drugs. Loss of the AADAP program due to funding would be devastating for future drug approvals. Inadequate numbers of approved drugs/chemicals might drive those involved with aquaculture to consider non-approved drugs. It would also mean continued and greater dependence on imported seafood due to hampered US aquaculture. Use of aquaculture drugs is less regulated in other countries and even the limited FDA inspections and testing currently in place have revealed approximately 10% of the refusals of fisheries imports from January 2011 to August 2013 are due to drug adulterations.

Committee Business:
Resolutions:
In response to the AADAP presentation, a motion from the floor for a resolution to address this issue was made by Dr. Jerry Heidel and was seconded by Dr. David Scarfe. After discussion, the motion passed unanimously.

The Committee also discussed possible actions to support the resolution by engagement of the Government Relations Committee or politically through the producers and the National Aquaculture Association (NAA), American
REPORT OF THE COMMITTEE

Veterinary Medical Association, and the Association of Fish and Wildlife Agencies (AWFA), and the American Fisheries Society – Fish Culture Section.

Future Meetings:
1. Dr. Snekvik asked the committee if they are interested in including scientific presentations for the next committee meeting in Kansas City. Please send these suggestions to Drs. Snekvik and Khoo.
2. Dr. Snekvik announced that he will be stepping down after 2014 and requested recommendations of any AAVLD members to serve in his position.
The Committee met on October 22, 2013 at the Town and Country Hotel, San Diego, California, from 7:00 to 10:00 p.m. There were seven members and 12 guests present. The meeting was opened by J.H. Wolfram and Vice Chair Joe Huff was introduced. Due to retirement last year, Wolfram is stepping down as Chair and asked for a replacement. Dr. Donna Gatewood has volunteered to do so, pending appointment by the President. Additionally, the chairs have requested an afternoon time slot for 2014.

Vaccination of Wild Prairie Dogs against Plague Using an Orally-delivered, Virally-vectored Recombinant Vaccine
Tonie E. Rocke, USGS National Wildlife Health Center

Sylvatic plague, caused by the bacterium *Yersinia pestis* which was introduced into North America about 100 years ago, is a devastating disease of prairie dogs (*Cynomys* spp.) and the highly endangered black-footed ferret (*Mustela nigripes*) which depends on them for prey. We have developed a novel, virally-vectored sylvatic plague vaccine (SPV), deliverable via oral baits to wild prairie dogs. Laboratory studies have demonstrated that consumption of SPV-laden baits effectively protects prairie dogs against plague infection. Field studies to assess the use of SPV as a preemptive management tool against plague began in selected prairie dog populations in 2012. If successful, an oral vaccination program could be initiated in key locations to decrease the occurrence of plague epizootics in prairie dogs, reducing the source of bacteria while avoiding the indiscriminate environmental effects of dusting. Control of plague in prairie dogs, and possibly other wild rodents through the application of SPV, could help stabilize grassland ecosystems, significantly enhance black-footed ferret recovery, and achieve additional economic, environmental, and public health benefits.

Reshaping Antibody Diversity in Cows - Implications for New Diagnostics and Therapeutics
Vaughn Smider, Scripps Institute

Cows have limited genome encoded combinatorial diversity potential, yet mount a robust antibody response. Cows have few V-regions but exceptionally long complementarity determining regions (CDR) H3 loops, however the mechanism for creating diversity is not understood. Crystal structures of two
cow antibodies reveal that these CDR H3s form a very unusual architecture composed of a $\xi$-strand “stalk” that supports a structurally diverse, disulfide-bonded, “knob” domain. Deep sequencing revealed that ultralong CDR H3s contain a remarkable complexity of cysteines, suggesting that these disulfide-bonded mini-domains may arise during repertoire development. Sequence analysis indicates that diversity arises from somatic hypermutation of an ultralong DH with a severe codon bias towards mutation to cysteine. These unusual antibodies can be engineered to recognize ion channels and GPCRs through the knob structure, opening up unique opportunities for the generation of a new class of biologics.

Transforming the Animal Health Regulatory System for the 21st Century: The Institute of Computational Comparative Medicine and the Animal Health Regulatory Science Initiative
Ronette Gehring, Kansas State University
Jim E. Riviere, North Carolina State University

The Institute of Computational Comparative Medicine (ICCM) was recently established at Kansas State University’s College of Veterinary Medicine (KSU-CVM) as a direct result of the University’s continued commitment to supporting research and service that is directly related to animal health. The ICCM’s focus is to apply quantitative mathematical modeling and simulation techniques to problems in animal health and welfare, which includes predicting impacts on human health and food safety. New faculty will be hired to complement existing expertise at KSU-CVM, making the Institute a one-of-a-kind resource for the animal health industry. One of the goals of the ICCM is to spearhead transformation in the animal health regulatory system through the Animal Health Regulatory Science Innovation Initiative (AHRSII). AHRSII will facilitate incorporating 21st century science into the animal health regulatory system through the application of novel methods of computational comparative medicine and modern biology. This will be achieved with minimal disruption to existing and established procedures through co-operation and collaboration between the ICCM, industry and the FDA/CVM. An outcome of this initiative will be the training of a cadre of quantitative regulatory scientists capable of improving the underlying scientific basis of the regulatory system in which they will be employed. The long-term deliverables and benefits of this initiative would include development of a vetted, improved and state-of-the-art “animal health product regulatory tool box”. AHRSII is envisioned to be structured as an academic-industrial membership-fee consortium between the ICCM at KSU, and participating animal health companies with contracted consultative input from CVM/FDA. In essence, the AHRSII would serve as an independent translational animal health drug research institute focused on moving modern scientific practices from the bench to the approved drug arena.
Veterinary Services Reorganization
Elizabeth Lautner, National Veterinary Services Laboratories (NVSL), USDA-APHIS-VS

Five years ago, the Veterinary Services (VS) leadership started a review of the organization’s strategic direction. After reports from many working groups and development of the VS: New Perspective document, the Deputy Administrator in June 2012 announced the intent to reorganize VS and provided a draft business structure based on four units. Additional working groups and leadership interactions developed the final organizational structure. The VS reorganization has received the necessary approvals and is scheduled to take place in November 2013.

The four business units are:

1) **Surveillance, Preparedness and Response Services (SPRS)** – The SPRS unit will provide planning, policy, program, regulatory oversight and implementation for VS surveillance, preparedness and response activities. It consists of the functional areas of Commodity Health, Field Services, National Preparedness and Incident Coordination, National Veterinary Stockpile, and One Health Coordination.

2) **Science, Technology and Analysis Services (STAS)** – The STAS unit brings together the VS science centers to provide the solid scientific, technical, and analytical foundation needed to support VS in meeting its mission responsibilities. It includes the Center for Veterinary Biologics, the National Veterinary Services Laboratories, the Center for Epidemiology and Animal Health and the Office of STAS Interagency Coordination. The scientific functions include diagnostic capability and capacity; regulatory activities related to the approval and monitoring of veterinary biologics (vaccines and commercial diagnostic test kits); surveillance design, planning and analysis; economic analysis; risk assessments, and predictive modeling in economics and epidemiology.

3) **National Import and Export Services (NIES)** – The NIES unit provides policy direction, international collaboration and regulatory oversight activities associated with import, export and interstate movement of animal and animal products. It consists of the functional areas of Policy, Permitting, and Regulatory Services; Service Centers, Animal Import Center Services; Port Services; Agricultural Select Agent Services; and International Animal Health Standards Services.

4) **Program Support Services (PSS)** – The PSS unit oversees the budget, information management and technology, administrative services, training and recruitment activities, writing services and strategic planning.
Desert Bighorn Pneumonia Outbreak and Response: Old Dad Peak and Marble Mountains

Ben Gonzales, California Department of Fish and Wildlife

A pneumonia outbreak has been identified in desert bighorn sheep in Mojave National Preserve. The disease has been identified in the Old Dad system (Old Dad Peak and vicinity including Kerr, Vermin, Main Old Dad, and Kelso water sources). Clinically ill animals have also been identified in the Marble Mountains which are in a separate metapopulation; diagnostic tests are pending. A recent helicopter survey (July 16-18, 2013) indicated there were significantly fewer sheep than have previously been surveyed in the Old Dad system, suggesting a large mortality event has occurred.

To date approximately 30 sheep carcasses have been identified. Samples from many of these carcasses have been submitted for necropsy and/or veterinary diagnostic tests. Confirmed respiratory pathogens include *Mycoplasma ovipneumoniae* and *Bibersteinia trehalosi*. Both are bacteria which have been linked to other pneumonia outbreaks in bighorn sheep. Both are pathogens associated with domestic livestock including sheep, goats, and cattle. The inciting cause of the outbreak has not been identified; however, interaction with domestic livestock is suspected.

An interagency working group has been formed to monitor the outbreak, suggest best practices for limiting effects of the disease, and provide recommendations for management actions. Members of the working group represent the California Department of Fish and Wildlife, National Park Service, Oregon State University, and affiliated researchers. Funding and staff for this work is provided by the Wild Sheep Foundation, Society for the Conservation of Bighorn Sheep, California Department of Fish and Wildlife, and the National Park Service.

- Management actions currently under consideration include:
  - Collaring healthy bighorn sheep in areas peripheral to the outbreak to sample for disease surveillance, monitor disease spread, and determine sources of mortality;
  - Strategically using water sources to discourage connectivity between sub-herds in an attempt to limit disease spread;
  - And removing clinically ill animals from the population to limit disease spread.

- Exact dates and implementation plans for these considered actions are in development.

Veterinary Biologics Program: 2013 Highlights and Current/Emerging Issues

Rick Hill, Center for Veterinary Biologics

Dr. Hill presented the accomplishments of the Center for the past year and compared those accomplishments with the budgetary constraints that this office has had over the past decade. Hill also described the changes that will be occurring in this Center as a result of the reorganization that is occurring.
Dr. Byron Rippke and Mr. Steve Karli, proposed speakers, were not able to make the meeting this year due to government constraints.

Dr. Hill reported CVB-IC fiscal year 2013 activities for Mr. Steven Karli, Center for Veterinary Biologics-Inspection and Compliance (CVB-IC) who was unable to attend the conference. Due to the lapse in appropriated funding, final year end numbers were not available in time for USAHA. The presentation will be amended and posted to the CVB website in November 2013.

An update was provided on the Licensing, Serial Release, Testing Information System (LSRTIS) used by CVB as the primary information system for veterinary biologics review, release and compliance activities. CVB regulates more than 125 licensed veterinary biologics manufacturers and over 2,500 different licensed products. In FY2013, CVB provided market releases of veterinary biologics for over 90 billion doses of products. Status of LSRTIS modules and the ongoing system enhancements was summarized. It was also noted that as a result of USDA Departmental data consolidation, the application will be moving from Ames to the USDA data warehouse located in Kansas City.

CVB has utilized the VS Stakeholder Notification through GovDelivery. Stakeholders are encouraged to register with GovDelivery, through a link on the CVB website. In return, when CVB publishes Notices, Memoranda, or Regulations, stakeholders will receive a bulletin announcing the publication. In February 2013, approximately 8,000 stakeholders had registered. CVB has issued a total of 43 bulletins since March 2012.

A summary of the Business Process Improvement project for Electronic Notification of Serial Release was provided. The project was initiated in March 2013 and fully implemented by September 30, 2013 to provide manufacturers with an email notification of market release for veterinary biologics. This has reduced industry wait times and provides for timelier product delivery to customers.

Pharmacovigilance activities within the CVB were summarized. PVWorks has been fully implemented and is being utilized to track and analyze data related to limited adverse event reports (AER) for veterinary biologics. A proposed rule will be published in FY2014 to move the United States to mandatory reporting of summary report of AER’s. It is anticipated that a final rule would not be implemented prior to FY2016 or 2017.

An update on current Compliance initiatives was also provided. Infraction notices for license or permitted manufacturers continues to be a significant area of regulatory activity. Efforts reducing regulatory burden for the manufacturers, while still maintaining compliance was discussed. CVB is currently participating with two industry organizations to gather input and feedback for consideration of expanding process control deviations procedures.

Dr. Hill discussed the projects and priorities for the Unit in FY 2013 on behalf of Dr. Byron Rippke, Center for Veterinary Biologics-Policy, Evaluation and Licensing shared the Units Business Process Improvement. These process improvements focus on helping the Center position itself to implement
and expand its ability to receive licensing submissions electronically. These improvements should help the Center more efficiently utilize its resources relative to processing submissions, and reduce the time it takes to ultimately license new biological products.

Another highlighted project is the One-tier label claim proposed rule. This rule is intended to simplify the review of product applications, and provide enhanced product licensing information to the public.

Additionally, work-measures relative to licensing issues (up through September 15, 2013) were presented.

Committee Business:

There was no further business by the Committee. The meeting was adjourned following presentations.
The Committee met on October 21, 2013 at the Town and Country Hotel, San Diego, California, from 1:00 to 5:30 p.m. There were at least 19 members and at least 25 guests present. James Maclachlan and William Wilson, Chair and Vice-chair, respectively, introduced the meeting.

**Bluetongue in Europe: Lessons Learned**

Francisco Javier Reviriego Gordejo, Disease Control and Identification; European Union, Brussels, Belgium

Dr. Reviriego Gordejo presented an overview of the sequence of events that occurred in Europe during their recent bluetongue outbreaks that began in the Mediterranean Basin in 1998. He then reviewed the EU response to this event, notably mass vaccination of livestock and animal movement restrictions. He also provided an update for the current situation and stressed the importance of ongoing surveillance informed by risk assessment. Bluetongue virus (BTV) serotype 1 has recently reappeared in Sicily and portions of Italy, with severe disease and high mortality among susceptible sheep.

Gordejo then discussed the remarkable occurrence of so-called “vaccine incidents” in which apparent live-attenuated strains of BTV serotypes 6, 11 and 14 have been naturally spread amongst farm livestock in northern Europe. Whereas the strains of BTV 6 and 11 were present only transiently, BTV-14 is still present in Europe. This virus was first identified in 2011 in livestock imported into Spain from Poland, and was again detected in animals imported to Spain from Lithuania. The virus was subsequently detected among livestock in Lithuania, Estonia, Latvia and Poland, and had been actively circulating in western Russia including in the region adjacent to the border with Belarus.

The EU has concluded that these “vaccine incidents” will “die out over time”, which they consider has subsequently come to pass. There are
concerns in the EU that intentional introduction of BTV strains complicate the understanding of infection and occurrence of disease.

**Development and Application of an *in vivo* Model for Studies of Vector Capacity of *Culicoides* spp. for Bluetongue and other Arboviruses.**
Matthew R. Van der Saag¹,², M. Ward² and Peter D. Kirkland¹
¹Virology Laboratory, Elizabeth Macarthur Agriculture Institute, Menangle NSW Australia
²University of Sydney, Camden NSW Australia

The international profile of arboviruses that are transmitted by biting midges from the *Culicoides* genus has become much more prominent in the last decade with widespread transmission of bluetongue virus (BTV) and more recently the emergence of Schmallenberg virus in Europe. While there is little doubt that most of these viruses are transmitted by *Culicoides* spp., it can be difficult to generate the data required to satisfy criteria for the acceptance of a midge species as a competent vector of a virus. Major elements include proof that the insect of interest takes a blood meal from a particular mammalian host, infection of the insect species with the virus, replication of the virus in the insect and subsequently transmission of the virus back to the animal host. Research to support these criteria can be extremely difficult because there are few midge species that have been colonized and raised under laboratory conditions. Further, transmission experiments typically require ruminants, with associated management, husbandry and ethics considerations. The small size of *Culicoides* spp. also makes research with many species in the genus very difficult. Consequently in most circumstances only limited indirect or partial data have been produced to support the role of an individual insect species as a vector. In recent times, this has involved detection of the virus in wild caught insects, use of semi-quantitative ‘real time’ PCR to demonstrate high levels of nucleic acid consistent with virus replication in the insect, and specifically high virus levels in the head or salivary glands suggesting a capacity to infect a mammal when taking another blood meal. To address these issues, we have developed an *in vivo* model using embryonated chicken eggs (ECE) and applied it to studies of vector competence of the major Australian vector of BTV, *Culicoides brevitarsis*, the smallest midge in the genus.

The kinetics of BTV replication and viraemia in inoculated embryos was monitored by qRT-PCR in individual ECE by collecting small volumes of blood several times per day. At peak viraemia, wild caught insects (raised as unfed adults, recently emerged from cattle dung) were placed in a small cage attached to the egg shell and allowed to feed on exposed blood vessels and membranes. Virus levels in the embryo blood were monitored pre and post feeding in each experiment. Engorged midges were held and fed on sucrose for the incubation period. To monitor potential virus replication, a proportion of insects were sampled at different time points and virus loads monitored by qRT-PCR. After an 8-10 day incubation period, pools of surviving midges were allowed to feed on uninfected chicken embryos. After this second feeding period, BTV ribonucleic acid (RNA) levels were quantified in individual midges.
Virus replication was also monitored in the ‘uninoculated’ ECE to establish whether the midges had transmitted virus. This model has many advantages, including the capacity to test field caught insects, study ‘wild type’ virus, has no need for ruminants, can be undertaken at short notice and has the capacity to test large numbers of replicates. Orthobunyaa and other viruses may also be studied.

National Surveillance: Bluetongue Virus (BTV) and Epizootic Hemorrhagic Disease Virus (EHDV) isolations/PCR positives; Calendar year 2012
Eileen Ostlund, USDA-APHIS-VS National Veterinary Services Laboratories

Bluetongue virus or ribonucleic acid (RNA) was detected in 51 samples submitted or collected during calendar year 2012. The positive bluetongue virus isolation (VI) and polymerase chain reaction (PCR) test results from submissions to the National Veterinary Services Laboratories (NVSL) in 2012 are listed in Table 1.

<table>
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<tr>
<th>State</th>
<th>No.</th>
<th>Species</th>
<th>PCR</th>
<th>VI</th>
<th>Other Info</th>
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<td>BTV-10</td>
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<td>Negative (1), Not done (1)</td>
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<tr>
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<td>LA</td>
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<td>Frozen blood submitted for typing</td>
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During calendar year 2012, 142 samples tested positive for EHDV by virus isolation and/or PCR. The positive EHDV isolation and PCR test results from submissions to NVSL in 2012 are listed in Table 2.

<table>
<thead>
<tr>
<th>State</th>
<th>No.</th>
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<th>PCR</th>
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<th>Other Info</th>
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<tr>
<td>LA</td>
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<tr>
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<td>1</td>
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<td>Elk</td>
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<tr>
<td>ND</td>
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<td>Positive</td>
<td>Negative</td>
<td>Unable to type</td>
</tr>
<tr>
<td>OK</td>
<td>1</td>
<td>Cattle</td>
<td>BTV-13</td>
<td>Negative</td>
<td></td>
</tr>
<tr>
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<td>1</td>
<td>Cattle</td>
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<tr>
<td>SD</td>
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<tr>
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<td>State</td>
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<td>PCR</td>
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<td>---------</td>
<td>---------------------</td>
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<td>IL</td>
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<td>EHDV-6</td>
<td>Negative or not done</td>
<td>1 also BTV-13</td>
</tr>
<tr>
<td>IL</td>
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<td>Deer</td>
<td>EHDV-6</td>
<td>EHDV-6</td>
<td>1 also BTV-13</td>
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<tr>
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<tr>
<td>IA</td>
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<tr>
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<td>EHDV-6</td>
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<tr>
<td>IA</td>
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<td>EHDV-6</td>
<td>EHDV-6</td>
<td></td>
</tr>
<tr>
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<tr>
<td>MN</td>
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</tr>
<tr>
<td>MO</td>
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### REPORT OF THE COMMITTEE

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<th>VI</th>
<th>Other Info</th>
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### SCWDS Update: Hemorrhagic Disease and *Culicoides* sp. Surveillance

Drs. Joseph Corn, David Stallknecht, and Ms. Stacey Vigil, Southeastern Cooperative Wildlife Disease Study (SCWDS), University of Georgia

An update hemorrhagic disease and *Culicoides* surveillance was given. The SCWDS, in collaboration with the USDA-APHIS- VS, conducts surveillance for epizootic hemorrhagic disease and bluetongue viruses, and for *Culicoides* vectors of these viruses. Collection of data for the 2012 National Report on Hemorrhagic Disease (HD) Activity in the United States has been completed. This annual summary of HD activity, which is conducted through a questionnaire sent to multiple facilities and personnel in every state, has been assembled and distributed annually since 1980. Diagnostic work related to HD conducted during 2013 has included virus isolation attempts from animals (primarily white-tailed deer) submitted from Florida, Georgia, Indiana, Iowa, Kansas, Louisiana, Maryland, Michigan, Mississippi, Missouri, Montana, New Jersey, New Mexico, North Carolina, Tennessee, Virginia, and West Virginia. To date, EHDV-1 (Indiana, Mississippi), EHDV-2 (Iowa, Missouri, Mississippi, Montana), and BTV-17 (Montana) have been isolated from white-tailed deer. In view of the isolation of several exotic EHD and BT viruses from deer, as well as detection of exotic orbiviruses among livestock in the USA in recent years, SCWDS, following consultation with USDA-APHIS-VS, has implemented a surveillance program for endemic and exotic species of *Culicoides* midges in
the Southeast United States. New state records for nine species of Culicoides in 13 states have been identified and surveillance is ongoing.

Molecular Evolution of Field Strains of Bluetongue of Epizootic Hemorrhagic Disease Viruses
Bill Wilson¹, Dane Jasperson¹, Donna Johnson², Eileen Ostlund², Raymond Lenhoff³, Pejman Naraghi-Arani³, Mark Ruder¹, Andrew Allison⁴, David Stallknecht⁴, and Timothy Smith⁵
¹USDA, ARS, Arthropod-Borne Animal Diseases Unit
²USDA, APHIS, VS, National Veterinary Services Laboratory
³Lawrence Livermore National Laboratory
⁴Southeastern Cooperative Wildlife Disease Study (SCWDS), University of Georgia
⁵Meat Animal Research Center

The Arthropod-Borne Animal Diseases Research Unit (ABADRU) has adapted the published single primer ligation - whole genome amplification protocol that allows the whole bluetongue and epizootic hemorrhagic disease virus genome to be amplified without prior sequence knowledge and submitted to high-throughput DNA sequencing. This technology was applied to bluetongue virus serotype 3 isolates from Florida, Arkansas, Mississippi, Central American and the Caribbean basin. The analysis dataset is consistent with hypothesis that these viruses were introduced from the Central America and the Caribbean basin. The BTV-2 in California was also submitted to a similar analysis that indicated that this virus was likely introduced into FL then moved south to the Caribbean and West to CA. A historical molecular characterization of EHDV strains has been completed and used to compare recent 2012 strains causing clinical disease in cattle. Finally, this analysis was performed on BTV-11 isolated from two separate canine cases that demonstrated that the virus isolates were almost identical. These studies indicate the value of this technology in understanding virus epidemiology and ecology.

The Arthropod-Borne Animal Diseases Research Unit: Research Program Update and Current Status
William C. Wilson, Lee W. Cohnstaedt, Barbara S. Drolet, Robert Pfannenstiel, Dana Nayduch, Mark G. Ruder and D. Scott McVey
USDA-ARS, Arthropod-Borne Animal Diseases Research Unit

The Arthropod Borne Animal Diseases Research Unit’s (ABADRU) research mission is to solve major endemic, emerging, and exotic arthropod-borne disease problems in livestock. The Unit completed the move to Manhattan, Kansas in 2010 and now the ABADRU is well established at the Center for Grain and Animal Health Research (CGAHR). Five new scientists that were hired to replace the scientific staff that did not relocate to Kansas are well on the way to establish new research ABADRU programs under the Agricultural Research Service (ARS) National Research Programs: NP103 and Animal Health and NP104, Veterinary, Medical, and Urban Entomology. The
areas of research range from vector biology to understand virus-host interactions to better control these important diseases. The ABADRU and Kansas State University hosted an Orbivirus Gap analysis meeting last year. This unfunded workshop organized by the USDA-APHIS, USDA-ARS, and Department of Interior (DOI) was in response to the resolution made last year regarding the need for a gap analysis and research efforts to control Orbiviruses, and was successful because of participants from the U.S. and around the world. The result of this analysis will be published and available at the following link: www.ars.usda.gov/OrbivirusesGapAnalysis.pdf. The analysis addressed surveillance, diagnostics, virology, vector control and vaccines. The diagnostic and surveillance group determined that there are well standardize diagnostics for BTV in terms of export testing; however, this could be improved for EHDV and for routine diagnostic testing. There is a need for a coordinated network for surveillance of activity. The NAHLN is designed for surge capacity in an event of an outbreak but is not utilized for national surveillance. Although there is good science in the virology and vector biology around these viruses, there are still many basic science questions that need to be addressed. Tools to develop vaccines are available and the ideal characteristics of these vaccines were agreed upon. Although no formal alliance was established, it was generally agreed that international communications and coordination of efforts will be continued to facilitate progress toward addressing these important vector transmitted diseases.

Committee Business:

The Committee reviewed the response to the Resolution passed in 2012 and Bill Wilson updated results of the Gap Analysis that was convened by USDA in response to this resolution (see above). The Resolution encouraging vaccine development and increased study of bluetongue and epizootic hemorrhagic disease was also again forwarded to the Committee on Nominations and Resolutions. No additional resolutions were proposed. The issue of Committee leadership was discussed because both the Chair and Vice-chair positions were subject to five year review. Given the highly unusual nature of this year’s meeting with the Federal shutdown, and the considerable “unfinished business” of the original Committee agenda for the 2013 meeting, it was proposed, seconded, and supported unanimously that Drs. Maclachlan and Wilson continue as Chair and Vice Chair of the committee for the coming year, which will be referred to the President.
The Committee met on October 21, 2013 at the Town and Country Hotel, San Diego, California from 1:00 to 5:30 p.m. There were 48 members and 77 guests present. Introductions of Vice Chairs and Subcommittee Chairs were made. An overview of the 2012 meeting and resolutions were given.

Presentations and Reports

Dr. Phil Elzer presented the Scientific Advisory Subcommittee Report, which is included at the end of this report.

Dr. Joe Corn presented the Feral Swine Subcommittee Report, which is included at the end of this report.

Dr. Marty Zaluski presented the Greater Yellowstone Area (GYA) Report, which is included at the end of this report.

Dr. Lee Ann Thomas presented the National Brucellosis Program Update.
Montana Report Summary
Marty Zaluski, Montana State Veterinarian

Brucellosis detections: Two cattle herds located in the Designated Surveillance Area (DSA) of Montana were detected during fall testing in 2013.

- On September 25, 2013, a two-year-old cow in a Madison County DSA herd cultured positive for *B. abortus*.
  - The culture positive animal was detected through pre-slaughter testing as required by Montana regulations. She was not pregnant and had a negative test in July 2012. A whole-herd test revealed two more reactor animals in a test of over 1,100 cattle for a herd infection rate of 0.27%. All three animals were managed together and most likely represent a single point exposure.

- On October 4, 2013, DOL received positive *B. abortus* culture results on a seven-month-old bull from a second herd. This herd is located in the DSA of Park County. The bull was the only non-negative animal in a whole-herd test of 550 animals which would calculate to a herd infection rate of 0.18%. The bull’s dam was tested annually since 2010 and remains negative after five tests (2010, 2011, 2012, and two tests in 2013).

*B. canis* was isolated from a two-year-old Labrador Retriever that presented for discospolydylitis. The animal was adopted from a rescue facility as a neutered puppy. No link to wild elk or bison could be established.

Designated Surveillance Area (DSA) Compliance Assessment

Nearly 280 herds use the DSA at some time of the year. One-hundred-ninety-two (69%) herds are resident, while 88 (31%) herds use the DSA for only part of the year (typically summer grazing).

Montana Department of Livestock (MDOL) conducted a compliance assessment with DSA regulations in the fall of 2013. The assessment found that 236 herds (84%) submitted at least one brucellosis test during the last fiscal year; while 44 herds (16%) submitted no brucellosis tests (figure 2). As expected, herds that did not participate in testing tended to be smaller, and therefore, the 16% of non-participating herds only represented 7% of DSA cattle (figure 3).

Of the 44 non-participating herds, 17/44 herds did not sell or move test-eligible animals, no longer used the DSA or sold all their animals. Therefore, these 17 herds were in compliance even though they did not test any animals. These herds have an average herd size of 40 animals.

Herds out of compliance (sold or moved test-eligible animals that were not tested), numbered 27 herds (9.6%) of the total DSA herds. These herds numbered 4,323 cattle. The majority of the non-compliant herds (22/27) were due to an error by market personnel who: a) did not check the market computer for flagged brands that denote that a brand requires testing, or b) superseded the flag with their own assessment of grazing location. This error
BRUCELLOSIS

has since been corrected. Five herds representing 1,372 animals were out of compliance for other reasons.

**Brucellosis Rule Changes**

- **Testing in the Designated Surveillance Area**
  - Breeding cattle out of the Designated Surveillance Area must be tested for brucellosis regardless of age. Non-breeding cattle tested at 12 months and older.
  - Clarified that DSA cattle must be tested for brucellosis prior to shipment to slaughter (pre-slaughter testing) to ensure that they are not missed by the scaled down national MCI program.

- **Testing for dairy goats:**
  - Removed the requirement for brucellosis testing of dairy goats if imported for exhibition and not originating from a surveillance area for brucellosis (DSA).

**Idaho Report Summary**

Bill Barton, Idaho State Veterinarian

The Idaho State Department of Agriculture (ISDA) continues to work with livestock producers throughout the state to address the risk of transmission of brucellosis from infected elk to cattle. Two livestock herds that were identified in 2012 as affected with brucellosis remain under quarantine. A herd of domestic bison located well within Idaho’s DSA was determined to be affected with brucellosis following testing due to known interaction with elk. The herd was put under quarantine and a herd plan implemented. The herd has completed three whole herd tests and at least one reactor was identified on each of the tests. Heifer and bull calves from this herd are being fed to slaughter only in an Idaho approved feedlot. The herd will remain under quarantine until three (3) consecutive negative whole herd tests have been achieved.

A small beef herd was identified in April, 2012 as affected with brucellosis. The herd was located just outside of Idaho’s Designated Surveillance Area (DSA) and prompted expansion of the DSA. The herd was put under quarantine and a herd plan implemented. The herd had undergone two consecutive negative whole herd brucellosis tests however another reactor was identified on the post calving whole herd test. The herd will remain under quarantine until three consecutive negative whole herd tests have been achieved. All bull calves from this herd are castrated and all heifer calves are spayed.

In September, 2012, USDA-APHIS-VS completed a review of Idaho’s Brucellosis Management Plan (BMP). Several recommendations were made for enhancement of Idaho’s brucellosis management activities and action has been taken on all recommendations.

The review recommended expansion of Idaho’s DSA. Prior to the review, plans were already underway to expand the DSA to include the area where the affected beef herd was identified. The 2013 Idaho Legislature approved
expansion of Idaho’s DSA to include the entirety of Fremont County in the DSA.

The review recommended that the ISDA work with Idaho Department of Fish and Game (IDF&G) to enhance surveillance of wild elk in areas around the DSA. The ISDA holds a brucellosis coordination meeting at least annually with the IDF&G to discuss brucellosis activities. Enhanced hunter surveillance was conducted in the fall and early winter on 2012. The coordination committee adopted a rotating scheme for hunter surveillance in game management units outside of the current DSA. The IDF&G will conduct live animal capture and testing of wild elk when feasible. Both agencies will continue to work aggressively with livestock producers to implement actions to prevent elk/cattle interaction.

The review also recommended that the ISDA work with the USDA to implement pre-slaughter testing of all DSA cattle at Idaho livestock markets. Markets that receive cattle from Idaho's DSA are required to test those animals for brucellosis. The ISDA has been closely monitoring testing compliance at the markets and has been working to identify direct to slaughter sales at ranches to insure they are pre-slaughter tested as well.

Enhanced enforcement of movement testing and identification of DSA cattle was recommended by the review team. Unlike Wyoming and Montana, Idaho does not have county to county brand inspection requirements for movement. In order to better enforce the current testing requirements for cattle leaving Idaho’s DSA, the ISDA is proposing a change to Idaho’s Rules Governing Brucellosis that will require cattle producers utilizing Idaho’s DSA to obtain a permit from the ISDA prior to movement out of the DSA to other areas of Idaho. This will allow enhanced enforcement of testing requirements for cattle leaving the DSA. Numerous negotiated rulemaking meetings were held with affected producers and the Idaho Cattle Association (ICA) regarding the rule change and producer support for the change was widespread. The rule change will require the approval of the 2014 Idaho Legislature.

Finally, the review team recommended that the ISDA increase public outreach regarding brucellosis. Multiple meetings were held with the Idaho Cattle Association general membership. The ICA appointed a producer committee to assist with enforcement of testing requirements and provide input on enhancement of Idaho’s brucellosis management plan. Numerous local meetings with producers in and around the DSA were held. The IDF&G is assisting with outreach to hunters and landowners.

The ISDA and Idaho’s cattle producers remain committed to managing appropriately to prevent the risk of transmission of brucellosis from wildlife to cattle. Industry support and assistance with enforcement of Idaho’s brucellosis testing requirements for cattle leaving our DSA are paramount to our success. That support has never been greater as we work to ensure that the brucellosis risk in Idaho is managed appropriately.
Wyoming Report Summary
Jim Logan, Wyoming State Veterinarian

Wyoming currently has one herd of domestic bison under quarantine for Brucellosis. This herd was initially placed under quarantine in the fall of 2010 and it has been verified that the source of infection is wild elk. All suspect and reactor animals found on any herd test are removed direct to slaughter or strict isolation for terminal feeding and conditioned for slaughter. This herd is within the boundaries of Wyoming’s Designated Surveillance Area (DSA).

In September 2012, USDA-APHIS-VS conducted a review of Wyoming’s DSA activities to assess the effectiveness of our surveillance and prevention efforts. The key strengths recognized were 1) good testing and surveillance in livestock, 2) good movement documentation, monitoring, and documentation through brand inspection, 3) buffer area around the DSA, and 4) good record keeping and availability. The review team offered five recommendations: 1) development of a formal template for written herd plan for affected herds, 2) increase surveillance on slaughter cattle leaving the DSA, 3) continue wildlife surveillance, 4) continue producer education, and 5) increase the number of herd plans. Even prior to the review, we had begun requiring testing of direct to slaughter cattle due to the decrease in the national slaughter surveillance system. We have completed a written template for affected herd plans and have continued producer education efforts and development of herd plans based on risk assessment. The Wyoming Game and Fish Department (WGFD) has increased its’ wildlife surveillance efforts and risk mitigation efforts.

In 2013, the Wyoming Game and Fish Department found two brucellosis sero-positive elk on hunter-killed elk surveillance about 30 miles outside of the DSA. This represents the first time Brucellosis has been found outside the boundaries of the DSA since Wyoming achieved brucellosis-free status in 1985. The Wyoming Livestock Board (WLSB) has responded to this finding by conducting testing on test-eligible, female cattle in two counties (Big Horn County and Sheridan County), which are in the vicinity of the elk herd unit from which the sero-positive elk were found. Testing is being done on ranches/farms and at all Wyoming markets, along with two Montana and two South Dakota markets, at WLSB expense. Additionally, risk assessments are being conducted on area herds to determine if cattle/wildlife conflict exists that could cause exposure risks. The WGFD has also increased its elk surveillance activities in the area to determine the elk sero-prevalence rate in the elk herd unit. The WLSB will utilize cattle and elk surveillance data and results to determine any rule changes of DSA boundary change proposals.

Wyoming requires calfhood vaccination statewide for all heifers that will remain in a breeding herd. All sexually intact female cattle that inhabit the DSA must be calfhood vaccinated or adult vaccinated. From July 1, 2012 to June 30, 2013 (state FY2013), 218,011 female cattle/bison were Brucellosis vaccinated – this includes calfhood, yearling booster and adult vaccinations. There were 72 herds that conducted adult and/or yearling booster vaccinations during the state fiscal year 2013, which accounts for 4,239 of the total head vaccinated statewide. The WLSB has a statewide identification requirement for
sexually intact female cattle 12 months of age and over to be officially identified prior to any change of ownership. Additionally, all sexually intact female cattle, regardless of age, that are in the DSA at any time must be officially identified prior to moving from the DSA.

All female cattle from the DSA sold for breeding purposes (regardless of age) and all females 18 months and over are required to be tested within 30 days prior to change of ownership, movement from the DSA, and interstate movement. Between October 1, 2012 and September 31, 2013 (Federal FY2013), 39,835 head of cattle were tested from Wyoming’s DSA and the area we are currently conducting surveillance on in response to sero-positive elk previously mentioned. This figure represents cattle tested on farms/ranches, at market, and at slaughter. All cattle 12 months and over are required to be tested at Wyoming slaughter plants. Cattle numbers that are within the Wyoming DSA total 79,200 head. We have 132 DSA Brucellosis herd plans and 43 herd plans for producers outside the DSA. Our test and identification requirements provide good surveillance, traceability and early detection. The WLSB Brucellosis requirements are well enforced through brand inspection since any change of ownership or inter-county and interstate movements must include a brand inspection clearance.

Status of the Yellowstone National Park (YNP) Remote Delivery Vaccination Program EIS
Dave Hallac, National Park Service

In 2000, the National Park Service committed to evaluating whether to implement remote vaccination of Yellowstone bison within the park for *Brucella abortus* using a rifle-delivered bullet with a vaccine payload. An Environmental Impact Statement (EIS) was prepared to analyze three alternatives: a) continue syringe vaccination of calves and yearlings periodically captured at the park boundary; b) continue syringe vaccination and remotely vaccinate calves and yearlings; and c) continue syringe vaccination and remotely vaccinate calves, yearlings, and adult females. Preliminary analyses indicate remote delivery vaccination would not achieve a substantial reduction in brucellosis prevalence at this time due to: 1) the limited understanding of bison immune responses to brucellosis suppression actions such as vaccination; 2) the absence of an easily distributed and highly effective vaccine; 3) limitations of current diagnostic and vaccine delivery technologies; 4) effects of bison nutrition, condition, and pregnancy/lactation that lessen protective immune responses from vaccination; 5) adverse consequences to wildlife and visitors from intrusive brucellosis suppression activities; and 6) chronic infection in sympatric elk that would re-infect bison. Collaborative research to answer uncertainties, improve technology, minimize adverse impacts, and lower operational costs will be an important component for developing strategies that could reduce brucellosis infection rates in the future. A final decision will be made by the Intermountain Regional Director in autumn 2013.
Mexico Brucellosis Update
Jose Alfredo Gutierrez, CGRPA, Mexico

The Campaign in Mexico has begun in 1991. The overall campaign aims to eradicate brucellosis in cattle, sheep and goats throughout the country. Aiming specifically to cattle, sheep and goats present a low prevalence. We care with the campaign: 33 million head in cattle (30.5 beef, dairy 2.5), valued in U.S. at $19 billion. Eight million head of goats, valued at U.S. $338 million. Sheep, nine million head, valued at U.S. $677 million.

The campaign is operated by 8,718 people focused on the administration, operation and organization of the exercise of such a campaign.

The main strategic actions exerted by the campaign are: intensive vaccination, culling reactors to the official laboratory tests, passive and active surveillance, as well as, training.

The Campaign has the following indicators:

- Diagnostic test: Cattle 1,402,000; Goats 93,469; Sheep 106,714.
- Vaccines: Cattle 4’810,459; Goats 1’001,989; Sheep 59,083.
- National frequency of the disease in areas "A": Cattle 0.09%; Goats 0.01%; Sheep 0.04%.
- Free Herds: Cattle 3,245; Goats 134; Sheep 289.

This year has been obtained the brucellosis eradication phase in the State of Colima and the Hidalgo Huasteca’s, A1 and A2 regions in Puebla and A region in Chiapas.

Elk Brucellosis Prevalence Reduction Study
Brant Schumaker, University of Wyoming – Wyoming State Veterinary Laboratory

Cattle producers and state wildlife management agencies have undertaken several management strategies to reduce the risk of elk (Cervus elaphus)-cattle (Bos taurus) brucellosis transmission in the southern greater Yellowstone area (GYA). However, cases of brucellosis continue to appear in cattle and domestic bison in the GYA, and the wildlife-livestock brucellosis interface has the potential to expand. With decreasing funding available to combat brucellosis, a better understanding of the regional cost-effectiveness of management strategies is necessary. We surveyed cattle producers in the southern GYA to determine where their cattle herds were located and whether producers observed elk overlapping with their cattle during winter months. We used this information to create a resource selection function for elk-cattle overlap. We then used the elk-cattle overlap model as an input to a risk model to estimate the number of years until a cattle case was expected. We modeled three management strategies (Test and Slaughter, Strain 19 vaccination, and low density feeding) to effect varying reductions in elk seroprevalence, thus increasing the number of years until a spillover event was expected. Next, we compared the net change in the annualized cost of a brucellosis case to the annualized cost of the management strategy. For all three management
strategies, costs exceeded estimated benefits. If the maximum that society is willing to pay for a management strategy is equal to its expected benefit, none of these three management strategies should be employed. However, if society is willing to pay more for management than its expected benefit, or if the costs of a brucellosis outbreak increase, one or more strategies may be adopted. Based upon our cost-benefit analysis, low-density feeding of elk has the least-negative net benefit and should be the top strategy chosen.

National Brucellosis Program Update Summary
Lee Ann Thomas, USDA-APHIS-VS

Since July 10, 2009, all 50 States, Puerto Rico, and the U.S. Virgin Islands have been classified as Class Free for bovine brucellosis. Late in fiscal year 2013, state surveillance identified one bovine brucellosis-affected herd in Montana. During fiscal year 2013, five bovine brucellosis affect herds – two herds (one bison and one beef herd) located in Idaho, two bison herds in Montana and one in Wyoming – were held under test and remove protocols. However, as a result of the interim rule, there was no loss of Class Free State status due to new provisions.

During fiscal year (FY) 2013, greater than 2.9 million head of cattle were sampled under the National Bovine Brucellosis surveillance program, reflecting approximately 2.9 million head of cattle tested at slaughter and approximately 164,000 head of cattle tested at market. Approximately 383,000 additional head of cattle and domestic bison were tested as a result of other surveillance activities. The primary reasons for testing on-farm or ranch includes testing for movement and sale (~44%), testing associated with MCI reactor investigations and affected herd epidemiologic investigations (~32%), herd certification testing (~19%), private sale (~13%), and testing for show or exhibition (~11%). There were approximately 3.6 million calves and approximately 19,500 adult cattle vaccinated for brucellosis and there were approximately 1,100 brucellosis certified-free cattle herds.

Since the publication of the Brucellosis interim rule in December 2010, the 60-day comment period has ended and thirty comments were received from private citizens, State agencies, industry groups, animal welfare organizations, environmental groups, and Congress. The rule has been designated as significant by the Office of Management and Budget. Additional economic analysis and civil rights impact analysis were completed and in July, APHIS provided additional information to the department regarding the changes reflected in the interim rule. The final rule remains in the departmental review process.

APHIS continues to develop new regulations and supporting standards for the brucellosis and TB programs. Under the proposed approach, the Code of Federal Regulations will provide the legal authority for the programs while the details of the programs will be described in a program standards document. APHIS intends to publish both the Proposed Rule and Program Standards in the Federal Registry in early calendar year 2014. Both documents are currently under Departmental review.
In July 2011, Veterinary Services (VS) announced changes to the National Bovine Brucellosis Slaughter Surveillance Program. This included reducing the brucellosis slaughter surveillance samples from approximately six million samples to approximately three million samples. In 2012, due to growing budget concerns, VS evaluated the program and determined further modifications were needed to our baseline surveillance activities to improve the program’s cost effectiveness. The revised goal is to detect *Brucella abortus* infection with a 95 percent confidence that the prevalence level does not exceed one infected animal per 100,000 animals and documenting disease freedom at that level. After presenting this plan in August of 2012, further discussion took place with the National Assembly of State Animal Health Officials (NASAHO). Revisions were made to the slaughter surveillance plan. The target number of samples to collect is 1.9 million samples in 11 slaughter establishments. Veterinary Services started implementing this revised plan in October of 2013. VS will continue to evaluate the brucellosis surveillance program and will propose further changes to participating plants or number of samples collected if necessary.

**Committee Business:**

Two resolutions were brought before the Committee for discussion, both resolutions passed and forwarded to the Committee on Nominations and Resolutions.
The Subcommittee met at the Town and Country Hotel, San Diego, California on October 20, 2013 with five attendees: Don Davis, TX, Don Evans, KS, Valerie Ragan, MD, Walt Cook, WY; absent: Jack Ryan, CO, Steve Olsen, IA.

Presentations:
There were no presentations; this was due to the Federal Government shutdown. All of the scheduled presenters were from the USDA.

Discussions:
A few questions were posed to the subcommittee regarding latent/exposed heifer syndromes:
1. Are calves latently infected from a positive dam only (can environmental infections prior to puberty also contribute to this phenomenon)? Committee response: The classical definition of a latent brucellosis heifer is exposure in utero, but environmental exposure prior to puberty can also contribute to these issues.
   a. Are there any documented cases of environmental infection leading to latency? Committee response: Yes there are documented cases.
2. At what age does a latently infected animal manifest as a seropositive animal (anecdotally, the bison quarantine study seems to suggest that no later than puberty)? Committee response: There are many factors which need to be taken into account before an age can be pinpointed, and those include but are not limited to: environmental factors, infectious dose, vaccination status, genetics, stage of gestation, etc.
3. Along the same lines of the above…What are circumstances that lead to a heifer being latently infected? Committee response: See the response to number two.
4. What is the probability of a breeding female being latently infected? Committee response: The probability is variable.
5. What is the most recent case report of a latently infected animal? Committee response: It has been decades since the last case because of restrictions put in place regarding heifers, but a vast majority of those heifers were spayed or slaughtered.
   Another question came to the committee regarding white-tailed deer.
6. Do white-tailed deer get Brucellosis? Committee response: Testing of white-tailed deer, mule deer and pronghorn antelope for interstate movement has been conducted for 30 years. Tens of thousands of these species have been tested, and very few had detectable titers. The success of the brucellosis eradication program in cattle has not been negatively impacted by these species.
BRUCELLOSIS

The committee is waiting for some formal questions from the GYA group.

Subcommittee Business

There was no old business. The subcommittee is open to rendering opinions on scientific matters, and all formal requests need to go through Chair Jim Logan.

The committee went into a closed door discussion and has the following to say:

There is a high likelihood that seropositive animals in a known area of exposure are infected; however, a certain percentage of exposed heifers will remain sero-negative until near or after calving (USAHA proceedings 2012, Evans' report). The committee would be happy to review any risk assessments related to the topic of potential herd exposure.
The subcommittee met on October 20, 2013 with Chair, Marty Zaluski, calling the meeting to order at approximately 2 p.m. The subcommittee meeting was held in conjunction with the Scientific Advisory Subcommittee and the Feral Swine Subcommittee.

Subcommittee members present included: Jim Logan, Dave Hunter, Bill Barton, Michael Gilsdorf, Neil Anderson, Marty Zaluski, Susan Keller, and Rick Wallen. Mark Drew was absent.

The subcommittee received a presentation by Brant Schumaker on a cost benefit analysis of wildlife interventions in the Greater Yellowstone Area (GYA) that may reduce the rate of infections in cattle. Schumaker, et al modeled three management strategies: test and slaughter, Strain 19 vaccination, and low density feeding on feedgrounds. For all three management strategies, costs exceeded estimated benefits. However, low-density feeding of elk had the least-negative net benefit.

The subcommittee also discussed and voted on a recommendation to the GYA states to share data with the Scientific Advisory Subcommittee to allow a more thorough assessment of risk of heifers latently infected with brucellosis.
Dr. Joseph Corn provided an update on the National Feral Swine Mapping System (NFSMS). SCWDS began producing nationwide feral swine distribution maps in 1982 by working directly with state and territorial natural resources agency personnel. In 1982, 17 states reported feral swine in a total of 475 counties. With support from USDA-APHIS-Veterinary Services (VS) the SCWDS developed and implemented the National Feral Swine Mapping System (NFSMS) in 2008. The NFSMS is an interactive data collection system used to collect and display current data on the distribution of feral swine in the United States. The feral swine distribution maps are produced using data collected from state and territorial natural resources agencies, USDA-APHIS-Wildlife Services (WS), and other state/federal wildlife and agriculture agencies. The map is available to be viewed by the public on the NFSMS home page. Distribution data submitted by agency personnel are evaluated by SCWDS on a continual basis, and the distribution map is updated with verified additions on a monthly basis. Feral swine populations and/or sightings are designated either as established breeding populations, or as sightings, but only established breeding populations are included on the map and in the total of the number of states with feral swine. Over 600 additions have been made to the feral swine distribution map through the NFSMS since January 2008. The NFSMS is accessed via the internet at http://www.feralswinemap.org/. Additional data are provided to state/federal agencies and universities on request. Although the distribution of feral swine continues to increase in the United States, feral swine were recently eliminated from Nebraska. Established feral swine populations were reported in 37 states in 2011, but currently in 2013 are reported as present in 36 states.

Dr. Tom Gidlewski, United States Department of Agriculture (USDA), Wildlife Services (WS), National Wildlife Disease Program gave an update on USDA-APHIS-WS. The National Wildlife Disease Program of the National Wildlife Research Center, USDA-APHIS-WS continues to monitor feral swine removed by WS state operations throughout the United States. The monitoring is based upon targeted surveillance of high risk populations as well as populations of unknown risk status. As one of the data streams for the Classical Swine Fever surveillance program, WS takes the opportunity to test those animals for swine brucellosis, pseudorabies and other diseases as well. Brucella and pseudorabies positive populations of feral swine continue to be discovered. In 2013, the Wildlife Disease program coordinated the sampling program conducted by our state disease biologists in which approximately 3,000 feral swine samples were collected in 34 states. For 2014, there is a
proposed feral swine plan designed to accelerate control efforts aimed at the rapidly expanding population of feral swine, dependent on funding.

Dr. Lindsey Holmstrom, Foreign Animal and Zoonotic Disease (FAZD) Center, AgriLife Research, Texas A&M University System, gave a presentation on the implications of potential transboundary disease spread in U.S. feral swine populations. The continued increase in the number and distribution of U.S. feral swine populations raises serious concerns regarding their potential role in infectious disease spread and persistence. With respect to disease spread, the U.S. feral swine population is largely an unknown ecologic system. The introduction of exotic transboundary diseases into feral swine populations could go undetected for some time, fadeout, or become endemic. Although U.S. feral swine populations are currently free from these diseases, other countries’ experiences emphasize the important role of ecological factors affecting disease spread and persistence. These factors include population distribution and density, social and spatial structure, population dynamics, movement, habitat connectivity, and inter-species contact. A compilation of knowledge of these factors within the U.S. feral swine population is presented. To better assess the risk of feral swine for spreading diseases, intensive locational data of GPS collared wild pigs were collected in California from 2010 to 2012 at study sites representing three different ecoregions. Analyses were performed to assess the association between landscape pattern and habitat selection of feral swine, to characterize and compare the distribution of movement patterns between sounder groups and solitary boars, and to identify the spatial connectivity of wild pig populations and assess disease mitigation strategies. By better understanding movements and interactions of feral swine over various landscapes, the epidemiologic and ecologic factors involved in disease spread can be identified and control measures effectively assessed.

Dr. Cristopher Young, USDA-APHIS Veterinary Services (VS), provided a presentation on a project to evaluate *Brucella suis* in Dairy Cattle. The impact of the growing feral swine population in the United States is creating disease pressure for interspecies infection with *B. suis*. Of particular interest is the infection of dairy cattle with *B. suis* and the subsequent risk from raw milk consumption. A Grassroots Project is on-going in Georgia to evaluate and define the interface of feral swine and dairy cattle, to perform targeted brucellosis surveillance, develop a survey instrument to evaluate risk factors for dairy farms, and finally to develop materials for outreach.
REPORT OF THE COMMITTEE ON CAPTIVE WILDLIFE AND ALTERNATIVE LIVESTOCK
Chair: Peregrine Wolff, NV
Vice-Chair: Julie Napier, NE

Wilbur Amand, PA; Paul Anderson, MN; Scott Bender, AZ; Warren Bluntzer, TX; Deborah Brennan, GA; Kristina Brunjes, KY; Beth Carlson, ND; Donald Davis, TX; Mark Drew, ID; John Fischer, GA; Nancy Frank, MI; Richard French, NH; Tam Garland, TX; Richard Gerhold, TN; Robert Gerlach, AK; Paul Gibbs, FL; Colin Gillin, OR; Michael Gilsdorf, MD; Chester Gipson, MD; Greg Hawkins, TX; Kristi Henderson, IL; Terry Hensley, TX; Michael Herrn, OK; Linda Hickam, MO; Robert Hilsenroth, FL; David Hunter, MT; John Huntley, WA; Shylo Johnson, CO; Kevin Keel, CA; Karl Kinsel, TX; Diane Kitchen, FL; Patrice Klein, MD; Terry Kreeger, WY; John Lawrence, ME; Francine Lord, CAN; Konstantin Lyashchenko, NY; David Marshall, NC; Chuck Massengill, MO; Leslie McFarlane, UT; Robert Meyer, WY; L Devon Miller, IN; Michele Miller, FL; Eric Mohlman, NE; Jeffrey Nelson, IA; Sandra Norman, IN; Dustin Oedekoven, SD; Mitchell Palmer, IA; Janet Payeur, IA; William Pittenger, MO; Jewell Plumley, WV; Justin Roach, OK; Keith Roehr, CO; Mark Ruder, KS; Emi Saito, CO; Shawn Schafer, ND; David Schmitt, IA; Dennis Schmitt, MO; Stephen Schmitt, MI; Roy Schultz, IA; Andy Schwartz, TX; Charly Seale, TX; Laurie Seale, WI; Daryl Simon, MN; Jonathan Sleeman, WI; Manoel Tamassia, NJ; Cleve Tedford, TN; Robert Temple, OH; Charles Thoen, IA; Lee Ann Thomas, MD; Brad Thurston, IN; Kurt VerCauteren, CO; Rick Wahlert, CO; Ray Waters, IA; Scott Wells, MN; Skip West, OK; Ellen Wiedner, FL; Kyle Wilson, TN; Nora Wineland, MO; Richard Winters, Jr., TX; Jill Bryar Wood, TX; Mary Wood, WY.

The Committee met on Tuesday, October 22, 2013 at the Town and Country Hotel, San Diego, California, from 8:00 a.m. to 12:47 p.m. There were 40 members and 43 guests present.

Presentations and Reports

Update on Mycoplasma bovis Infection in Bison and Cervid Species
Dave Hunter, National Bison Association
Peregrine Wolff, Nevada Department of Wildlife

Mycoplasma bovis infections have resulted in the loss of bison from Western Canada to Oklahoma. Bison losses in the Turner bison herd started in 1999 in yearling animals. Six years later, Mycoplasma was the reason for losses in older bison in their New Mexico herds. In 2009 and 2011, two Turner herds suffered a loss of fifteen to twenty percent of the breeding bison cows on infected properties. In 2011 a similar outbreak in Canada reported losses up to 60 percent in many of the breeding herds in Alberta and Saskatchewan. A team of research scientists, regulatory officials, veterinarians, and industry representatives from the U.S. and Canada stated "mycoplasma in bison has become a primary pathogen. It may be the most important disease facing the
bison industry”. A research project conducted at USDA, ARS identified that M. bovis from a combined sample of Canadian and U.S. isolates was able to infect bison without other virus precursors. In cattle, results showed the need for a concurrent inoculation of BVDV to create disease. The efficacy and safety of an autogenous vaccine is currently being investigated.

*Mycoplasma bovis* has been diagnosed in free-ranging and farmed cervids in a number of states. Lesions described were similar to those reported for M. bovis in cattle.

**The American Association of Zoo Veterinarians (AAZV) Infectious Disease Committee (IDC) Manual on Infectious Diseases affecting Captive and Free-ranging Wildlife in North America**

Julie Napier, Omaha’s Henry Doorly Zoo and Aquarium

In 2006 the European Association of Zoo and Wildlife Veterinarians (EAZWV) published a Transmissible Disease Notebook covering approximately 100 diseases affecting captive and free-ranging wildlife in Europe. It was written and reviewed by approximately 50 zoo and wildlife veterinarians. The purpose was to provide a brief review of infectious diseases in wildlife to both practicing veterinarians and regulatory officials regarding such topics as transmissibility, species affected, and the reportable status in each country, thus enabling them to determine whether to move animals both within a country and between countries, while following established laws and guidelines.

That same year the Infectious Disease Committee (IDC) of the AAZV elected to produce a version for North America and, with the permission of the EAZWV, used their Notebook as a template. In 2011 the IDC published the first edition of the Manual on Infectious Diseases affecting Captive and Free-ranging Wildlife in North America on the publicly available portion of the AAZV website. It provides two to five page fact sheets on 163 bacterial, fungal, parasitic and fungal diseases affecting wildlife in captive and free-ranging settings. It was written by 106 authors, reviewed by 216 reviewers from the AAZV as well as a number of professional organizations, educational institutions and government agencies. It also provides reportable status in all 50 United States, Canada and Mexico. This manual, designed to be a starting point for information and to provide additional resources on these diseases, works in concert with the European version and is a living document designed to be updated every 18 to 24 months. A second addition is forthcoming at the end of 2013.

The website address:
http://www.aazv.org/displaycommon.cfm?an=1&subarticlelenbr=754

**Elephant Care Stakeholders Taskforce, Tuberculosis Update**

Kay Backues, Tulsa Zoo

Background:

The Management and Research Priorities of Tuberculosis for Elephants in Human Care Stakeholders Task Force (hereafter, the “Elephant Care Task
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Force”), ECT for brevity, is a group of specialists in the fields of elephant husbandry, elephant veterinary medicine, elephant management, zoonotic and human infectious disease, public health, and animal sciences. The ECT first convened in 2011 and has since met annually to address questions and concerns over the science and data supporting the 2010 and proposed 2012 USAHA generated, Guidelines for the Control of Tuberculosis in Elephants, hereafter referred to as ‘The Guidelines’. The ECT meetings have been sponsored by the AAZV, EMA, IEF, Feld, and the Zoos that have hosted the meetings; Fort Worth-2011, Tulsa 2012, Pittsburgh-2013. These meetings have been by invitation only and have brought together professionals representing all aspects of the industry that work with elephants. The meetings have not always produced consensus but have produced actionable items, highlighted areas for future research and sought evidence based medicine solutions in regard to elephant treatment and diagnosis.

The ECT believes that the 2010 and 2012 Guidelines, which are a significant departure from the 2008 Guidelines, raise serious procedural, public policy, scientific, veterinary and legal issues. Furthermore they do not support or further enhance elephant health and welfare. The 2010 and 2012 Guidelines would result in the unnecessary and unfair restrictions on the movement of animals in interstate commerce, and breeding, as well as the unnecessary and in some cases harmful treatment of animals that do not actually have disease and present no disease risk to other animals or to the public. The Guidelines would have a disparate impact on traveling elephant exhibitions and such impacts need to be fully considered and justified.

Currently the USDA is using the 2008 Guidelines and the 2010 Guidelines are under consideration. The 2012 Guidelines produced by USAHA elephant TB subcommittee are still under review by that USAHA subcommittee. The ECT has submitted lengthy reviews with recommendations to both groups about the 2010 and 2012 guidelines respectively.

Current Statements from the ECT:

1. While tuberculosis is a serious disease that can and does impact the welfare of elephants, experience indicates that it is manageable under the current 2008 Guidelines and that continued scientific inquiry and study is appropriate.

2. Current data indicates tuberculosis in elephants has a low infectivity and a low prevalence in the current captive elephant population, ~8 % with 2-3 new cases a year. (Feldmen 2013).

3. The frequently cited literature, Greenwald 2009 reports the sensitivity, Se and specificity, Sp of the Chembio serologic tests as a 100% for a small population of known status animals, i.e. samples from animals that had been confirmed with Mycobacterium tuberculosis (Mtb) infection via microbial culture. However no paper has reported the true Se and Sp in the entire captive population, where individual animal’s infection status cannot be determined. The Greenwald 2009 paper is cited erroneously in the Guidelines and other papers and can cause misinterpretation of testing results for elephants whose true status cannot be confirmed via culture.
4. The ECT has sent a resolution with four parts to the USAHA Committee on Tuberculosis and the USAHA Committee on Captive Wildlife and Alternative Livestock.
   
   a. USAHA to recommend to the USDA to postpone implementation of the 2010 guidelines, until a complete review of all submitted comments, new research and ECT recommendations can be completed.
   
   b. USAHA to recommend to the National Assembly of State Animal Health Officials (NASAHO) endorsement of the USAHA 2008 Guidelines for the Control of Tuberculosis in Elephants as the most current guidance for issues related to importation and movement of elephants across state lines.
   
   c. In light of the critical role and valuable input of the American Association of Zoo Veterinarians (AAZV) in developing the original 2008 Guidelines for the Control of Tuberculosis in Elephants, the United States Animal Health Association urges the USAHA Elephant Tuberculosis Subcommittee and the USDA to collaborate with the AAZV and the ECT in the review of the 2010 and 2012 proposed Guidelines to ensure that they reflect the best science, data and research available and incorporate stakeholder input.
   
   d. The United States Animal Health Association directs the USAHA Subcommittee on Elephant Tuberculosis to conduct a de novo review of the 2010 and 2012 versions of Guidelines for the Control of Tuberculosis in Elephants. The subcommittee should encourage compliance with regulatory bodies consistent with the 2008 Guidelines until such a review is complete.

The ECT has been funding independent research and inquiry to help answer some of the questions associated with mycobacterium tuberculosis (Mt) disease in elephants. These projects include:

1. An industry wide epidemiological survey of tuberculosis in captive elephants at U.S. facilities. This is currently underway with expected completion sometime in late 2014.

2. An evidence based review of all published elephant Mt diagnostic papers. This paper is in its final review by authors with expected submission for publication in late 2013 or early 2014.

3. Evaluation of other Mt diagnostics that may have potential as tools for the diagnosis of Mt in elephants, such as GeneXpert, IGRAS, High definition cytometry and other antigen, agent based testing. A group within the ECT participants has been tasked with a research and proof of concept proposal for a nucleic acid amplification study to be submitted for review to the ECT meeting in 2014.

4. Development of a fact sheet for state veterinary health officials containing referenced human and livestock health risk information. Provide this fact sheet quickly and easily to state animal health officials and provide contacts for further questions.

The members and sponsoring institutions of the ECT are committed to pursuing answers to the questions and problems the presence of Mt in captive elephants pose. The ECT supports the best health and welfare decisions for elephants in human care in the U.S., having all members of the
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elephant community at the table for open discourse and facilitating the dissemination of information about the disease to regulatory and public health care providers.

USDA Contingency Planning and Training through Partnerships
Yvonne Nadler*1, Y. Johnson-Walker2, S. Olson3, and J. Briscoe4
1Lincoln Park Zoo; 2Department of Veterinary Clinical Medicine, University of Illinois; 3Association of Zoos and Aquariums; 4United States Department of Agriculture, Animal Care.

When compared to traditional agricultural species, captive wildlife and alternative livestock are a small percentage of the total number of animals in the United States. However, they may have irreplaceable genetic or monetary value. They may be part of a zoological park, cherished by members of an entire community. Given the unique requirements of some of these species, traditional contingency planning tools and training may not address all the needs of these animals and their caretakers.

This presentation will update the audience on projects of interest to stakeholders in the captive wildlife-alternative livestock communities. Funded by United States Department of Agriculture (USDA), Animal Care, these projects were designed to a) provide guidance for all hazards contingency planning for managed wildlife; b) provide opportunities for collaborative discussion across the industries; and c) provide Incident Command System training and a chance to use that knowledge in a functional internet exercise. Partnerships between USDA, Association of Zoos and Aquariums, University of Illinois and others made the project goals achievable. The audience will be given an update on future collaborative opportunities.

CervidTB Stat Pak® and DPP Testing in 2013
Lee Ann Thomas, USDA-APHIS-VS

In late 2012 Veterinary Services approved two new serological tests for TB in cervids: The Stat-Pak and the dual-path platform (DPP). The testing protocol was published in a VS Guidance Document and in an Interim Rule to the 9CFR. Three webinars to inform animal health officials, private practitioners, and cervid producers were presented. National Veterinary Services Laboratory (NVSL) began testing cervid blood serum samples collected by private practitioners in February, 2013. Animals testing positive to first Stat-Pak and DPP tests were retested after 30 days with the DPP. If the second DPP is positive, animals are classified as reactors and may be indemnified and submitted for necropsy and sample collection for TB testing. The DPP tests, which resulted positive, produced a line on the cassette and were being read visually as negative or positive per test kit instructions. A colorimetric reader was also being used in the laboratory to obtain a numerical optical density (OD) reading for visually positive samples. This data was recorded and kept for future use and analysis. During the spring cervid TB testing season, 5,214 cervids of five species have been tested from 25 states. White tailed deer were the largest number of any species tested and represented the largest number
of reactors. Forty four necropsies have been conducted on white tailed deer, elk, and fallow deer. No lesions typical of TB were found on the necropsies and to date, 29 samples have been negative on culture and 13 cultures are pending. APHIS-VS recognizes that a larger number of positive tests and false positives have occurred than expected based on our data from the test validation studies and previously published scientific papers. The statistical analysis on our testing data performed by USDA’s Centers for Epidemiology and Animal Health indicates that with a test combination specificity of 97.7% and a sensitivity of 77% we can be 95% sure that the cervid population prevalence of TB is less than 0.29%. The DPP reader OD values from retrospectively tested banked serum samples of known infected animals and presently tested negative animals were analyzed statistically. The statistical analysis allowed for negative/positive OD numerical cutoff values to be determined giving an acceptable sensitivity and specificity for the tests. A new testing protocol using the DPP test OD numerical values and established cutoff points for calling a test negative or positive was developed. There were still 12 living reactor animals and after reclassification, two remained as reactors based on the new OD cutoff values. Of 23 suspect animals remaining, only one animal remained as suspect. The new protocol and supporting information and statistical analysis was submitted to the USAHA Tuberculosis Scientific Advisory Subcommittee for review and comment.

Goals for CWD Herd Certification Program

Lee Ann Thomas, Ruminant Health Programs, USDA-APHIS–VS

An overview was presented of the voluntary national Chronic Wasting Disease (CWD) herd certification program for farmed deer, elk, and moose as well as established minimum standards for interstate movement of cervids. The purpose of the Herd Certification Program (HCP) is to provide clarification and guidance on how to comply with and meet requirements of the CWD rule and contains two Parts: Part A – Herd Certification and Part B – Guidance on Response to CWD-affected herds.

Funding for the program is through APHIS-VS Equine, Cervids, Small Ruminants (ECSR) Commodity Health Line which funds essential activities for surveillance and program operations with flexibility to respond to new and emerging health concerns.

A review of the FY 2013/14 Program Activities of APHIS-VS which included federal oversight of the voluntary national CWD HCP as well as the principle activities conducted that pertain to the HCP.

Based on available resources, APHIS will serve in an advisory capacity to Approved States for 1) epidemiological investigations of positive findings; 2) development of herd plans (newly infected herds); 3) quarantine, depopulations, cleaning and disinfection; and 4) assistance with annual herd inspections and tri-annual physical herd inventories.

FY 2013/14 Program Activities required for Approved States included 1) compliance with CWD rule; 2) annual reports; 3) management of HCP data; 4) reporting positive cervid herds to APHIS; 5) respond, investigate, and manage
any positive, suspect, and exposed animals/herds; and 6) develop herd plans for positive/exposed herds.

The CWD Interim Final Rule (CWD Herd Certification Program and Interstate Movement of Farmed or Captive Deer, Elk, and Moose) was published in the Federal Register June 13, 2012 with a public comment period. The effective date of the rule was August 13, 2012.

Part 81 of the Rule delayed enforcement until December 10, 2012. Public comments have been considered and affirmation of a final rule is in development. The Revised federal rule applies only to the following genera known to be susceptible to CWD by natural infection including, Cervus (elk, red deer, sika deer), Odocoileus (white-tailed deer (WTD), mule deer (MD), black-tailed deer (BTD) and Alces (moose). States may have requirements for other cervid species.

The objectives of the CWD rule are to 1) provide uniform minimum requirements for state CWD herd certification programs (HCPs); 2) provide uniform minimum requirements for interstate movement of CWD susceptible species; 3) provide a regulatory framework to support domestic and international markets for farmed cervids and cervid products; and 4) provide a consistent approach towards minimizing risk of introduction and transmission of CWD in cervid populations.

Provisions of the CWD rule include 1) Part 55 (Subpart A): Indemnity, Laboratory Approval, Official Laboratory Testing; 2) Part 55 (Subpart B): Voluntary national Approved State CWD HCP for farmed cervids (deer and elk) (fencing requirements, animal ID and herd inventory requirements, surveillance - testing mortalities >12 months, and herd status – based on years of surveillance and participation in HCP), 3) Part 81: Interstate movement minimum requirements ) establishes minimum requirements for interstate movement of cervids. The CWD rule does not include international movement regulations.

States having a CWD HCP may request federal approval of their State program which will be approved by APHIS in accordance with CWD rule (9 CFR 55.23). As of October 2013, there are 29 Approved State HCPs. Approved states must have a signed memorandum of understanding (MOU) with APHIS that addresses 1) authority to restrict animal movement; 2) enforces and monitors quarantines; 3) surveillance and disease reporting capability; 4) animal identification; 5) designated CWD HCP coordinator; 6) mortality surveillance; 7) recordkeeping and data management; 8) ability to conduct epidemiologic investigations; 8) education/ outreach for producers; 9) herd plans (CWD positive/exposed herds); and 10) annual reports to renew Approved status.

Herd owners already participating in State CWD programs will keep initial State enrollment date (first date of participation) when State is designated an Approved State CWD HCP. There is no available funding projected for FY2014 to support direct herd owner enrollment in the national program. Herd owners must comply with animal identification, fencing requirements, reporting
escapes & mortalities and mortality testing for certified status, herd records and inventories, separation from other herds, and status of herd additions.

A CWD Working Group was formed to review and provide input on revisions to the CWD Program Standards (2012 USAHA Resolution). Members included representatives from the cervid industry, state animal health officials, state wildlife agencies/ Association of Fish and Wildlife Agencies (AFWA), and diagnostic laboratories (AAVLD/NAHLN), and APHIS-VS. Meetings were conducted through weekly teleconferences and topics discussed included – physical inventory, sample collection, missing samples, reporting mortalities and escapes, transiting, herd plans, trace outs, animal identification, fencing, and interstate movement.

Further information can be found at: http://www.aphis.usda.gov/animal_health/animal_diseases/cwd.

A Review of the Orbivirus Gap Analysis: Conclusions and Research Recommendations
William Wilson, Center for Grain and Animal Health Research, USDA-ARS

Bluetongue and epizootic hemorrhagic disease viruses are of concern to livestock producers in North America because of 1) the emergence of new serotypes; 2) increased reports of spill over and clinical disease in cattle; and 3) increased spread and adaptation to new geographical areas. Accordingly, USAHA passed Resolution 16 in October 2012, requesting the United States Department of Agriculture (USDA), and the United States Department of Interior (DOI) to arrange a diversified blue-ribbon panel (including: industry stakeholders, university and federal researchers, federal and state regulatory agencies) to determine research needs and identify and prioritize intervention strategies.

In response to USAHA Resolution 16, the USDA in collaboration with the DOI, organized a gap analysis workshop comprised of international experts on Orbiviruses. On May 14-16, 2013, at the Arthropod-Borne Animal Diseases Research Unit, in Manhattan, Kansas, the Orbivirus Working Group (OVWG) conducted a gap analysis workshop of the available scientific information and assess countermeasures to effectively control and mitigate the impact of an outbreak of an emerging Orbivirus with epizootic potential, with special emphasis given to bluetongue virus (BTV) and epizootic hemorrhagic disease (EHD) virus. The OVWG will prepare a report that will 1) define the threat; 2) provide a gap analysis of our knowledge of animal orbiviruses; 3) identify priority research needs; and 4) provide an in-depth analysis of available countermeasures to contain and mitigate the threat.

Results from the workshop included recommendations on diagnostic testing, vector control, and vaccines. A number of Working Groups (Virology, Diagnostics, Epidemiology, Vector Control, and Vaccines) were formed and also provided specific recommendations. Research gaps relative to EHDV vaccine development were also identified.

Further information can be found at: www.ars.usda.gov/OrbivirusesGapAnalysis.pdf.
**Committee Business:**

There was one resolution presented and passed by the Committee regarding a National Review of Research Needs for Chronic Wasting Disease. The resolution was submitted requesting that the USAHA request the USDA, and the U.S. Department of Interior (DOI) to arrange a diversified blue-ribbon panel (which would include industry stakeholders, university and federal researchers, and Federal and State regulatory agencies) to determine research needs and identify and prioritize intervention strategies for the control of Chronic Wasting Disease. The resolution was moved by member Warren Bluntzer and seconded by Glen Zebarth, and forwarded to the Committee on Nominations and Resolutions.

A recommendation was presented to the Committee on Captive Wildlife and Alternative Livestock to create a new Committee on farmed cervidae. The motion to form the new Committee was moved by Richard Winters and seconded by Paul Anderson. A vote following discussion was tied 13 to 13. The following is a copy of the recommendation with some preliminary edits. It was felt by many of the members that if this Committee was approved that there should be some significant modifications to the mission statement, which was proposed as follows:

**Background:**

*The farmed cervidae industry is unique in that producers deal with diseases, regulations and political issues which are unlike any other animal agricultural industry.*

To effectively address these issues requires a national forum for discussion. The creation of a new USAHA committee where farmed cervidae producers can work together with state and federal regulatory officials and scientists to solve the problems faced by the industry is critical.

**Mission:**

“The purpose of the Committee on Farmed Cervidae is to provide a national forum to (1) discuss scientific, regulatory and political issues affecting the farmed cervidae industry, (2) evaluate state and federal regulatory programs, (3) develop effective programs to control diseases, and (4) recommend regulatory programs that contribute to the growth and prosperity of the farmed cervidae industry while mitigating disease risks.”

The Committee adjourned at 12:47 p.m.
The Committee met on October 20, 2013 at the Town and Country Hotel in San Diego, California, from 1:00 to 5 p.m. There were ten members and six guests present. The meeting included several presentations pertinent to the Committee's purpose.

Presentations and Reports

*Availability and Use of Veterinarians by Small-scale Livestock Operations*
Andrea Beam, Mary Jane McCool, Randy Pritchard
USDA-APHIS-VS Centers for Epidemiology and Animal Health (CEAH)

The United States Department of Agriculture’s (USDA) National Animal Health Monitoring System (NAHMS) conducted a survey of small-scale U.S. livestock operations in spring 2011. The study focused on operations that raised animals and had gross annual sales from $10,000 to $499,999. Producers from 8,123 operations in all 50 States completed the study questionnaire. Because of concerns about food animal veterinarian shortages, one objective of the study was to explore producer access to and use of veterinarians. In this study, 62.0% of operations had used a veterinarian in the 12 months prior to the survey. Farms with higher sales ($100,000 or more) were more likely to use a veterinarian. The most common reason for not using a veterinarian was “no disease or other need for a veterinarian.” Overall, 82.0% of operations had a veterinarian available within 29 miles of the operation, while 1.4% had no veterinarian available, or the nearest veterinarian was 100 or more miles away. To better characterize areas where producers had limited access to veterinarians, a spatial hot-spot analysis (Getis Ord Gi) was performed at the county level for the entire United States. The objective was to identify clusters of counties with a veterinarian shortage, which was...
defined as areas where producers reported that the nearest veterinarian for their animal type was 100 or more miles away, or that a veterinarian was not available at all. Hot spots were identified in numerous states, and were compared to the 2011 Veterinary Medicine Loan Repayment Program designated shortage areas. Of the hot-spot counties identified in this study, 19.1% were also designated as VMLRP shortage areas. The results of this study are useful to government agencies and the overall veterinary community.

2013 AVMA Workforce Summit
Mike Dicks, AVMA
Summary of Key Points:
Four major issues were found:
- Excess Capacity in Profession
- High Cost of Entry
- Lack of Diversity
- Lack of Evidence Based Action

Most probable causes of the excess capacity in the companion animal veterinary workforce:
- Supply increased faster than trend
- Demand well below trend
- Price increases above gross domestic product (GDP)/capita growth

Next steps:
- Strategic plan- Building an economic plan- gather data through the following surveys:
  - Pet survey
  - Senior survey
  - Post graduate survey

Initiatives to Increase Veterinary Public Practice Opportunities
Valerie Ragan, Center for Public and Corporate Veterinary Medicine (CPCVM)
Veterinarians possess a wide variety of skills and training applicable to far more than private practice clinical treatment of animals. These skills can be utilized to address hiring needs within a wide range of veterinary public practice areas in the fields of science, public health, agriculture, environment and other technical/management fields.

The diverse skill set, critical thinking ability and strong scientific background of veterinarians is often over-shadowed by the perception that veterinarians just take care of pets or privately owned livestock, thus leading hiring authorities to under-value the skills and knowledge that veterinarians have to contribute and succeed in a variety of employment areas.

In this presentation, several initiatives to increase veterinary public practice opportunities were discussed. These included the ongoing work of a task force created through a partnership of the Center for Public and Corporate...
Veterinary Medicine within the Virginia-Maryland Regional College of Veterinary Medicine, the American Veterinary Medical Association, and the National Association of Federal Veterinarians. The task force has created a white paper to deliver to federal authorities including human resource personnel intended to expand opportunities for veterinarians in federal service, with the intent in the future to use the same template for messaging to enhance opportunities in state service and industry as well. A second initiative includes career transition workshops being conducted in multiple venues to help veterinarians prepare for and effectively transition into new public practice career areas.

Veterinary Services Reorganization
Beth Lautner, USDA-APHIS-VS

Five years ago, the Veterinary Services (VS) leadership started a review of the organization’s strategic direction. After reports from many working groups and development of the VS: New Perspective document, the Deputy Administrator in June 2012 announced the intent to reorganize VS and provided a draft business structure based on four units. Additional working groups and leadership interactions developed the final organizational structure. The VS reorganization has received the necessary approvals and is scheduled to take place in November 2013. The four business units are:

- **Surveillance, Preparedness and Response Services (SPRS)** – The SPRS unit will provide planning, policy, program, regulatory oversight and implementation for VS surveillance, preparedness and response activities. It consists of the functional areas of Commodity Health, Field Services, National Preparedness and Incident Coordination, National Veterinary Stockpile, and One Health Coordination.

- **Science, Technology and Analysis Services (STAS)** – The STAS unit brings together the VS science centers to provide the solid scientific, technical, and analytical foundation needed to support VS in meeting its mission responsibilities. It includes the Center for Veterinary Biologics, the National Veterinary Services Laboratories, the Center for Epidemiology and Animal Health and the Office of STAS Interagency Coordination. The scientific functions include diagnostic capability and capacity; regulatory activities related to the approval and monitoring of veterinary biologics (vaccines and commercial diagnostic test kits); surveillance design, planning and analysis; economic analysis; risk assessments, and predictive modeling in economics and epidemiology.

- **National Import and Export Services (NIES)** – The NIES unit provides policy direction, international collaboration and regulatory oversight activities associated with import, export and interstate movement of animal and animal products. It consists of the functional areas of Policy, Permitting, and Regulatory Services; Service Centers, Animal Import Center Services; Port Services; Agricultural Select Agent Services; and International Animal Health Standards Services.
Program Support Services (PSS) – The PSS unit oversees the budget, information management and technology, administrative services, training and recruitment activities, writing services and strategic planning.

Rural Veterinary Medicine Challenges and Opportunities
John Thomson, Professor Emeritus, Iowa State University

Dr. Thomson reminded attendees of the committee’s mission of educating policymakers and influencing policy on the supply and demand of veterinarians and laboratory diagnosticians and also animal health laboratory facility needs. He emphasized the importance of such a committee because it is difficult to drive change from within – external stakeholder influence is required. Thomson pointed out that history tends to repeat itself, and some of the issues facing veterinary medicine today are remarkably similar to many noted by the AVMA in 1980 - future direction of the profession, new schools coming, too many veterinary graduates, and economic uncertainty. Today there is significant finger pointing within and at the profession, often with colleges being blamed for an oversupply of veterinarians and graduates who have large debt loads.

The National Food Animal Veterinary Institute (NFAVI) sponsored a conference in December 2012 called “Strengthening Our National Rural Veterinary Infrastructure” where participating organizations were asked to include issues and concerns related to maintenance of the rural infrastructure and to include future projects that might address the issues. All presentations are at www.nfavi.org.

A strengths, weaknesses, opportunities, and threats (SWOT) analysis revealed that programs such as the Veterinary Medicine Loan Repayment Program (VMLRP) are making a difference but the veterinary profession continues to send mixed messages, there are not enough veterinarians to respond to a national emergency, and student debt currently is a significant negative impact. There are opportunities for the profession to unite for advocacy, to provide leadership and business opportunities for animal wellbeing, food safety and disease surveillance, and to address education and its costs. Online training modules for business, regulatory and technical training are available through NFAVI. Threats to the rural veterinary infrastructure include fragmentation of veterinary agencies (multiple messages), loss of credibility and perceived need, and further deterioration of rural America where there is loss of influence and recognized relevance in general and also for veterinary medicine.

Thomson ended his presentation with additional focus on the VMLRP where he emphasized the significant need to remove the required tax on VMLRP awards. Awards are currently taxed at 39%, with the taxes paid by the USDA on behalf of the award recipient. Removing the tax would result in one additional veterinarian for every three based on current appropriations. Dr. Thomson also indicated that assessment of the VMLRP awardees by National Institute of Food and Agriculture (NIFA) will occur in 2014, which will determine
contributions, best practices and future programming. There are opportunities for coordination of financial and economic initiatives, for partnering between public and private practitioners to address rural needs, and for emphasizing the value of a strong veterinary infrastructure to the health and wellbeing of animals, humans and the nation.

Meeting Surge Capacity Needs within the Veterinary Workforce
Michael J. Gilsdorf, Federal Talent Management Advisory Council

If the U.S. had a major animal disease outbreak or public health event, who would lead the effort?
- Nationally APHIS-VS would be in charge
- Locally State Animal Health Authorities would be in charge
- Department of Homeland Security (DHS) would help coordinate

Major zoonotic disease, public health event, or food defense issue
- Nationally Department of Health and Human Services (DHHS) would be in charge
- Locally State Public Health Authorities would be in charge
- DHS would help coordinate

Segments of the U.S. Veterinary Workforce APHIS-Veterinary Services

Department of Health and Human Services
- FEMA
- FSIS
- State Veterinary Response Teams
- Non-Government Veterinary Response Teams
- Veterinary Diagnostic Laboratories
- Canadian Veterinary Reserve (CVR) Example

APHIS-VS has fewer than 250 deployable veterinarians to immediately respond to a major animal health event and Four Incident Command teams. APHIS-VS also has the National Animal Health Emergency Response Corps (NAHERC). NAHERC has approximately 1,000 veterinarians who have volunteered. There is an online training site created by the Center for Food Security and Public Health, located at Iowa State University in the College of Veterinary Medicine.

For responses to state and local public health emergencies, Department of Health and Human Services (DHHS) has the following volunteer opportunities for skilled Health professionals:
- Emergency System for Advance Registration of Volunteer Health Professions
- National Disaster Medical System (NDMS)
- Medical Reserve Corps (MRC)
- Citizen Corps
- Commission Corps

U. S. Army Veterinary Corps
The US Army has one Veterinary (VET) detachment on call with NORTHCOM. Their mission is to provide support in national emergencies. That would include a total 58 person detachment with eight veterinary corps officers.

State Government Veterinary Surge Assistance
- SARTs- State Animal Response Team- (# of veterinarians ?)
- CART- County Animal Response Team (# of veterinarians ?)
- VMRC- Veterinary Medical Response Team (# of veterinarians ?)
- VRT- Veterinary Response Team (# of veterinarians ?)
- SAADRA- Southern Agriculture & Animal Disaster Response Alliance (# of veterinarians ?)
- NASAAEP- National Alliance of State Animal and Agricultural Emergency Programs
- (# of veterinarians ?)
- There are also others

The American Veterinary Medical Associations - Veterinary Medical Assistance Teams (VMAT) serves as first responders to ensure high-quality care of animals during disasters and emergencies. There are 140 members in the VMAT that includes veterinarians, technicians, and others.

Diagnostic Laboratory Surge Capacity
In preparation for a major animal health surge event, the National Animal Health Laboratory Network (NAHLN) laboratories are trained, proficiency tested, and follow standardized testing protocols for the following diseases:
- Avian Influenza (AI)
- Bovine Spongiform Encephalopathy (BSE)
- Chronic Wasting Disease (CWD)
- Classical Swine Fever (CSF)
- Exotic Newcastle Disease (END)
- Foot and Mouth Disease (FMD)
- Pseudorabies Virus (PRV)
- Scrapie
- Swine Influenza Virus (SIV)
- Vesicular Stomatitis Virus (VSV)

The Canadian Veterinary Reserve (CVR) is a national voluntary group of trained veterinarians that was created by the Canadian Veterinary Medical Association to provide supplemental veterinary resources (“surge capacity”) to the Canadian Food Inspection Agency (CFIA) in the event of a foreign animal disease outbreak in Canada that exceeds the veterinary response capacity of the CFIA.
REPORT OF THE COMMITTEE

In Summary:
- There are numerous veterinary response groups established to respond to animal health and public health disasters/events
- In several instances we have estimates of veterinary workforce capacity
- However, there is not a national assessment of the veterinary workforce surge capacity in the U.S.
- A national assessment is needed to determine if the veterinary workforce surge capacity is adequate
- It is proposed that all veterinary and animal health groups and stakeholders join together to conduct such an assessment
- This assessment information can be used to establish workforce needs and identify permanent funding gaps and resolve those gaps to maintain the workforce
- A cost/benefit analysis could then be conducted to show the benefit of maintaining the veterinary workforce

USDA-FSIS Update
Al Almanza, USDA Food Safety and Inspection Service (FSIS)
(submitted in lieu of presentation)

Thank you for the invitation to speak with you all today. I regret that recent events in Washington have impacted FSIS’ operations so that I was unable to join you in San Diego.

I was asked to give an update on FSIS’ proposal to modernize the way we ensure that poultry produced in this country is safe to eat. This proposal is the agency’s top priority right now, and it is something I would very much like to discuss with all of you.

Rates of illness caused by Salmonella have been steady, even showing occasional rises, in recent years, while Campylobacter is the second-most reported illness in the United States. We must reverse this trend, and if we are to do so, one thing is clear: we cannot continue inspecting poultry the way we have been for over 50 years.

Our proposal is based on a 15-year pilot program, and our peer reviewed risk assessment shows that this new way of inspecting poultry would prevent at least 5,000 illnesses annually.

There has been public criticism of our efforts, but I reject that criticism. I want to make it clear that this proposal sets the right course. It is first and foremost about saving lives. It would refocus our inspection program personnel on the inspection activities that are proven to make food safer, allowing our workforce to do our job of protecting the public health better than we have ever done it before.

The National Association of Federal Veterinarians, who I know is well represented at today’s meeting, has given the proposal a lot of support in the press. My colleagues at FSIS and I truly appreciate that support.

The proposal is still in the rulemaking phase. We cannot predict a timeline right now for its progression, but we do hope that it will move forward soon.
Again, this is the top priority for FSIS currently. I hope you all enjoy your time in California, and I hope that future circumstances allow for an in-person meeting with all of you who are so important to food safety.

Committee Business
The Committee reviewed previous resolutions. No resolutions were modified. One new resolution was passed and forwarded to the Committee on Nominations and Resolutions.
The Committee met on October 19, 2013 at the Town and Country Hotel, San Diego, California, from 3:30 until 6:25 p.m. There were 15 members and 22 guests present. Dr. Tim Evans welcomed the group and provided a background of the Committee work, including the mission statement.

Dr. Thompson led the discussion of old business.

A short proficiency testing update was given by Dr. Hall on trace mineral analysis in bovine liver, including background information on the clinical case of lead toxicosis in the adult cow whose liver was used. The animal was also deficient in copper as well as selenium. The full report had just been presented at the American Academy of Veterinary and Comparative Toxicology (AAVCT) meeting on the preceding day. The Committee thanks Dr. Hall, the Utah State Diagnostic Laboratory and the USDA Poisonous Plants Research Laboratory for processing (including freeze drying, repeat homogenization steps and initial validation of homogeneity) and distributing the samples by to the participating laboratories. A total of 21 laboratories participated, supplying 24 data sets for evaluation. Data sets ranges from analysis of only 1 element up to analyses for 28 different elements. Specific results had been distributed and discussed at the AAVCT meeting. Dr. Hall mentioned that additional samples remain if laboratories wish to use them as in-house standards.

Dr. Poppenga gave the update and background on the next proficiency test which would concern anticoagulant rodenticides in liver. Cases submitted to CAHFS Laboratory will be composited, homogenized, divided and shipped frozen to participating laboratories. Several anticoagulants are expected in the composite sample. Information about this proficiency test will be distributed following the first of the new year. Dr. Poppenga will be requesting funds for processing and distribution from VET-LIRN.

Dr. Thompson updated the group on the request to USDA for additional funds for processing and mailing of samples. The request is to go to Dr. Beth Lautner of the National Veterinary Services Laboratory (NVSL) in Ames.

There was no update on the Vet-LIRN activities because scheduled speaker Dr. Renate Reimschuesssel of FDA-CVM could not attend the meeting due to the government shutdown that was resolved just earlier in the week. However, several in the group mentioned there were continuing problems with
results submission. Dr. Thompson will discuss with Dr. Reimschuessel at the next opportune time.

Dr. Jeff Hall then made the following motion, “The Committee move forward with the planned proficiency test for anticoagulant rodenticides in liver.” Seconded by Dr. Steve Hooser. Motion passed. Dr. Poppenga will lead in the information dissemination and sample handling. The Committee thanks Dr. Poppenga and the CAHFS Laboratory at UC-Davis for their work.

Dr. Poppenga reported to the Committee of FDA VET-LIRN grants recently awarded for method development. Granting was reported as totaling $99,000 for each of 5 years and 5 laboratories of the 7 funded were toxicology laboratories. Test methods include various metals and carbamate insecticides. Methods will be available to other labs participating in VET-LIRN once validated.

Under New Business, it was noted that 12 participating VET-LIRN laboratories were present at this Committee meeting. Dr. Hall suggested the minutes reflect the Committee and each laboratories appreciation to Dr. Renate Reimschuessel for her continuing work for VET-LIRN and her continuing work to liaison with this Committee. So noted in the minutes and Dr. Thompson will extend the Committee’s appreciation personally to Dr. Reimschuessel at the next opportune time.

New business then turned to the roundtable discussion on the topic of toxicology and residue incidents as reportable diseases and applicable state regulations and reporting these incidents to the respective State Veterinarian. Dr. Cynthia Gaskill related a poisoning incident involving cattle and chlorinated hydrocarbon ingestion. The full case report had been presented at the AAVCT meeting. Although the University of Kentucky Veterinary Diagnostic Laboratory had diagnosed a chlorinated hydrocarbon intoxication and residue concern in the affected animals, there was no guidance coming from the state veterinarian’s office or USDA officials on quarantine requirements of the herd or testing requirements for the animals to be released for markets. It was only through Dr. Gaskill’s concerted efforts to contact appropriate FSIS officials that such guidance could be obtained.

A presentation by Dr. Brent Hoff from the University of Guelph outlined the procedures set up in Ontario, Canada for reporting hazardous exposure incidence causing chemical food safety concerns in animals. Specific authority and guidance is given by the Animal Health Act of 2009. The one-page flow chart that provides veterinarians and diagnostic laboratories guidance on the process is included in the attached report. It is suggested that this be explored as a template for each state or diagnostic laboratory as state guidelines are developed.

Dr. Hall then presented results of his questionnaire to state veterinarians concerning their states regulations on reportable disease status of toxicology and residue considerations. As of three years ago, only six states of the 18 states responding to the survey had reporting requirements. Twelve states responding had no reporting requirements for incidents involving toxicology. Immediately following the meeting one additional state was added to those that
have reporting requirements. Thus final tally would be seven states out of 19 surveyed have toxicology or residue reporting requirements.

Dr. Hall gave a summary of each states language, and inexact or potentially confusing language was noted in several instances. Further discussion ensued including the current AAVLD privacy policies on release of client information. A motion was made by Dr. Gaskill to “The Committee to develop a draft document providing model language for a State regulation concerning toxicology or residue incidents to be reportable to the State Veterinarian.” Seconded by Dr. Poppenga. Motion carried. Dr. Hall volunteered to develop initial draft within 30 days of meeting, to then be reviewed by Committee Co-chairs within 30, before being sent to all Committee members for comment and approval. As a component of this motion, Dr. Gaskill volunteered to develop a one-page document for proper handling of such a toxicology or residue situation, based on her experience and utilizing the Ontario model provided by Dr. Hoff. A Draft to be completed within 30 days of meeting, forwarded to Co-chairs to be reviewed within 30 days, and then forwarded to Committee members for review, comment and final approval.

Following this Committee’s approval of the above two draft documents, it was suggested that both documents will be forwarded to the USAHA Governmental Relations Committee for their review. Motion made by Dr. Hall that “This Committee forward both final draft documents generated concerning development of State Regulation and reporting of toxicology and residue incidents to the USAHA Governmental Relations Committee for their comments and suggestions.” Dr. Gaskill seconded. Motion carried. Dr. Thompson will contact Chair of that Committee with background information.

A quick discussion then ensued on the incidents of mycotoxins in member states as seen by member laboratories. Ergot was reported in increased rates this year and quite widespread, as reported by Dr. Tim Evans of Missouri. Following this all members were encouraged to review their toxicology cases and prepare to give a summary next year of all cases involving toxicology. Co-chairs will send a reminder via email to Committee with guidance on suggested formats. Formats and reporting structure will be placed on next year’s agenda.
The Committee met on October 20, 2013 at the Town and Country Hotel, San Diego, California, from 1:30 to 4:00 p.m. There were 19 members and 29 guests in attendance. Members and guests were informed that the expected agenda was affected by circumstances beyond our control (the Federal Government shut-down and one speaker cancellation due to illness), but that speakers present, including a last minute volunteer speaker, would be presenting their scheduled topics, though perhaps not exactly on the original times listed on the agenda.

The meeting agenda was affected by cancellations related to the Federal Government shut-down (Dr. Renate Reimschuessel – had been scheduled to speak on two topics: Vet-LIRN, and Update on FDA food and feed safety policies; Dr. Joe Hill – had been scheduled to give an update on FSIS STEC testing), and one speaker was unable to participate due to illness.
Presentations

The Horsemeat Scandal - Implications for Global Food Security and Safety
Patrick L. McDonough
Cornell University, College of Veterinary Medicine

This topic has been in the news globally since early this year when beef burgers in Ireland were found to have both equine and pig deoxyribonucleic acid (DNA). It illustrates many aspects of food safety and food security unfolding in real-time before our eyes: consumer confidence issues, pre-harvest food safety, food safety continuum, regulatory matters: inter-country food distribution and movement, food adulteration (motive/intentional), humane treatment of animals (horses), and societal differences in food consumption (horsemeat consumption) and food taboos.

This topic also poses the question: are there any Issues for the USA in the horsemeat scandal? Have we contributed to the problem in some way? Are we complicit in the horsemeat scandal? In light of that one must consider the ongoing issues of unwanted/abandoned horses, cessation of domestic equine slaughter in the USA, horses in the USA not raised for food/thus residues exist? (“Bute”), the issues associated with the transport of horses to Canada...to Mexico.

This talk presented the ongoing story involving issues of cheap horse meat found in ground beef in the European Union. While initially detected by the Food Safety Authority of Ireland due to a unique, proactive Food Fraud Task Force that was set up to support the quality of the Irish food production industry, it was later found in the U.K. by the Food Standards Agency after an alert from Ireland. Subsequently it became a European Union-wide issue with Poland...then France....and then a more widespread problem.

Dr. McDonough also explored the issues of food safety posed by the scandal after phenybutazone residues were detected in ground meat products sold as beef. The talk showed how horses may enter the human food chain, possible motives for the introduction of horsemeat as if it were beef, the issues of traceability of sources, and what does it mean to have “Irish” meat....or “British” meat, or USA meat on the consumer label.

Lastly, the issues raised by the Government Accountability Office (GAO) Report that examined horse welfare since cessation of domestic slaughter in 2007 were presented.

Incidence of Shiga Toxin-Producing \textit{Escherichia coli} In Meat.
Chitrita DebRoy
Pennsylvania State University

Shiga toxin–producing \textit{Escherichia coli} (STEC) are associated with foodborne illnesses, including hemolytic uremic syndrome in humans. Cattle are reservoirs for STEC and therefore, beef products are a major source of STEC. While STEC O157:H7 has been considered an adulterant in ground beef since 1996, Food Safety and Inspection Service of the Department of
Agriculture has declared six additional STEC (O26, O45, O103, O111, O121 and O145), as adulterants in beef since June 2012. Little is known about the prevalence of these “top six” STEC O groups in retail meat as well as in game meat, that are consumed worldwide. While there are selective media to distinguish *E. coli* O157 from other strains, there are no distinguishing characteristics to detect these “top six” STEC O groups easily. *E. coli* Reference Center at the Pennsylvania State University has been involved in serotyping of *E. coli* for many decades. We have developed different assays such as PCR, ELISA, flow cytometry and microarray for detecting the STEC O groups. Based on these assays, we determined the incidence of STEC O groups in ground meat from beef, chicken, pork, deer, reindeer, bison, boar and whole rabbit. In another related study, we assessed the load of STEC O groups in the carcass, ground beef and the environment of small and very-small beef-processing plants. It was clear from the findings that although several samples collected from retail vendors exhibited the presence of STEC O groups in the meat as well as in the environment, most of them were non-pathogenic and did not carry Shiga toxin genes (*stx*1 and 2) or attaching and effacing enteropathogenic escherichia (*eae*) gene. Only one strain belonging to O45 from deer, out of 136 isolates tested, carried *stx*1 gene. In the other study from beef processing plant, only 7.4% of environmental samples, 4.4% of carcass samples belonging to STEC O groups carried *stx* and *eae* genes that were potentially pathogenic. The research on prevalence of these pathogenic STEC strains in meat will assist in improving food safety and public health.

**Raw Pet Food Diets**
Shelley Mehlenbacher  
Vermont Agency of Agriculture

The purpose of the study was to characterize the commercially available raw meat pet food diets in the Minneapolis/St. Paul area by (i) determining the number and types of available diets; (ii) assessing pet food stores and brand labels for the provision of precautionary statements regarding the risk of foodborne illness from raw meat; (ii) assessing the labels for Food and Drug Administration (FDA)/American Association of Feed Control Officials (AAFCO) required content and nutrient-related information; and (iv) culturing purchased diets for the presence of Salmonella. Sixty raw meat diets were purchased, representing 11 different brands from eight different stores. Diets were readily available in the form of raw-frozen, dehydrated or freeze-dried varieties from different protein sources, such as lamb, beef, chicken or duck. All stores promoted raw meat diets; however, none provided foodborne illness warnings. Brands varied greatly in their precautionary statements; none of the diets underwent feeding trials; and nutritional adequacy substantiation was through formulation only. The first five ingredients tended to consist of meat, organ meat (by-products), vegetables, grains and ground bones. Currently, it is required that pet foods have an AAFCO nutritional adequacy statement and provide a guaranteed analysis table. Three brands did not meet these FDA requirements. Thirty-one (51.7%) of the 60 raw meat diets underwent some
degree of processing including dehydration, freeze-drying or high-pressure pasteurization. Four of the 60 raw diets (7%) tested positive for Salmonella. Analysis of raw meat pet food labels indicated a lack of foodborne illness warnings. Based on these findings, we recommend that warning statements similar to those required by the United States Department of Agriculture.

Committee Business
The Committee was informed of the acceptance by the Presidents of both USAHA and AAVLD of the recommendation made by the committee at the last annual meeting (2012) to combine the AAVLD Food Safety Committee and the USAHA Committee on Food and Feed Safety into a joint committee – the USAHA/AAVLD Committee on Food and Feed Safety.

No new Resolutions were put forth, and no new recommendations were formulated.

Committee members were invited to suggest topics or actions for the 2014 meeting. One committee member suggested that a larger subcommittee be formed to develop the committee agenda. Another suggestion was to have topics for moderated discussion on the agenda, rather than just speakers. Another member expressed an interest in more discussion on policy next year.
REPORT OF THE COMMITTEE ON FOREIGN AND EMERGING DISEASES

Chair: Paul Gibbs, FL
Vice Chair: Tammy Beckham, TX

Helen Acland, PA; Bobby Acord, NC; John Adams, VA; L. Garry Adams, TX; Bruce Akey, NY; Wilbur Amand, PA; Gary Anderson, KS; Joan Arnoldi, WI; George Badley, AR; Karen Beck, NC; Tammy Beckham, TX; Lisa Becton, IA; Melissa Berquist, TX; Bob Bokma, MD; Philip Bradshaw, IL; Richard Breitmeyer, CA; Deborah Brennan, GA; Becky Brewer-Walker, AR; Gary Brickler, CA; Charlie Broadus, VA; Charles Brown II, WI; Corrie Brown, GA; Dawn Bueschel, NM; Suzanne Burnham, TX; Jerry Callis, NY; Jon Caspers, IA; Nancy Chapman, MD; Gregory Christy, FL; Jeein Chung, MN; Neville Clarke, TX; Matt Cochran, TX; Leslie Cole, OK; Thomas Conner, OH; Joseph Corn, GA; Paula Cowen, CO; Stephen Crawford, NH; Wendy Cuevas-Espelid, GA; Debbie Cunningham, OK; Donald Davis, TX; Glenda Davis, AZ; Ignacio dela Cruz, MNP; Thomas DeLiberto, CO; Linda Detwiler, NJ; Leah Dorman, OH; Brandon Doss, AR; Edward Dubovi, NY; Anita Edmondson, CA; Dee Ellis, TX; Francois Elvinger, VA; Peter Fernandez, AA; James Foppoli, HI; Heather Fowler, MN; W. Kent Fowler, CA; Patricia Fox, NC; Richard French, NH; Mallory Gaines, DC; Cyril Gay, MD; Robert Gerlach, AK; Samantha Gibbs, VA; Colin Gillin, OR; Linda Glaser, MN; Timothy Goldsmith, MN; James Mark Hamer, NC; Cathleen Hanlon, NY; William Hare, MI; David Harlan, MN; Greg Hawkins, TX; Larry Hawkins, MO; Rudolf Hein, DE; Jan Hershenson, CA; Richard Hesse, KS; Linda Hickam, MO; Rick Hill, IA; Donald Hoenig, ME; Lindsey Holmstrom, TX; Thomas Holt, FL; Floyd Horn, MD; Dennis Hughes, NE; Holly Hughes-Garza, TX; Pamela Hullinger, CA; David Hunter, MT; John Huntley, WA; Carla Huston, MS; Annette Jones, CA; Gary Kinder, WV; Patrice Klein, MD; Paul Kohrs, WA; Charlotte Krugler, SC; Elizabeth Krushinskie, DE; Elizabeth Lautner, IA; John Lawrence, ME; Randall Levings, IA; Tsang Long Lin, IN; Linda Logan, TX; Pat Long, TN; Francine Lord, CAN; Margie Lyness, GA; Janet Maass, CO; John Mahoney, MN; Edward Mallinson, MD; Bret Marsh, IN; David Marshall, NC; Barbara Martin, IA; Michael Martin, SC; Sarah Mason, NC; Todd McAlloon, MN; Thomas McKenna, WI; David Meeker, VA; Shelley Mehlenbacher, VT; Gay Miller, IL; Frank Milward, GA; Ray Mobley, FL; Janice Mogan, IA; Igor Morozov, KS; Lee Myers, GA; Thomas Myers, MD; Sherrie Nash, MT; Cheryl Nelson, KY; Gene Nemecheck, NC; Sandra Norman, IN; James Novy, TX; Stephanie Ostrowski, AL; Kristy Pabilonia, CO; Lanny Pace, MS; Charles Palmer, CA; Elizabeth Parker, ITA; Roger Parker, TX; William Parker, GA; William Parker, GA; Boyd Parr, SC; Barbara Porter-Spalding, NC; Jeanne Rankin, MT; Tom Ray, NC; Anette Rink, NV; Keith Roehr, CO; James Roth, IA; Mark Ruder, KS; Emi Saito, CO; Mo Salmon, CO; John Sanders, WV; A. David Scarfe, IL; Shawn Schafer, ND; David Schmitt, IA; John Shaw, AA; Dan Sheesley, DC; Kathryn Simmons, DC; Marilyn Simunich, ID; Jonathan Sleeman, WI; Tom Smylie, CAN; Harry Snelson, NC; Rosemary Speers, VA; Diane Stacy, LA; Nick Striegel, CO; David Swayne, GA; Manoel Tamassia, NJ; Rodney Taylor, NM; Belinda Thompson, NY; Beth Thompson, MN; Brad Thurston, IN; Jimmy Tickel, NC; Peter Timm, CA; Peter Timoney, KY; Alfonso Torres, NY; Susan Trock, GA; Paul Ugstad, NC; Arnaldo
The Committee met on Tuesday, October 22, 2013 at the Town and Country Hotel, San Diego, California, from 8:00 a.m. to 5:15 p.m. Dr. Paul Gibbs welcomed the committee and guests and Dr. Tammy Beckham provided an update on 2012 Committee resolutions.

**Time Specific Paper:**

**Foot-and-mouth disease (FMD) in South America and Briefing on Activities of the Pan American Health Organization**
Alfonso Clavijo
Surveillance and Control of Zoonotic and Emerging Diseases at the Pan American Health Association (PAHO)

The Pan American Health Organization (PAHO), founded in 1902, is the world’s oldest international public health agency and serves as the Regional Office of the World Health Organization for the Americas. The Pan American Foot-and-Mouth Disease Center (PANAFTOSA) is a Specialized Center of PAHO and provides technical cooperation to the countries of the region in Veterinary Public Health. This cooperation is primarily intended to strengthen the structure of the veterinary services and public health issues related to the prevention, early detection, early warning and implementation of contingency plans on priority diseases affecting animals, food safety, zoonoses and foodborne diseases. It also integrates Veterinary Public health within emergency response programs and disaster. During the 2013-2017 period, PANAFTOSA is giving priority to three major subject areas:

1. Eradication of Foot-and-Mouth Disease (FMD) in the Americas and the strengthening of national capacities in animal health surveillance.
2. Prevention, control and elimination of zoonoses and prevention of emerging infectious diseases.
3. Food safety and the prevention of foodborne diseases.

Foot-and-mouth disease is still a major focus of PANAFTOSA. Although vaccines are available and have been instrumental in eliminating the disease from most of the South American countries, viral circulation still persists in some countries. The current Plan of Action 2011–2020 for the elimination of FMD is based on the experience acquired by the countries and PANAFTOSA during the past 60 years. This plan is now being implemented; several challenges are still continue to ensure the elimination of FMD from the Americas by 2020, however, the goal is achievable.
FOREIGN AND EMERGING DISEASES

Presentations and Reports

**Update: Department of Homeland Security, Science & Technology Directorate**
Michelle Colby, DHS S&T Directorate (*via webinar*)

An overview of the Agricultural Defense program of the Department of Homeland Security, Science and Technology Directorate (DHS S&T) was presented. Agricultural defense programs primarily fall under DHS S&T Chemical/Biological Defense Division (CBDD), Office of National Laboratories, and the Office of University Programs. The CBDD is within the Homeland Security Advanced Research Projects Agency and its goals are to detect, protect against, respond to, and recover from potential biological or chemical events. The mission for Agriculture Defense is to enhance current capabilities and develop state-of-the-art countermeasures for high priority foreign animal diseases (FADs). This includes near- and long-term research and development for vaccines and diagnostics, in coordination with internal and external stakeholders. The Program’s projects expand the entire outbreak spectrum. The Enhanced Passive Surveillance (EPS) project includes diagnostic tests, mobile surveillance tools, and data integration procedures to identify infected animals prior to overt clinical signs and improve our ability to detect diseases that threaten the U.S. agricultural critical infrastructure. The FAD modeling program provides tools to support outbreak planning and response, drive requirements for countermeasures development, and inform post-outbreak response activities by creating scalable simulation and modeling tools to analyze potential responses and control options to minimize FAD spread. The FAD vaccines and diagnostic projects develop more effective vaccines and diagnostic countermeasures for high priority FADs, in partnership with the USDA and industry. These include FMD vaccines and research and development (R&D) funding for swine (African swine fever (ASF), classical swine fever (CSF) and zoonotic (Rift Valley fever (RVF) FADs. Next-generation high-throughput and molecular-based technologies are also being developed to provide surge in the National Animal Health Laboratory Network (NAHLN). Agriculture Screening Tools (AST) projects support the development of portable tools and standardize protocols to provide rapid detection and field identification of high priority pathogens and toxins of concern in the U.S. livestock and agriculture sector. ASTs also facilitate decisions on animal movement to preserve continuity of business. The decontamination, depopulation, and disposal (3D) program is a multi-agency effort to develop new and enhanced methodologies and equipment for high-capacity mass livestock mortality depopulation and disposal, decision support tools for FAD mass livestock mortality disposal, and strategies for depopulation best management practices and for cleaning and disinfection of animal facilities. In addition to contractual relationships, the Ag Defense Branch works closely with the Plum Island Animal Disease Center (PIADC) and the two Zoonotic and Animal Disease DHS Centers of Excellence (COEs). Each partner plays a key
role in the development process. PIADC develops industry partnerships and conducts critical applied research related to vaccines and diagnostics. The COEs (National Center for Foreign Animal and Zoonotic Disease (FAZD) and Center of Excellence for Emerging and Zoonotic Animal Diseases (CEEZAD) maintain important international, state, local and academic partnerships, and conduct basic research vital to a continuous pipeline of candidates for advanced development and transition. Furthermore, the Agricultural Defense Branch coordinates with other R&D organizations such as the National Science and Technology Council’s FAD Threats working group, USDA Agricultural Research Service (ARS), Departments of Defense, Health and Human Services, Interior, State, the Environmental Protection Agency, the Smithsonian Institution, and the National Science Foundation. Sub-working groups ensure that DHS and other agency resources are utilized as efficiently and effectively as possible.

Update: National Veterinary Services Laboratory (NVSL)
Elizabeth Lautner, USDA-NVSL (on behalf of Paul Hauer)

NVSL modified its structure slightly during the reorganization of Veterinary Services (VS) to consolidate from three Sections to two at the Foreign Animal Disease Diagnostic Laboratory, and to create a new Proficiency Test Section which combined with cytology portions of the Reagents Biosecurity and Reference Materials Section of the Center for Veterinary Biologics (CVB). This new Section will report through the Diagnostic Virology Laboratory (DVL) and provide services to all of NVSL and CVB. Lautner moved into the Assistant Deputy Administrator over the new Science, Technology, Analysis Services business unit in VS which includes all of NVSL in addition to CVB and portions of the Centers for Epidemiology and Animal Health (CEAH). Key staff positions filled during the year include the selection of Dr. Mia (Kim) Torchetti as Head of the Avian Viruses Section in the DVL and Dr. Sarah Tomlinson as the NAHLN Coordinator. During the time period between October 1, 2012 and September 1, 2013, NVSL received over 43,000 accessions, processed 239,000 samples, and reported 364,000 tests. The first case of Porcine Epidemic Diarrhea (PED) reported in the United States was confirmed at NVSL in May from samples submitted to the Iowa State Veterinary Diagnostic Laboratory from an Iowa farm. NVSL also participated in Influenza A (H7N9) preparedness activities this spring including the cooperative development of an updated “pan-H7” avian influenza assay to detect more circulating H7 strains including the low pathogenic avian influenza A (H7N9) that has caused significant morbidity and mortality in humans in China. Key developmental activities included a) the transition from using *Mycobacterium bovis* genotyping methods of spoligotyping and Variable Number Tandem Repeats (VNTR) to single nucleotide polymorphism analysis of whole genome sequencing; and b) the development of high pressure liquid chromatography (HPLC) with fluorescence spectrophotometry tests to determine the blood levels of Ivermectin. These tests will be used to correlate blood levels of Ivermectin in animals with the degree to which the animals are tick-free, thus assessing the efficacy of orally
administered Ivermectin on tick load. Quality remains a focus at NVSL. NVSL successfully completed an ISO 17025 renewal and scope expansion audit in May. Accredited methods now number 379 with 11 proficiency panels accredited under ISO 17043 and 24 reference materials accredited under ISO Guide 34.

**Update: Foreign Animal Disease Diagnostic Laboratory**

Fernando Torres-Velez, Plum Island Animal Disease Center (via webinar)

The Foreign Animal Disease Diagnostic Laboratory (FADDL) is divided into three main sections: Diagnostic Services, Reagents and Vaccine, and North American Foot and Mouth Disease Vaccine Bank (NAFMDVMB). In 2013 Foreign Animal Disease (FAD) investigations and surveillance activities within FADDL included a total of 178 accessions with the majority being priority level two and three diagnostics. Out of the 178 accessions, 104 had FADs ruled-out but with an undetermined diagnosis. Final diagnosis of other samples included Seneca Valley Virus (ten total), Epizootic Hemorrhagic Disease (46 total) and Parapox (BPS/Orf; 18 total). These totals do not include testing of imports and reference submissions. As part of the U.S. classical swine fever (CSF) surveillance program, 2,236 accessions were tested representing 7,661 samples. Reagent Production and Proficiency Panels have been provided for foot and mouth disease (FMD)/CSF, lumpy skin disease, and contagious bovine pleuropneumonia. FADDL has also provided training to veterinarians for Foreign Animal Disease Diagnosticians (60), Veterinary Laboratory Diagnostics Course (28), and International Transboundary Animal Disease Course (52). FADDL has many completed and ongoing research projects to develop and establish diagnostic assays. Research has been completed on qRT-PCR/PCT test for endemic and foreign animal diseases from swine oral fluids, CSF ELISA to detect antibody in sera, an FMD 3ABC NSP ELISA, and development and implementation of a microarray. Research ongoing includes development of a FMD 3D NSP ELISA for bovine and swine, development of an immunohistochemistry assays for FMD, CSF, ASF, and peste des petits ruminants (PPR), and a subtracted hybridization to enhance detection of foreign or emerging pathogens. Projects are also ongoing for reagent production, assay validation, and NAHLN support. These include a FAD assay validation program for FADs in wildlife and development of monoclonal antibodies specific to ASF virus proteins. Production of polyclonal antisera against vesicular disease viruses was completed. Staff support was increased for the North American FMD Vaccine Bank and efficiency tests of 4 VACs were conducted, with three added to the emergency stockpile. FADDL also has many international activities and capacity building efforts in Panama, Guatemala, Kazakhstan, Brazil, Italy, Kingdom of Saudi Arabia, Bangladesh, Mexico, Lebanon, Kenya, and Russia (pending).
Update: National Animal Health Laboratory Network  
Sarah Tomlinson, National Animal Health Laboratory Network, USDA-APHIS-VS (via webinar)  

The National Animal Health Laboratory Network (NAHLN) is a partnership between the United States Department of Agriculture, State, university and federal diagnostic laboratories across the U.S. Currently, there are 60 NAHLN laboratories that work together to ensure there is adequate diagnostic capacity and capability for early detection of, rapid response to, and recovery from animal health emergencies. In 2012-2013 the NAHLN continued to focus on activities related to its founding principles and improving the network. A concept paper that reflects a revised NAHLN structure was published for public comment in the Federal Register in April 2013; forty-two comments were received that will be incorporated into efforts to codify the NAHLN, develop program standards and update the NAHLN strategic plan. Additionally, trainings on quality management systems were conducted in an interactive classroom and via an on-line application for NAHLN laboratories, other laboratory network members and international partners. Also, improvements were made for the network’s secure communication mechanisms in the form of standardized electronic messaging of test results and a secure NAHLN portal for management of laboratory information, documents, SOPs and proficiency testing results. Further, NAHLN continues to focus on preparedness through the activities of the Exercises and Drills Working Group such as the development and enhancement of the Laboratory Capacity Estimation Model to improve the ability to accurately estimate and monitor testing capacity. Finally, as a fundamental function of the network, NAHLN and collaborators completed a number of assay validation studies this year, including: real time RT-PCR for Foot and Mouth Disease (FMD) virus in bulk tank milk; a FMD pen-side antigen assay; and real time RT-PCRs for Lumpy Skin Disease and Contagious Bovine Plueropneumonia. Other studies to be completed in 2013 include an FMD serological negative cohort and a multiple influenza H7 PCR inter-laboratory comparison.

Post-eradication of Rinderpest: Required Activities to Maintain Global Freedom from Rinderpest - Food and Agriculture Organization (FAO)  
Mo Salman, Colorado State University (on behalf of Samia Metwally, FAO Rome)  

For centuries, outbreaks of rinderpest have caused wide-spread destruction of cattle, which resulted in famine and starvation. The FAO Global Rinderpest Eradication Programme (GREP) was concluded mid-2011, with FAO and OIE announcing global freedom from Rinderpest June 28, 2011. Following the declaration, FAO and OIE have taken strict measures in light of adopting the FAO Resolution 4/2011 and OIE Resolution 18 and signed an agreement to maintain world freedom from rinderpest in June 2012. Resolutions called for the creation of a FAO/OIE Rinderpest Joint Advisory Committee (JAC) with the objective to support both organizations in ensuring continued world freedom from rinderpest. A joint FAO/OIE secretariat was
appointed in March 2012 and the members of the JAC were selected in April 2012. JAC members met for the first time in June 2012 to assume their responsibilities and are taking lessons learned from the World Health Organization's (WHO) experience in smallpox eradication. A FAO-OIE agreement was signed in June 2012: “FAO-OIE Agreement on joint actions to maintain the world free of rinderpest”, it includes Terms of Reference of the FAO/OIE Rinderpest Joint Advisory Committee.

There is a critical need to establish a clear planning process for global response in the case of a rinderpest recurrence and for the response of countries directly affected or at risk.

African Swine Fever – Focus on the Situation in Eastern Europe and the Caucasus
Sherrilyn Wainwright, FAO of the United Nations, Rome (via webinar)

The evolution of the African swine fever (ASF) incursion and spread outside of the African continent began in June 2007 with an introduction to the country of Georgia. From there it spread to Armenia in August 2007 and was found in wild boar in the Russian Federation in December 2007. The disease was seen in Azerbaijan in January 2008 (a single introduction in domestic pigs), in Iran in December 2008 and January 2009 (detected in three wild boar), in the Ukraine in July 2012 (as a single introduction in domestic pigs), and in Belarus, with three ASF outbreaks reported in June and July 2013. Currently, the Russian Federation, Georgia and Armenia remain infected with ASF. Dynamics of the density and distribution of backyard domestic pig (with low biosecurity) and wild boar populations were presented, as well as the risks for movement of the virus beyond the current locations. The risk to other ASF-free countries in Europe may be from ASF moving from the Ukraine and Belarus, countries with ASF outbreaks reported in 2012 and 2013, to ASF-free countries in Europe. Challenges identified in these two countries include porous borders, movement of people, including immigrant workers to the Russian Federation and the countries of the European Union, and tourists. More than fifty percent of the domestic pigs in these countries are backyard pigs, usually with low biosecurity standards. A number of FAO activities have been developed to address the ASF outbreaks and to reduce the risk for spread to ASF-free countries.

Update: Plum Island Animal Disease Center
Luis Rodriguez, Plum Island Animal Disease Center, ARS-USDA

The current Foreign Animal Disease Research Unit (FADRU) staff includes a total of 54 people, which includes scientists, federal post-docs, research fellows, university collaborators, and volunteer scientists. CRIS Projects for 2012-2017 include Intervention Strategies to Support the Global Control and Eradication of FMD, Countermeasures to Control FADs of Swine (CSF/ASF), and the Ecology and Pathogenesis of Re-Emerging VSV in North America. A double marker cDNA-derived killed FMDv vaccine platform has been developed that has two independent DIVA markers and is a safe and easy
production platform. It is non-transmissible from cattle and swine and all early development work has been performed. There is an rRT-PCR detection test available and the development of two DIVA detection ELISA tests are underway. Research is also underway on a) the molecular epidemiology and biosurveillance of FMD in endemic regions of Central Asia, Southeast Asia, and Africa; b) on the transmission and evolution of FMDv in livestock in the Lake Chad Basin, Cameroon; and c) on persistent FMD infections in buffalo in Vietnam. PIADC also has an active African swine fever (ASF) research program. As there are currently no vaccines for ASF, PIADC research is focused on vaccines and development of animal models to evaluate ASF pathogenesis. A challenge model has been developed and standardized that resembles natural infection in swine and DHS has provided funding for the next three years to support research toward developing the first effective vaccine against ASF. A research alliance has been established of 22 countries and a meeting held at PIADC in April 2013 that resulted in the creation of the Global African Swine Fever Research Alliance. A CSF DIVA vaccine has been developed that is effective in three days. There has been a re-emergence of vesicular stomatitis virus (VSV) with recent outbreaks in southern U.S. The virus has been traced back to a 2005 strain in southern Mexico. Analyses of genetic lineages have been performed to better understand the spatial spread of the virus. Other activities ongoing at PIADC include projects on disinfection of FAD viruses on surfaces relevant to the pork packing industry. PIADC has many strategic partnerships with government, stakeholders, academia, and industry to help guide and support R&D activities.

Update: Center of Excellence for Emerging and Zoonotic Animal Diseases
Jessica Green, CEEZAD

Center of Excellence for Emerging and Zoonotic Animal Diseases (CEEZAD) enters its fourth year with a streamlined research portfolio that addresses four major themes surrounding response to high priority foreign animal and zoonotic diseases: Vaccines, Detection, Epidemiology and Education/Outreach. Vaccine and detection research continues to focus on high-threat pathogens, but now reflects shifts in proposal selection, implementation and review processes that emphasize consideration of stakeholders and include short-term projects with clear pathways to deliverables. CEEZAD’s core vaccine project is focused on development of recombinant subunit vaccine for Rift Valley fever virus. We have completed immunogenicity studies with potential vaccine candidates and are currently working on efficacy trials. In continuing development of NDV-based vaccine platforms, we successfully completed a proof of concept efficacy study on an NDV-based vaccine for avian influenza. Our detection projects focus on applications of MassTag PCR and unbiased pathogen detection techniques in agricultural settings and on the deployment of pen side PCR detection systems for emergency response. We recently participated via webinar with the NAHLN Methods Technical Working Group Meeting on Emerging Disease Detection to
an overview of CEEZAD detection projects and their potential practical implementation. The scope of the epidemiology theme now focuses on one major project on model ontology; CEEZAD has proposed the addition of a small advisory board to this project to guide application of this research. The education and outreach overlay is an integral part of CEEZADs mission. Education/Outreach programs emphasize web-based continuing education on zoonotic and emerging diseases of agricultural animals using the Emerging and Exotic Diseases of Animals course developed by the CFSPH. The program will expand to include training of young researchers for careers that focus on emerging and exotic diseases of animals.

Update: National Center for Foreign Animal and Zoonotic Disease Defense
Tammy Beckham, FAZD Center

The National Center for Foreign Animal and Zoonotic Disease Defense (FAZD Center) performs research and develops products to defend the nation from high-consequence foreign animal and zoonotic diseases. Founded in April 2004 as a Department of Homeland Security (DHS) Science and Technology (S&T) Center of Excellence (COE), the FAZD Center leverages the resources of multiple major universities, Minority Serving Institutions, national laboratories, and partners in state and federal government. The FAZD Center is a multi-institutional organization with partners in 42 U.S. states and the District of Columbia and with 14 foreign countries, plus laboratories in the National Animal Health Laboratory Network (NAHLN). The center’s portfolio is also closely aligned with the DHS Science and Technology Directorate, U.S. Department of Agriculture’s Animal and Plant Health Inspection Service (APHIS), the USDA Agricultural Research Service (ARS), agricultural and allied industries, the private sector, bio-pharmaceutical companies, additional federal agencies, national laboratories, and other DHS Centers of Excellence. The FAZD Center’s team of scientists conducts cutting-edge, inter-institutional and interdisciplinary research across three areas of emphasis:

- **Biological Research** – Vaccines, screening tools, diagnostic assays and universal sample preparation/preservation platforms to help meet the goals of early detection, diagnosis, prevention, response and recovery.
- **AgConnect** – A suite of customizable data integration and analysis products designed to enhance situational awareness. The FAZD Center is currently piloting the AgConnect suite of tools in four states to solicit feedback on requirements for use, visual displays, data integration, and other capabilities needed to support daily use by state animal health officials.
- **Training and Education** – Graduate programs, early responder training, K-12 education and stakeholder workshops to provide the next generation workforce for agriculture, public health and homeland security.
In addition, the FAZD Center is currently expanding its portfolio internationally to adapt and apply technology and products developed at the Center to support global animal health.

Veterinary Science Certificate Program
Heather Simmons, FAZD Center

This presentation provided an overview of a national program that addresses the veterinary paraprofessional workforce by providing education and training toward eventual professional certification. The Veterinary Science Certificate Program (VSCP) integrates human, animal, and environmental health sciences and emphasizes the public health, diagnostic, and regulatory aspects of zoonotic and transboundary diseases. Specifically, the VSCP curriculum includes 150 lessons of core sciences, clinical medicine, public health, and laboratory science. The program has been designed to be used at three levels. These include youth organizations, (such as 4-H and FFA), high schools, and community colleges. With over 11,000 students enrolled annually in the program, it provides students with the knowledge, motivation, and skills necessary to pursue educational and career goals. The program is provided in 490 high schools across the United States with program resources being utilized in 31 states.

USDA-APHIS FAD Training Efforts
Ms. Elizabeth Clark, Plum Island Animal Disease Center (via webinar)
Lee Myers, National Veterinary Stockpile, USDA-APHIS-VS

The Professional Development Staff (PDS) provides professional and technical training for both Federal and State Veterinarians. In addition to the Foreign Animal Disease Diagnostician (FADD) course, PDS delivers training to provide refresher courses for field veterinarians who have been previously trained at Plum Island. The FADDs must obtain training each year in order to maintain their FADD status. The development of additional courses assists field veterinarians in maintaining their skill sets and enhances their knowledge base in the event of a foreign animal disease outbreak. This presentation outlined the new training initiatives for FY 2014 as well as providing an update on the FAD Investigation Manual.

CFSPH Education and Outreach Efforts
Jim Roth, Iowa State University

The Center for Food Security and Public Health (CFSPH) at Iowa State University College of Veterinary Medicine works to increase national and international preparedness for accidental or intentional introduction of disease agents which threaten food security or public health. The CFSPH has a staff of veterinarians, graphic designers, instructional development and information technology specialists that develop and deliver educational resources. Almost all the resources are freely available at www.cfsph.iastate.edu. The website received almost 24 million hits in 2012. The CFSPH is funded entirely through grants and cooperative agreements.
Education and Outreach materials include:

- Fact sheets and annotated images for 140 trans boundary animal diseases
- The training website for the National Animal Health Emergency Response Corps
- Details on Secure Food Supply Plans for eggs, turkeys, milk and pork. These plans are designed to provide business continuity in the face of a foreign animal disease outbreak. Goals include avoiding interruptions in animal/animal product movement to commercial processing from farms with no evidence of infection during a foreign animal disease outbreak; providing a continuous supply of safe and wholesome food to consumers; and maintaining business continuity for producers, transporters, and food processors through response planning.
- Just-In-Time Training Resources for Responders to Animal Health Emergencies
- Emerging and Exotic Diseases of Animals Web Course and Initial Accreditation Training (in English and Spanish)
- USDA National Veterinary Accreditation Program Supplemental Training Educational Modules
- Basic Veterinary Immunology and Principles of Vaccination web-based courses

**Porcine Epidemic Diarrhea (PED) in the USA**
Harry Snelson, American Association of Swine Veterinarians

On May 17, 2013, the USDA confirmed the introduction of porcine epidemic diarrhea virus (PEDv) in a U.S. swine herd. This is the first time this virus has been diagnosed in North America. The virus was diagnosed in a handful of geographically and operationally disparate herds in multiple states within a few days. The virus clinically resembles transmissible gastroenteritis (TGE) which is endemic in the U.S. swine herd. While all ages of swine are susceptible, the disease is most severe (typically resulting in 100% mortality) in suckling pigs. Infected animals generally exhibit diarrhea, vomiting and anorexia. Older animals typically recover post-exposure and exhibit some level of immunity. This presentation will describe the introduction and continued spread of PEDv within the U.S. swine herd and the response undertaken by producers, veterinarians, diagnosticians and state and federal animal health officials.

**Low Pathogenic H7N9 Avian Influenza Virus – China, 2013**
Susan Trock, Centers for Disease Control and Prevention

On March 31, 2013, the China Health and Family Planning Commission notified the World Health Organization (OIE) of three cases of human infection with influenza A(H7N9). The cases were laboratory confirmed on March 29 by
China CDC. All three cases presented with severe respiratory distress and subsequently died. As of August 8, 2013, there have been 134 cases reported from 12 provinces; 43 died. The earliest illness onset date was February 18 and the last case onset date was July 10, 2013. The virus was characterized as a low pathogenic avian H7N9 influenza virus. The H7N9 appears to be a reassortant virus deriving the HA from domestic ducks, while the NA is similar to that identified in wild birds and the remaining six genes most closely relate to H9N2 virus recovered from domestic poultry.

The Ministry of Agriculture (MOA) in China identified the virus in several live bird markets, including some associated with the human cases. The MOA reported >700,000 samples were collected from farms, retail live markets, agricultural distribution market areas and wild birds. As of August 8, 52 isolations of H7N9 have been reported to OIE. All but two of these viruses were from birds and environments associated with the live market system. Several provinces and municipalities responded by ordering their live bird markets temporarily closed. Subsequent trace out investigations from the markets did not identify infected farm supply sources.

**H7N9 Poultry Experimental Results in Response to the 2013 China Outbreak**

David Suarez, University of Georgia

The recent outbreaks of H7N9 influenza in China has resulted in many human cases with a high fatality rate. Poultry have been suspected as the source of infection based on sequence analysis and virus isolations from live bird markets, but it’s not clear which species of birds are most likely to be infected and shedding sufficient levels of virus to infect humans. Intranasal inoculation of chickens, turkeys, Japanese quail, pigeons, Pekin ducks, Mallard ducks, Muscovy ducks, and Embden geese with $10^6$ EID$_{50}$ of the A/Anhui/1/2013 virus resulted in infection but no clinical signs. Virus shedding in quail, chickens, and Muscovy ducks was much higher and prolonged than in the rest of the species. Quail effectively transmitted the virus to direct contacts but pigeons and Pekin ducks did not. In all species, virus was detected at much higher titers from oropharyngeal swabs than cloacal swabs. The HA gene from samples collected from infected chickens and quail were sequenced to examine for changes in the virus after passage in these species. Three amino acid differences were observed when compared to A/Anhui/1/2013: N123D, N149D, and L217Q. Different combinations were present indicating most likely that the inoculum had virus subpopulations that were selected after passage in birds. In conclusion, these experimental studies corroborate that poultry species are an important reservoir of the H7N9 virus. The high levels of viral replication in the upper respiratory tract is characteristic of poultry-adapted influenza viruses, and consequentially testing of bird species should preferentially be conducted with OP swabs for best sensitivity.

**Schmallenberg Virus**

Francisco Javier Rivierego Gorejo, European Commission
The Schmallenberg virus (SBV) is not a zoonosis and infects ruminants. It can give congenital malformations similar to Akabane. The European Union (EU) established a management and coordination plan to address this virus, performing a risk assessment in 2011. In 2012 the EU co-financed studies and preliminary results of these studies have been received in 2013 with the EFSA releasing an epidemiological reporting May 2013. Completion of these studies is planned for March 2014. SBV has short viremia. The virus is transmitted horizontally through midges (Culicoides) and vertically through the placenta. There is no conclusive data on semen and there is also no direct transmission. The proportion of affected sheep flocks is less than 0.1% in affected regions with maximum 4-6% in the most severely affected regions. In cattle the maximum affected ranges from 2-4%. Syndromic surveillance for SBV was coordinated among EU member states, the European Commission, and European Food Safety Authority (EFSA). A harmonized case definition was developed that addresses both adult and new born animals as well as herds and requires confirmation of suspicious cases. There is regular analysis of data by EFSA and publications within scientific reports. Syndromic surveillance within the EU also involves non-EU countries. Transparency and timely communication has been implemented from the start. Several seroprevalence studies have been performed in Austria, Belgium, Germany, and The Netherlands with seropositive levels ranging from 63% (dairy heifers in The Netherlands) to 99.76% in Belgium cattle herds. Recent findings suggest there is no evidence to refute the assumption that SBV infection results in long term immunity. SBV is 30 times more efficient in disease spread and transmission than bluetongue. While vaccines for SBV are becoming available, research is still needed to determine protection. In May 2012 the 80th OIE General Session concluded that the conditions to consider SBV infection as an emerging disease are no longer met and that the disease does not meet the criteria for listing by the OIE. The emergence of SBV is a test for the international community and research activities should continue to be performed in a transparent manner. Careful considerations should be given to the implications of the expected new findings that will come from future research of this virus.

The Screwworm Barrier between Two Continents: Biologic, Political and Economic Considerations
John Shaw, Commission for the Prevention and Eradication of Screwworm – COPEG, Panama (via webinar)

The goal over some sixty years of screwworm (SW) eradication in North America was always to maintain a permanent barrier of sterile insects – the same tool used in eradication. The site of this barrier has over the Program’s history, moved southward with eradication efforts. In 1998, the Program began the eradication of Panama, and the goal of a barrier which was cost effective was clearly in sight. The original barrier in Eastern Panama, the Darien Province, also included release into Colombia up to 20 nautical miles of the border. With SW eradication and the transnational barrier in place, cases within
the Program’s Panama surveillance area (all within the political delineations of the country of Panama) all but disappeared. However, for a period of two years the sterile fly dispersal over Colombia was suspended. During the second of these years, the amount of cases within Panama’s barrier zone tripled, plus one case outside the dispersal zone. Each situation incurred high costs. Subsequently, the Colombia portion of the barrier was re-established. The number of cases the following year decreased greatly (two detections to date in 2013 in the dispersal area). This presentation seeks to explore the nature of biological and economic/political barriers for animal disease programs, current SW dispersal and costs, SW dispersal grid options with costs and risks, SW detections in Panama and their costs, and SW Program benefits.

NAADSM Update
Kelly Patyk, APHIS-VS-CEAH (via webinar)

Disease modeling is one tool that can be used to evaluate disease spread scenarios and evaluate control and response strategies against animal disease outbreaks. The North American Animal Disease Simulation Model (NAADSM) has been in use and development for 15 years at USDA-APHIS–VS Centers for Epidemiology and Animal Health (CEAH). In 2003 a modeling team was established to continue developing and using the model and in 2006 the NAADSM model was released. NAADSM is a herd-based, state transition model and is spatially explicit. It is a stochastic Monte Carlo simulation model that can account for natural variability and chance events. NAADSM has been used to evaluate control strategies, outbreak consequences, inform response and policy, and for training and exercises. A recent study using NAADSM was performed to evaluate potential control strategies for highly pathogenic avian influenza (HPAI), using de-identified commercial and backyard poultry premises in South Carolina. Conclusions from this study showed that the choice of control strategy, the type of poultry premises an outbreak originated from, and detection delay affected outbreak outcome. A stop movement disease control strategy consistently provided most favorable outcomes. NAADSM has also recently been used to evaluate the epidemiological impact of delayed detection for FMD. The study was focused in Texas and six surrounding states (New Mexico, Colorado, Oklahoma, Kansas, Arkansas, and Louisiana). Outbreak outcomes were affected by herd density and type of livestock operation where the outbreak originates. In addition, varying time to detection in one day intervals affected outbreak outcomes. The study showed a linear increase between mean infections and increases in delay of detection, in which each one-day delay led to more severe outcomes. The study also showed a lot of indirect spread, suggesting a focus on education to the industry on biosecurity practices would be of benefit. A next step for this study is to perform an economic analysis on outbreak outcomes. There are also many other ongoing projects underway and USDA-APHIS-VS-CEAH has a number of cooperative agreements in place with national and international institutions and agencies to support modeling activities.
De-identification of Spatially-Explicit Premises Data for Epidemiologic Disease Spread Modeling

Michael Martin, Clemson University

One important tool in preparing for control of an introduced foreign animal disease is stochastic disease spread modeling. Because disease spread models such as North American Animal Disease Simulation Model (NAADSM) are spatially explicit they depend upon realistic animal location information. Farm locations can be simulated using sources of aggregate population information such as the National Agricultural Statistics Service's Census of Agriculture. However the quantitative results obtained from such synthetic data sets have been shown to vary significantly from reality. Accurate farm location data exist in a number of data sets around the country. These data sets were almost always collected with a promise of confidentiality. We developed a technique for removing the identifying information from a spatially explicit data set in such a way that the epidemiologically significant clustering is preserved while providing a significant degree of anonymity for the individual farms in the dataset. This technique was shown to produce both qualitative and quantitative modeling results that are statistically indistinguishable from those obtained with fully identified data. This approach has been implemented in the form of an open-source Java program that can create the de-identified data set from a fully identified set with field-mappings, degree of anonymity, and a few other parameters set in a configuration file.

Controlled Movement of Swine in an FMD Outbreak

Jim Roth, Iowa State University (on behalf of Jon Zack, USDA-APHIS)

The controlled movement aspect of the secure pork supply plan was presented. There is a need to change how we will move swine as the North American agricultural industry is unique, with very large herd sizes and extensive mobility of animals, products and feed. There is a lot of movement of U.S. swine both within and between states. When considering Foreign Animal Disease (FAD) outbreak response plans, all types of swine operations in the U.S. have to be considered, including small and large operations. In the US, 62% of pigs live in premises with 5,000 or more pigs. Wildlife must also be considered in FAD response plans as the U.S. feral swine and deer populations continue to increase and become more widespread. Wildlife can potentially affect an FAD outbreak and could play a role in moving disease between herds, depending on the virus. We have had nine outbreaks of foot and mouth disease (FMD) in the U.S. between 1870 and 1929, all of which were successfully controlled with stop movement and stamping out. However, given the change in the U.S. agriculture industry, our response strategies need to change and various control options considered. If an FMD outbreak is small in size and restricted to a local area, stamping out is a likely strategy, but this may not be the case for larger outbreaks. FAD response strategies shift based on outbreak size, in which vaccination and other control strategies should be
considered with larger outbreaks. As such, a secure pork supply planning committee was established to develop the secure pork supply plan. The committee included industry representatives from all phase of swine production, government, state, industry groups, and academia. The FADs focus is on FMD, African swine fever (ASF), classical swine fever (CSF), and swine vesicular disease (SVD). Plans are always subject to change based on new science and risk assessments and so will be considered evolving documents, but these plans will be publically available in the near future. The plans are guidelines only, with final decisions made by responsible officials during an outbreak. There needs to be a lot of outreach and training pre and post outbreak. Within the plans, biosecurity performance standards have been developed for producers, haulers, and packers/processors. Biosecurity performance standards are being revised based on experience with Porcine Epidemic Diarrhea virus (PEDv). Traceability is important so premises identification is needed to track movements and to allow trace forward/back in the event of an outbreak to be performed. The plan recommends implementing active observational surveillance (AOS), in which someone on each premises is a herd health monitor who can identify potential clinical signs of FADs. AOS enhances early detection. On day one of an outbreak, there will be no new pigs put on trucks and moved. Pigs currently on a truck and all pork from processing facilities that have received swine from a FAD control area will be considered to potentially be infected with FMDv. However, as FMD is not a human health risk pork should be allowed to still enter commerce even if infected. Feeding garbage to swine must be strictly enforced due to risk of disease spread. Animals in transit to slaughter facilities will not be able to be unloaded if the processing of swine at the plant is not continued. It is recommended to process all healthy animals in slaughter and in transit. Restarting movement will be dependent on type of outbreak. The main requirements of the plan for restarting movement require implementing biosecurity, surveillance/traceability with validated premises ID, and movement permits. A new working group is being formed that will include Food Safety and Inspection Service (FSIS), APHIS, packers, and the food industry to further evaluate the secure pork supply plan.

**Conventional FMD Vaccines – Current Capabilities and Surge Capacity**

Larry Elsken, EDGE Veterinary Vaccines Consulting Group, LLC

There is an increasing realization that in the event of a widespread outbreak of Foot and Mouth Disease (FMD) in North America, the use of FMD vaccine will probably be an essential element in control and eradication measures. Currently, the sole practical source(s) for vaccines are "conventional" killed virus products already in regular production, distribution, and use. However, there are multiple issues related to accessing these vaccines, including availability of vaccine, and issues with the use of vaccines that have not been evaluated and approved by the USDA Center for Veterinary Biologics.
FOREIGN AND EMERGING DISEASES

- Current vaccine production capacity is closely matched to the money available to purchase FMD vaccine.
  - Current worldwide FMD vaccine needs greatly exceed number of doses produced.
  - Increasing capacity for ‘possible’ need is not economical or rational.
  - If there were money available, and an outbreak resulted in demand for 100 million to 1 billion ‘new’ doses of FMD vaccine, it would require months to years for manufacturers to shift production, and years to build increased manufacturing capacity.
- FMD vaccine manufacturers advise policy planners to assume the only FMD vaccine that will be available for the first three months after a ‘new’ demand occurs will necessarily be supplied from prepared bulk antigen such as:
  - Banked (frozen) vaccine antigens; Vaccine Antigen Concentrates (VACs, not owned by the manufacturer).
  - Prior contracted access to ‘on-hand’ vaccine inventory.
  - On-hand frozen or refrigerated bulk antigens or vaccines (owned by the manufacturer).
- Storage site(s) for VACs
- Money for vaccine or VAC banks
- ‘Triage’ for vaccine use: dairy vs. beef vs. swine
- Perspectives on Center for Veterinary Biologics (CVB) approval for any vaccine used:
  - Producer perspective
  - Consumer perspective
  - Redundancy costs (multiple manufacturers)

Committee Business:
A gift was presented to Dr. Paul Gibbs in recognition of his scientific expertise and service to the Committee as chair from 2008-2013.

One new resolution was brought forward to the Committee, namely that the United States Animal Health Association requests that USDA-APHIS supports the completion of the eradication of foot-and-mouth disease from the Americas by 2020 as outlined in the Pan American Foot-and-Mouth Disease Center (PANAFTOSA) action plan. The committee reviewed, discussed and passed this resolution. No other resolutions were brought forward and the meeting was adjourned.
The Committee on Government Relations met on February 25-26, 2013 in Washington, D.C., in conjunction with the American Association of Veterinary Laboratory Diagnosticians (AAVLD). There were 33 participants on behalf of the two organizations. The Committee convened at the office of the American Veterinary Medical Association (AVMA) on Tuesday, February 25. A summary of the meetings and discussion items is as follows.

**American Veterinary Medical Association (AVMA)**

Dr. Mark Lutschaunig, Director of AVMA Governmental Relations Division in DC, introduced the AVMA and Dr. Ron DeHaven, Executive Director of AVMA who joined the meeting via two-way video conferencing. AVMA also included Ms. Gina Luke, Dr. Whitney Miller and Dr. Ashley Morgan.

Dr. DeHaven illustrated the current three main areas of involvement of AVMA relevant to USAHA’s Food Animal perspective and AAVLD’s veterinary diagnostics.

1. Building practice and career
2. Promoting and protecting the profession
3. Keeping veterinarians in all areas and disciplines connected

Dr. DeHaven also indicated plans to review and if necessary revise existing AVMA governance structure: currently the Executive Board is composed of 15 members; there are 30 committees and councils, with some potentially ‘superfluous’ redundancies; the 136-member House of Delegates includes 68 organizations; and the organization is staffed by 143 employees, with potential for more efficient use of volunteers.

A Taskforce is evaluating accreditation of foreign colleges (currently 13 accredited in mostly English speaking countries) – two sides of the same coin are the solid reputation of U.S. accreditation standards, versus the concern voice of flooding of the U.S. veterinary job market by graduates from foreign schools.

AVMA responded to the early February article in New York Times on veterinary new graduate’s school debt.

Dr. Lutschaunig provided two hand-outs: the listing of staff members and their areas of responsibilities, and AVMA’s priorities in front of the 113th Congress.

A comment illustrated a concern with ‘turn-over’ in Congress and the problem of losing champions for veterinary professional issues. Response: AVMA works in a bi-partisan mode and therefore has good relationships with Congress. There also are currently two veterinarians in the House, and the profession is well respected.
Ms. Luke discussed turn-over on congressional agriculture committees; tax exemption for Loan Repayment Program Enhancement Act, AVMA request for Level funding at $4.7M, handed out information on 175 awards to 555 applicants for total awards of $17M.

Dr. Miller presented AVMA’s position on Animal Fighting Spectator Prohibition Act (support), Horse Transportation Safety Act (support), Horse Slaughter (oppose), Horse Protection Act Amendments (support), Egg Products Inspection Act Amendments of 2012 (not set). She responded to a question on how AVMA develops positions – bills provided to committees with oversight or impacted by bill, committees send recommendation to legislative advisory committee to Executive Board, after intro of bill in congress AVMA provides either ‘passive or active pursuit of defeat,’ ‘no action,’ or ‘passive or active pursuit of passage.’

Dr. Morgan presented on Animal Drug User Fee Act (ADUFA), with conditional support of AVMA.

Association of American Veterinary Medical Colleges (AAVMC)
Executive Director Andy Maccabe introduced the new director of governmental relations, Kevin Cain, who explained some of the current opportunities and challenges. The AAVMC agenda is closely aligned with the AVMA agenda, whose executive leaderships work closely together; idea of ‘creation’ of veterinary medicine caucus, with two current House members being veterinarians, plus adding members from districts with veterinary colleges.

Topics of presentation and discussion were educational financial burden to veterinary students, the opportunities associated with the loan repayment program; need for financial literacy of students, for whom burden of financial commitment has changed from the state to the students; recruitment of a more diverse student body – establishment of a national strategic recruiting plan (student body currently 80% female, 90% Caucasian, 94% suburban, with 94% of seats managed by AAVMC allocation; no change in enrollment in two decades, from 1981-2000 (~2300 seats in colleges), since 2001 increase to ~3000 seats in U.S. schools; 3-4 new private schools to come into operation in the next few years; initiatives regarding improvement of day one readiness of graduates, North American Veterinary Medical Education Consortium (NAVMEC), regional resource sharing between colleges to create Centers of Excellence among 28 U.S. AAVMC member colleges.

Animal Agriculture Coalition (AAC)
AAC is chaired by Damon Wells, National Turkey Federation and Gina Luke, AVMA. AAC shared its vision and planning moving forward as a coalition, looking at different opportunities to continue to be a successful voice for animal agriculture and the best means for hosting meetings and addressing issues. AAC has recently spent most of its focus on Farm Bill passage and appropriations for agriculture programs.
Agriculture Research Service (ARS)
Dr. Cyril Gay presented to the Committee on the following key topics:

- **150 year anniversary of USDA celebrated in 2012. USDA signed into law by Abraham Lincoln in 1862. In 1862, 50% of population rural, in 2012 only 2% of population rural.**
- **15% of ARS budget is for animal (85% for plant).**
- **USDA-ARS organized with World Animal Health Organization (OIE) a symposium of antibiotic usage in animals in 2012. Effort to start bringing focus on development of new tools for animal agriculture and reduce reliance on antibiotics**
  - Need to integrate nutrition and disease research to enhance synergies and understand antibiotic usage. The current gap in knowledge about alternatives to antibiotics are being filled by feed companies. Thus, private industry is getting a lot of products to animal owners without knowledge of how to use the product or how the product works.
  - Clearly there’s a need to produce new products for alternatives to antibiotics but also needs to support basic research to investigate mechanism of action and optimal utilization.
- **Budget Requests**
  - ARS will not likely have to implement furloughs, which is not compatible with developing new scientists.
- **Key Research initiatives**
  - Biodefense Research Program
    - Support National Animal Health Laboratory Network (NAHLN) and other programs to respond to catastrophic disease introduction.
    - National Veterinary Stockpile (HSPD-9) requires stockpile to be ready in disease outbreak.
    - Improvement of countermeasure or development of new counter measures.
    - Gaps identified through ARS sponsored workshops. Examples include foot and mouth disease (FMD) and classical swine fever (CSF). In 2013, ARS will host three workshops. One in April 2013 at the Foreign Animal Disease Diagnostic Laboratory (FADDL) on African swine fever. Second on High Path Avian Influenza in March 2013 sponsored by University of Georgia. Both will have post workshop reports to APHIS and NAHLN. Third workshop May 14-16 on Orbiviruses (first to address endemic USA disease versus foreign animal disease).

Dr. Gay then reviewed responses on 2012 USAHA Resolutions.
GOVERNMENT RELATIONS

- 8: Support for research on mycobacterial diseases in animals
- 14: Research on Seneca Valley Virus
- 15: Vaccine for various strains of epizootic hemorrhagic disease (EHD)
- 16: National review of research needs for bluetongue and related orbiviruses
  - ARS workshop will be identifying gap analysis in May 2013.

Dr. Gay then addressed questions from the Committee, as outlined below:
- Is orbivirus workshop in response to USAHA resolution? Yes.
- Is vaccine development for brucella and tuberculosis priority? Yes
  - Current programs in place and funded at National Animal Disease Center (NADC) on brucellosis and tuberculosis (TB) (led by Ray Waters and Mitch Palmer).
- What is ARS response to Seneca Valley virus (USAHA resolution)?
  - No appropriations from Congress for Seneca Valley virus. After USAHA, ARS leadership discussed resolutions, it was decided to have Dr. Marcus Kerhli take lead at National Animal Disease Center (NADC). Obtaining samples from Hawaii for study (Dr. Richard Willer). Will inoculate pigs to study pathogenesis and basic virology.
  - Funding for new or emerging disease currently through National Bio and Agro-Defense Facility (NBAF) and Foreign Animal Disease Diagnostic Laboratory (FADDL). New program on African swine fever (ASF) within ARS ongoing without additional funding. Example of expanding on five year research cycle only to include ongoing responses to stakeholder needs (such as USAHA resolutions).
- Can ARS do a gap analysis on foot and mouth disease (FMD) vaccine development and use?
  - Current ARS research focused on vaccination to live. That is, vaccine development not only for disease prevention but also disease control (counter measure tool).
  - Gap analysis of FMD vaccines is primary role of Centers for Epidemiology and Animal Health (CEAH) APHIS. ARS is trying to generate information for CEAH to use in their deliberations.
Food and Drug Administration – Center for Veterinary Medicine (FDA-CVM)

Dr. Bernadette Dunham, Dr. Renate Reimschuessel, Dr. Bill Flynn and Dr. David White

Dr. Bernadette Dunham, Director of CVM (Center for Veterinary Medicine) spoke about budget.

- CVM is currently operating on a continuing resolution (CR) congressional action which keeps funding at the previous fiscal year level. This is a total budget of $109 million; $23 million of this is from user fees.
- Budget sequestration on March 1 is probable, meaning FDA will tighten further, but not foreseeing any staff furloughs this year.
- Budget sequestration beyond 2013 would be a bigger problem unless FDA was allowed flexibility to meet budget cuts up to 10%. Higher cuts would also be a problem.
- Food Safety Modernization Act (FSMA) should mean more dollars for both CVM and Center for Food Safety and Nutrition (CFSAN).
- FDA collects user fees from approving animal drugs and generic drugs. There is a hearing on Capitol Hill on the reauthorization of this authority February 27 in which Dr. Dunham will testify.
- FDA will continue to interact with constituents, but must conserve funding. Tightening the budget means less travel, more meetings via phone and video, and district office staff may be attending some meetings rather than headquarters staff.

Dr. Renate Reimschuessel spoke about the Vet-LIRN (Veterinary Laboratory Investigation and Response Network).

- Vet-LIRN has grown from an idea in 2010 to a network of 32 laboratories today.
- Vet-LIRN has awarded 11 cooperative agreements to study salmonella in pets.
- Vet-LIRN collaborated with six laboratories to test a number of animal feed products for various contaminants.
- Vet-LIRN collaborated with three laboratories to optimize methods and test pig tissues for triazine contaminants.
- Vet-LIRN will contract for a feed survey to identify and prioritize issues.
- Vet-LIRN conducted investigations and case evaluations, including pet jerky treats.
- Budget will be an issue in 2013, and grants will be fewer-possibly 3-5 rather than 8-11.

Dr. Bill Flynn briefed the group on CVM antimicrobial strategies, concerns about resistance.

- A 2010 policy statement began the phasing in of more veterinary oversight and the phasing out of using antimicrobials for growth promotion in livestock.
Regulation of animal antimicrobials is impacted by the medical importance of each.

Some antimicrobials used for growth promotion may have therapeutic uses added to the approvals.

A draft guidance is out for comment to the pharmaceutical industry on implementation of the above points.

Another document is being developed on changing over-the-counter (OTC) products to prescription use. It is recognized that this will involve revamping specific rules related to the veterinary feed directive (VFD) so this change is not onerous. Changes would be implemented in 2016.

FDA is collecting data on the use of veterinary drugs—sales and distribution data are not necessarily an accurate description of volumes used.

There was discussion of the Food and Drug Administration (FDA) sampling survey of milk, tissue residues, and whether the two are directly related. There is also concern about how the data will be released and used.

Consumer activist groups have filed lawsuits trying to pressure FDA to withdraw approvals for some of the antimicrobials used in livestock.

The group discussed the need for better public understanding of these issues and risk (or lack of) involved.

Dr. David White, Food and Drug Administration (FDA), discussed focusing the research investments of the agency.

Between Center for Veterinary Medicine (CVM) and Center for Food Safety and Nutrition (CFSAN), the agency has 180 scientists. There are efforts currently to prioritize their work and to impact the agency mission (not just publish papers).

A high priority will be to validate FDA’s detection methods, particularly since FSMA will allow third parties to use the same methods.

FDA is undertaking a major effort to map 100,000 bacterial genomes, geared toward food borne pathogens and animal health targets.

The antibiotic development pipeline is almost dry; possibly FDA research on genomes can help.

FDA is doing an inventory of all food safety research in the various agencies of the U.S. government (Department of Homeland Security (DHS), FDA, Center for Disease Control (CDC), USDA, etc.) with the goal of better coordination and less duplication (also communicating with Canadian government counterparts).

The discussion concluded with NARMS (National Antimicrobial Resistance Monitoring System), which has been an ARS (USDA Agricultural Research...
Service) program. FDA recognizes the value of cooperating with USDA on this and is looking at ways to enhance it.

**Department of Homeland Security (DHS), Office of Health Affairs**
Dr. Jamie Johnson, Dr. Doug Meckes

Dr. Johnson provided an update on the National Bio and Agro Defense Facility (NBAF) and Plum Island.

DHS received the “green light” to proceed with construction of the utility plant at the NBAF site in Manhattan, Kansas. The contract for this work has been awarded. Estimated cost for this portion of the construction is $40M. The utility plant construction is considered the middle phase of the construction project. The third phase is the construction of the laboratory proper. DHS is hoping that the budget, anticipated to pass in March, will include full funding for the construction of the NBAF, but there are real challenges due to the tight economic climate, and the effort to cut federal spending.

Both the DHS Administration and the people in important positions in Kansas remain committed to seeing this project through. DHS Secretary is supportive. She is optimistic that some money will be allocated in FY ’14 budget. Ideally DHS would like to have it all allocated because that makes construction cheaper in the long run.

DHS has not stopped working on other important FAD tools. They are making good progress with FMD vaccines at Plum Island while they work to secure the new NBAF facility.

The NBAF facility will be a large building (>600,000 sq feet). This will take about five years to construct, followed by another year and a half to two years to “commission” the building so that everything is accredited.

This means that the current facility on Plum needs to stay operational for another seven to nine years. DHS has invested > $100M in Plum Island Animal Disease Center (PIADC) to keep it functioning.

All things considered this is a challenging time to build a new building in the face of current budget challenges. Updated figures for completion of NBAF = $1.2B. $200M has been appropriated to date. Kansas has provided $150M leaving $900M still to be appropriated.

In response to questions about the decision to build a new laboratory on the U.S. mainland verses refurbishing the existing laboratory at Plum Island, Jamie pointed out that the United Kingdom (U.K.) elected to tear down their laboratory located in Pirbright and build a new laboratory because retrofitting old laboratories is very expensive. Additionally, the cost of construction in New York is high. Add to that the added expense of working on an island, and the feeling is that taxpayers will get much more for his money building a new laboratory on the mainland.

Operational expense on a per square foot basis in the new laboratory will be cheaper than current operating expenses are at Plum Island due to modernizations. Labor will be $ 5-10M cheaper per year in Kansas than in New York. There are currently 275 employees at Plum Island. It is anticipated that in the new NBAF there will be 350-375.
There have been many opportunities for input during the planning phase of NBAF. This includes two committees commissioned by the National Academy of Sciences. One of these groups evaluated three options for NBAF:

- No change from the current plan
- NBAF light (a similar, but smaller, laboratory option)
- Stay on Plum Island

This group found that a new laboratory is needed, that most of the savings of downsizing the current plan would be eaten up in the redesign process. They felt that the U.S. needs to replace the aging facility at Plum Island, so the summary was basically to continue with the current plan.

One new thing to come from all of the input in the laboratory design is the inclusion of a bio-development module (BDM). The BDM will help expedite experimental vaccine development. DHS is going to hold a workshop in Kansas City to hear what the industry thinks about potential uses for the BDM (can it be leased out to industry, etc.).

Dr. Doug Meckes provided an update on the Office of Health Affairs (OHA). Dr. Meckes has worked hard at keeping the importance of the food and agriculture sector before management of DHS. The Secretary asked for an FMD tabletop to include broad sections of DHS and others. This tabletop stressed the importance of agriculture, and provided some numbers which capture the importance of agriculture to the U.S. economy. He quoted from Dermot Hayes study to emphasize the importance of ag in economy.

Homeland Security Presidential Directive (HSPD 9) - DHS has experienced variable success with the implementation of HSPD 9. The Health Affairs group has been charged with reviewing the status of HSPD9 implementation. A review has been written and is being circulated within DHS. There is some concern that the agricultural sector may not have enough visibility in this report. There have been lots of successes that should be included, and may be included in an edited version of the report. This review may be available in six to nine months (best case scenario).

**Integrated Consortium of Laboratory Networks (ICLN) – Laboratory Networks**

Matt Coats, Science and Technology (S&T) Directorate, Department of Homeland Security (DHS) (by phone)

Dr. Coats spoke primarily about the agriculture center: There are two centers of excellence funded by DHS which share the same mission; one at Texas A&M and the other at K-State. This group is called the Zoonotic and Animal Disease Defense Center. It is scheduled to go for six years which they are currently half way through at this time. The program looks at the strategic position of the research portfolio of DHS funded programs for FADs and zoonotic diseases – with a focus on three main areas:

- **Bio-theme:** Novel vaccine platforms - Rift Valley fever (RVF), African swine fever (ASF), and classical swine fever (CSF)
REPORT OF THE COMMITTEE

- Detections themes: Focuses on corresponding assays needed by first responders for the diseases identified in the Bio-theme area. This group has a strong relationship with the Chem-Bio branch of S&T which is overseen by Michelle Colby.

- Information analysis: How do you link the good work that USDA and DHS do with the industry? This group considers the importance of maintaining business continuity as a part of disease control. Some pilots are underway which is mostly Information Technology (IT)-centric. This area focuses on partnerships with industry and producers.

Education and training piece – This group also oversees formal education programs and generalized outreach programs which leverage state extensions and adult education programs.

The National Center for Food Protection and Defense (NCFDD) at the University of Minnesota has a unique relationship with the other centers. It conducts research in 3 areas:

- Agent behavior and threats in food
- Event modeling, horizon scanning
- Systems strategy – looking at risk.

Chem-Bio Center
Science and Technology (S&T) Directorate
Michelle Colby, Jamie Johnson, Matt Coats

Having strong interrelationships with USDA and the Centers of Excellence, allows these programs to be closely aligned. This group is working on multiple projects, several of which are listed below:

Vaccines projects:

1) Foot and mouth disease (FMD) vaccines – this is the longest running project. In the near term we will be wrapping up transitioning some molecular-based vaccines for FMD to the private sector. In the mid-term they are working on the characterization of off-the-shelf vaccines for FMD with the goal of being able to supplement the number of doses which are available in the North American FMD Vaccine Bank in the event of a large FMD outbreak. We are evaluating some FMD vaccines being made by Biogenesis, Inc. in Argentina. We are also exploring other foreign manufacturers of FMD vaccine to meet this need.

2) Marked molecular vaccines – We are working on vaccines which allow for the differentiation of vaccinated and infected animals. A vaccine for one serotype of FMD is licensed through a private-public partnership. This was started in USDA and DHS, and completed by a private company. This is currently in a field safety study. The plan is to continue to pursue this platform for other serotypes of FMD; and to continue to partner with large vaccine companies with the goal of having 18 vaccines through pipeline by 2018.
3) DHS is also investing in other vaccine platforms for other Foreign Animal Diseases (FADS): classical swine fever (CSF), Rift Valley fever (RVF), African swine fever (ASF), and Nipah.

4) DHS has several contracts with small companies who will take a research vaccine and turn it into a pre-manufacture seed vaccine that can be used for further studies required for licensure.

**Diagnostics projects:**

1) Diagnostics which support Differentiating Infected from Vaccinated Animals (DIVA) vaccines

2) Agricultural screening tools for the rapid detection of disease. They are working with the FAZD center (TX); focusing on the use of polymerase chain reaction (PCR) for FMDv in bulk milk tank samples.

3) Pen-side testing for use during an outbreak.

4) Evaluating oral fluids in swine for fad testing for surveillance or post event surveillance.

5) Investing in some other technologies – infrared thermography to identify sick animals from a distance.

6) Also looking at decontamination strategies, disposal strategies, and depopulation strategies for use during and FAD outbreak.

**FAD modeling:**

We are building a national scale model which estimates the need and supply of workforce and supplies, etc. for responding in the case of an outbreak.

There was a discussion on vaccine from off the shelf for use in the USA. The last discussion item included certified training courses for agriculture, and delivery and effectiveness of making these available. Dr. Meckes sought input from the group.

The Committee then adjourned for the day, to reconvene the next morning at the USDA Whitten Building.

**USDA-APHIS**

The first meeting for Wednesday, February 26 was with USDA-APHIS, Veterinary Services (VS). Participants included Drs. John Clifford, Jon Zack, John Picanso, Neil Hammerschmidt, Lee Ann Thomas, Beth Lautner, and Sharon Fisher.

Dr. Clifford first addressed the pending sequestration and expectations. VS has lost approximately 200 positions due to recent budget adjustments, including several not being filled or re-filled because of budgetary concerns. Actions have been taken since the beginning of the FY to adjust spending in anticipation of this. Furloughs are not expected, but there will likely be reductions in services, especially in the area of 2013-2014 cooperative agreements.

2014 budget: not yet released by President Obama. The 2013 budget contained ~$5 million for animal disease programs. VS will not receive this under the continuing resolution (CR) now in place.
John Picanso provided an update on two modernization initiatives:
- Surveillance Collaboration System (SCS; re-branded Core One product)
- Emergency Management Response System (EMRS)

The previous platforms, Generic Disease Database (GDB) and previous version EMRS, were built on Lotus Notes platform which is being retired. Data migration from GDB to SCS has been completed in two years (approx. 2 billion rows of information). Cognos, a reporting and potentially an analytical tool, is available to SCS users and is coupled in all SCS installations.

The NAHLN data system has been re-named to the Laboratory Messaging Service (LMS). There is a target date of March 26, 2013 to start receiving the Cornell laboratory information under a pilot project. The intent is to make LMS the conduit for any laboratory information into SCS and EMRS. Data Standards for data elements and data exchange are being developed within VS through a recently initiated subcommittee of laboratory personnel, industry, state animal health officials, and others. A Federal Register posting of draft data standards is available on the VS website. These data conventions are now available for use.

Jon Zack presented the latest developments in foot and mouth disease (FMD) and emergency preparedness.

FMD – the overall policy and approach are the same as always, starting with the priority of containment and control on a single premise. The larger approach picture is a much more complex one of expanded options, contingencies, and flexibility including the use of vaccine and vaccination scenarios, movement controls, and animal identification. A state animal health official working group may be convened to identify and discuss from a project management perspective similar to that used to develop the Animal Disease Traceability model.

The U.S., Canada, New Zealand, and Australia developed and submitted to the World Animal Health Organization (OIE) Scientific Committee a paper on nations using high potency FMD vaccine maintaining FMD Free status – not Free with Vaccination status. OIE internal consideration is expected to require a couple years. This position will need our support (USAHA, state animal health officials (SAHOs) when/if it is favorably received within OIE.

Another OIE issue is that of the use of new technologies in disease management. A survey of member countries is being conducted on how new technologies such as diagnostic imaging, global positioning systems (GPS), and others are being used in disease surveillance and management. The OIE will consider how to best incorporate these tools and what standards should be established for acceptance of programs that use these tools for disease status classifications.

A final point on consumer acceptance of food products from FMD vaccinated animals was discussed. Communications professionals will need to
be engaged well ahead of any outbreak for assistance regarding this issue and others associated with FMD management.

Animal Disease Traceability was next addressed by Neil Hammerschmidt. Identification (ID) tags and devices which are not collected with a sample (ie granuloma submission) will be given to APHIS Veterinary Services (VS). VS is working on a plan to 'retire' those tags by entering all manmade ID collected from slaughter into a searchable database.

A recent VS study indicated that more ID is collected at slaughter than current opinion would support. The results of this study will be available soon.

The animal disease traceability (ADT) regulation requires that the establishment collect ID and maintain throughout slaughter.

VS is working on a memorandum of understanding (MOU) with Food Safety Inspection Service (FSIS) so that FSIS can establish clear directives to plants. This will also give better direction to VS employees for uniform enforcement of the regulations regarding:

1) Collection of ID at slaughter – there will be a checklist for VS staff
2) Reviewing protocol (HACCP-type) to ensure compliance

What to do with tags after we have them?

There are two Pilot projects dealing with retired numbers:

1) Tag retirement center (Wisconsin)
2) The start-up plan involves two plants which will send tags to the center where they will be entered into a database with an event code. This includes production tags as well as official ID.

Outreach and Training to DVMs

1) VS is planning to add a module to the accreditation site. This will take several months to develop.
2) ADT roadmaps will support the area veterinarian in charge (AVIC) in providing training to DVMs
   - Handouts, CDs, Powerpoints

Clifford, along with Lee Ann Thomas led discussion on identification of Mexican origin feeder cattle.

Mexican ID – Mexico using SINIIGA tags, which are tracked by an industry coordinated computer system.

- To synchronize electronic identification (EID) and other tags
- Mexican officials are pushing to use SINIIGA tags in place of blue ear tags
- VS inspectors review blue tags at import
- Challenges at port re-screening regarding SINIIGA tags
  - If we had EID systems, electronic certification would work
  - USDA does not currently have electronic capabilities
  - Long term goal is that VS intends to have an electronic system
Dr. Bob Meyer (Wyoming) asked if VS might consider recognizing National System of Individual Cattle Identification (SINIIGA) EID in roping cattle, recognizing that metal tags are often removed (illegally) from roping cattle due to complications with their intended use. Dr. Clifford indicated that VS would look into this possibility.

- There is concern among all involved for illegal removal of tags.
- Dr. Jere Dick noted that Dr. TJ Meyer is working on VS’ ability to write administrative tickets.
  - Would relieve OGC attorneys and allow them to focus on “upper end” problems
  - In addition, states could/should have administrative authority, under state regulations, to deal with these issues as well.

A question was asked about electronic certificate of veterinary inspections (CVIs) – Explore use of eCVIs for International movement. Dr. Clifford noted that the proposed VS Service Center development is based upon the use of electronic CVIs for international movement.

Discussion continued on some of the brucellosis vaccination and research projects:
- Gonacon for the use in bison, looking to test efficacy and effectiveness of rendering brucella infection ineffective in bison.
- RB51 use in elk and bison - vaccination response using RB51 in bison and elk.

TB vaccination:
- No activities relating to TB vaccination of cattle in U.S.
- Some work by ARS on TB vaccination for cervids
  - TB StatPak & DPP: Just initiated February 4, closely monitoring results.
  - When comparing the skin test in the field to a laboratory test, we want to carefully evaluate the field test positives from the new test...we have seen about ten cases of Dual Path Platform (DPP)-positive cervids. Any animals that are DPP positive on the first test or DPP positive on the second test, we will heavily screen them for TB. We will indemnify the animals after the first DPP positive and necropsy. The guidelines do provide for a second DPP test if the first DPP is positive.
  - StatPak is an antibody response test and read visually but a good screening test; still need to evaluate tests against necropsy results.
  - Can it be approved in mule deer? We'll be stockpiling some serum to evaluate its possible use for mule deer - initial results don't look promising.
  - Specificity for cervids is 99.4 and sensitivity is 87.1. Would state animal health officials consider it as an official test for unapproved cervid species? It is hard to validate for other species when we have limited samples in those species.

Swine brucellosis and pseudorabies (PRV):
- New regulations have been published and are up for comment. States are considered free for brucellosis and PRV but may have feral swine with those diseases. The concept paper looks at combining swine brucellosis and PRV
regulations as the diseases have some of the same risk factors. The new regulations will streamline the rules and will move away from state based disease status; similar to cattle brucellosis and TB regulations. State swine health plans should include feral and "transitional" swine. Please look at the concept paper and make comments. We are not looking at setting up a separate working group but want/need stakeholder input through web, webinars, etc.

Do the states want a working group to work on these rules? The classification of a state would be similar to other disease programs. They would be consistent, inconsistent, or provisionally consistent. The rules are basically risk based and flexible.

A comment was posted regarding bovine spongiform encephalopathy (BSE) indicating the possible need to review the present protocol for renderers so that carcasses which are submitted for rabies, are flagged at the render and held until testing for rabies and BSE is completed.

The National Animal Health Laboratory Network (NAHLN) Coordinator Position is listed, needs to be a DVM or Microbiologist (as defined by USDA).

Dr. Clifford then discussed Veterinary Services (VS) participation for the 2013 USAHA Annual Meeting.

The Committee next discussed Cooperative Agreement funding, and the shift to a more umbrella cooperative agreement to increase flexibility for the states.

The VS Staff then provided an overview on VS Reorganization: Organized around four categories of function:

- Science and Technology Services
- Administrative Support Group (Program Support Services)
- National Import & Export Services
- Surveillance and Response Group

The Committee next welcomed Dr. Beth Lautner with National Animal Health Laboratory Network (NAHLN), National Veterinary Services Laboratory (NVSL), joined by teleconference with Drs. Sarah Tomlinson and Christie Loiacono. Dr. Lautner led the discussion providing the following updates:

- Dr. Mia Kim Torchetti is the new Avian Viruses Section Head in the Diagnostic Virology Laboratory (DVL) at NVSL. Mia.Kim.Torchetti@aphis.usda.gov and (515) 337-7551.
- The NAHLN Coordinator position was approved for refilling and has been posted internally and externally, to be open for a minimum of three weeks. Outlets include USAJobs, AAVLD, USAHA, and AVMA websites. AAVLD will be represented on the interview panel.
- A2LA accreditation of NVSL included the Veterinary Laboratory Accreditation Program Requirements, increasing to 62% the percentage of accredited tests offered. For the first time, the scope encompassed proficiency tests (avian influenza (AI), END, foot
and mouth disease (FMD), classical swine fever (CSF), polymerase chain reaction (PCR) and reference materials (Brucella and AI agar-gel immunodiffusion (AGID) materials). Reorganization will allow growth in the number of PTs available.

- The state/federal relationships forged between NVSL-NAHLN and the State Veterinarians during the simian immunodeficiency virus (SIV) A cases in fair goers last summer augmented those between ARS and CDC. NVSL’s whole-genome sequencing allowed Centers for Disease Control and Prevention (CDC) to compare with human cases and ARS to keep SIV experts in the loop. Voluntary, anonymous surveillance program is evolving this summer to include NAHLN laboratories, PCR subtyping and collection of clinical histories.

- NVSL and Southeast Poultry Research Laboratory (SEPRL) evaluated pooling 11 swabs/tube vs. 5/tube to decrease costs for AIV surveillance and found no differences in diagnostic sensitivity and specificity. The test is not valid if 11 swabs are used with the small volume of media appropriate for five swabs. Logistics are still to be worked out before implementing the increased swab count includes media volume or pooling from two tubes, changing tube size, rack size, centrifuge time, filtration instead of autoclaving.

- NVSL and American Association of Veterinary Laboratory Diagnosticians (AAVLD) are coordinating a non-regulatory ring test for PCR-based equine herpes virus (EHV) detection and typing to distinguish neuropathic EHV-1 and to establish performance limits using different platforms with the goal of determining relative sensitivity and specificity. Dr. Tim Baszler has been coordinating the AAVLD laboratories, and eight isolates (HV-1, HV-2, HV-5) have been submitted. These will be sequenced by Dr. Udeni Balasuriya at the Gluck Center, and will hopefully be ready to begin the collaborative study this summer.

- Three new Scrapie/chronic wasting disease (CWD) testing platforms have been approved by NVSL/VS for use in the 21 NAHLN laboratories performing surveillance to replace the Ventana NexES (being obsoleted). Laboratories may select from: Biocare Medical’s IntelliPATH FLX®, Leica Microsystem’s BOND MAX, or the Ventana Discovery XT. NVSL-Pathobiology Laboratory (PL) will continue to provide standard operating procedures (SOP), proficiency testing (PT), reagent quality assurance (QA) and confirmatory testing on each of the platforms.

- The NAHLN Coordinating Council has reviewed the NAHLN reorganization concept paper (2011) to meet missions of early detection, rapid response, and appropriate recovery from adverse animal health events. The Notice of Availability of a National Animal Health Laboratory Network Reorganization Concept Paper
will be published in the Spring 2013 Federal Register for stakeholder comment.

- The NAHLN IT system has been transformed to a Laboratory Messaging Service (LMS) able to accept Health Level 7 (HL7) messages from any laboratory for any disease of interest for NVSL-VS. In March 2013, it will begin to accept messages about swine influenza virus (SIV) and pseudorabies virus (PRV) surveillance testing. The LMS group is working with State Animal Laboratory Messaging Services (SALMS) to ensure compatibility and integration.

- CoreShield secure communication and information sharing mechanisms was used to develop a NAHLN Portal. A module of information on laboratories, their scopes of testing, their funding and their equipment inventories is currently in service. A partial module for registration and tracking proficiency testing is newly released. The next modules planned are for SOP and performance monitoring. The Portal also allows workgroup and webinar collaborations.

- In 2012, NVSL- Foreign Animal Disease Diagnostic Laboratory (FADDL) completed an FMD penside negative cohort study (two NAHLN laboratories) and an FMD milk PCR inter-laboratory comparison (five NAHLN laboratories, NVSL-FADDL, and Pirbright). The negative cohort study validating the real-time PCR for FMDV in bulk tank milk samples will be completed in March 2013. Also planned for 2013: a larger FMD penside negative cohort study (FAZD and NVSL-FADDL) to validate a commercial penside assay and an FMD serological negative cohort study (NAHLN laboratories and NVSL-FADDL).

**USDA, National Institute for Food and Agriculture (NIFA)**

The Committee welcomed Dr. Meryl Broussard, Dr. Gary Sherman, and Dr. Mark Murano. The representatives covered several topics, and related to budgeting and programming updates.

- Budget – The high level of uncertainty continues. Working on FY14 and FY15 budgets with no FY13 budget adopted is a challenge. Currently under a Continuing Resolution with 50 separate line items in the budget. Sequester would likely result in five percent cuts to each line item with no flexibility to move between line items for NIFA. While sequester is a concern, the bigger concern is a final appropriations bill for this year. Lack of a final appropriations bill for the full FY has held up the various grant programs.

- National Animal Health Laboratory Network (NAHLN) – NIFA remains committed to the NAHLN and working in concert withAPHIS on NAHLN – both agencies are on the same page.
REPORT OF THE COMMITTEE

- NAHLN – recognize the need for continued improvement in communications on the merits of NAHLN to Office of Management and Budget (OMB), the Director of NIFA and others.
- NIFA expects to maintain the same percentages that currently exist in distributing the budget line item that funds not only the NAHLN but also the plant laboratory network and Extension Disaster Education Network (EDEN). This would apply to cuts and increases.
- Veterinary Medicine Loan Repayment Program (VMLRP) – 107 awards have been made through the program to date. Expectation is for $4.7-4.8M in new funding which would allow for approximately 50 new awards.
- VMLRP – discussion about the possibility of cross border nominations, state level input in selection and allowing applicants to apply for more than one shortage situation simultaneously covered the advantages of these options but also the reasons why NIFA procedures have not allowed these up to this point. No immediate changes on this front are expected.
- Agriculture and Food Research Initiative (AFRI) – reviewed the grant programs (outlined on handout). $260M currently available in this program.
- Food Animal Residue Avoidance Database (FARAD) – currently at its highest funding level ever. Nature of this funding is that it will continue to be an every year battle for funding. Small line items such as FARAD will continue to be at high risk as a target for elimination from people who do not understand the program and are looking for cuts or offsets. FARAD is unique within NIFA as a continuing service program – other programs are time limited research.

USDA, Food Safety Inspection Service (FSIS)

The Committee next welcomed FSIS representatives Phil Derfler, Dan Englejohn and Patty Bennett.

They addressed collection of identification at slaughter, particularly on disease traces. FSIS and APHIS are developing an memorandum of understanding (MOU) for this process. They are reviewing SOPs on lymph collection versus cross contamination. There is incentive within plants on collection.

The Committee asked if there would be input on the MOU process outside of USDA.

Mr. Derfler addressed the FSIS plan in regards to furlough, expecting 5% across the board. Within the FSIS budget, 83% is workforce. Any furloughs would have 30-day notice, and also considerations as the positions are union.
The Committee asked about the APHIS system, which is fully implemented domestically, with data coming in. Plants are beginning to use to identify problems.

The Poultry Modernization Rule was also addressed, they received more than 100,000 comments on the Rule. A number of significant issues were identified, including worker safety. The final rule is in the review process.

Mr. Derfler provided information on the reorganization update, now in phase II. This is part of the strategic plan for 2011-2016, which includes annual performance plan and organizational efficiencies.

The final item for discussion included horse slaughter. FSIS has received five inquiries for processing facilities.
REPORT OF THE COMMITTEE ON IMPORT-EXPORT
Chair: Mark Engle, TN
Vice Chair: Robert Blomme, IA

Bobby Acord, NC; Debbie Barr, ONT; Bob Bokma, MD; Joyce Bowling-Heyward, MD; Bethany Bradford, VI; Gary Brickler, CA; Charles Brown II, WI; Stan Brunz, CO; Suzanne Burnham, TX; Bruce Carter, ME; Sarah Chalangaran, CA; Eric Coleman, MD; Ignacio dela Cruz, MNP; Linda Detwiler, NJ; Magde Elshafie, MD; Effingham Embree, Jr., IL; J Amelita Facchiano, TX; William Fales, MO; Mallory Gaines, DC; Julie Gard, AL; Chester Gipson, MD; Tony Good, OH; Cathleen Hanlon, NY; Robert Hilsenroth, FL; Donald Hoenig, ME; Floyd Horn, MD; Laurie Hueneke, DC; Annette Jones, CA; Elizabeth Lautner, IA; Susan McClanahan, MN; David Meeker, VA; Richard Mitchell, CT; Sandra Norman, IN; Elizabeth Parker, ITA; James Pearson, IA; William Pittenger, MO; Mark Remick, VA; Kay Riddell, AL; Paul Rodgers, WV; Larry Samples, PA; A. David Scarfe, IL; Shawn Schafer, ND; Kathryn Simmons, DC; Susan Tellez, TX; Peter Timoney, KY; Alberto Torres, AR; Charles Vail, CO; Arnaldo Vaquer, VA; Mark Walter, PA; James Watson, MS; Patrick Webb, IA; Roger Weigle, WI; Brad Williams, TX; William Wilson, KS; David Winters, TX; Richard Winters, Jr., TX; Cindy Wolf, MN.

The Committee met on October 20, 2013 at the Town and Country Hotel, San Diego, California, from 12:30 to 4:30 p.m. There were 21 members and 28 guests present. Introductions, housekeeping issues and timetables were presented. The following presenters and presentations were given.

Lisa Becton, National Pork Board (NPB) delivered a presentation on African Swine Fever (ASF) in Eastern Europe and its possible implications for the U.S. The take-home messages were as follows: 1) The disease is creeping closer to Western Europe; 2) The U.S. has reduced funding for surveillance and diagnostic capabilities over the last decade; 3) Practices such as swill feeding and illegal food products ingested by people/swine put the E.U. and the U.S. pork industry at risk. The full presentation is available on the Committee page at www.usaha.org.

Laurie Hueneke of National Pork Producers Council (NPPC) spoke in regards to the importance of the Transpacific Partnership (TPP) and the Transatlantic Trade and Investment Partnership (TIPP) Federal Trade Agreements in future export matters. The TPP is Asian focused and initially started with four Asian countries. It now has 12 Asian countries which have “signed on” to what was previously negotiated by the initial countries. The recent addition of Japan to the TPP is huge. Japan has been the number one export market for pork by value, and number two by volume. By becoming part of the TPP, they will most likely become an even larger destination for American pork.

In regards to the TTIP, Transatlantic Trade and Investment Partnership, the European Union is a challenge due to the differences among member
countries. The list of European concerns will make consensus amongst the 28 member countries of the E.U. difficult. Ractopamine, beef hormones, and GMO issues are just a sliver of the concerns that will need to be addressed. Sound science and transparency are guidelines U.S. negotiators bring to the table that other cultures may not hold so dear. Full presentation will be submitted to USAHA for member access.

Rick Hill presented two talks pertaining to the reorganization of the Animal and Plant Health Inspection Service (APHIS) Veterinary Services (VS) organization. The goal is to lessen the regulatory burden, yet meet the regulatory responsibilities they have been entrusted with. Veterinary Services is going from two Eastern/Western Regional directors to six District directors, with a change away from disease emphasis to a species emphasis.

In his second talk, Dr. Hill went through the contact changes and the working parameters the changes hopefully will develop. Several APHIS staffers answered questions in regards to what the new structure will look like, and who will be the “boots on the ground”.

**Committee Business:**

1) Larry Samples was introduced, expressing a concern he shared with the group there is the possibility that a vial may be billed out at $200, thereby increasing testing costs. The issue has been presented to proper authorities, who may be able to address this concern. Larry shared for information purposes only, and did not see the need of this organization to formally address.

2) The Committee reviewed USDA final comments on two Resolutions from 2012:

   a) TB culture testing of suspect animals is not considered an undue risk (no gross lesions and negative histopathology) in allowing the remaining negative animals to ship. USDA was supportive of the committee’s 2012 resolution which addressed the concern with the timeline associated with culture and the dysfunction it creates on exports of cleared cohorts waiting for culture negative results.

   b) Scrapie control programs in the U.S. are based in the National Scrapie Program, which some potential trade partners are not comfortable with. As such, they rely on the OIE standards as their default measure in disallowing sheep imports from the U.S. USDA responded that basically they will not be able to change those National Scrapie Program shortcomings in the short term. USDA will negotiate with OIE and may effect change by 2015.

3) Larry Samples presented a Resolution in support of the establishment of a Federal Advisory Committee on Livestock Export. Motion was made by Dr. Samples, seconded by Don Walters for this resolution. Discussion before the vote clarified what the poultry industry had in regards to an advisory committee as there was a misconception of such. Other discussion centered on the better approach of working
with existing APHIS staffers as opposed to setting up another committee which is likely not to be funded and will be made a low priority by USDA. Vote was taken with three Ayes and nine Nays. Motion failed. Discussion followed on the openness, by the APHIS officials in attendance, to discuss concerns Dr. Samples and others may have.

4) Import/Export Resolution 2007-65 was brought up for review. There has been concern that proper attention had not been provided by USDA. A final response to the resolution was to be determined by second quarter of 2008. That final response was never received. The Import/Export Committee requests the USAHA Executive Committee review Resolution 65 and asks them to take appropriate action to bring this resolution to a conclusion.

5) No further business, motion was made by Bobby Accord, seconded by Susan Tellez to adjourn the meeting. Motion carried.
The Committee met on October 20, 2013 at the Town and Country Hotel, San Diego, California, from 12:30 to 5:00 p.m. There were 28 members and 34 guests present. An amended agenda was presented due to the unavailability of the USDA speakers. Dr. Evermann announced the upcoming International Bovine Viral Diarrhea Virus (BVDV) Symposium to be held October 15-16 in conjunction with the American Association of Veterinary Laboratory Diagnosticians (AAVLD)/USAHA meeting in 2014.

Dr. Evermann also reported on recent information about MERS-Corona Virus epidemiology in the Middle East. There have been approximately 140 human cases with a mortality rate of 50%. Bats and camels have been implicated as carriers of the virus. To date the virus has only been isolated from bats but not from camels. Camels however have a high seroprevalence over 90% in some regions.

BVDV Subcommittee report was presented by Dr. Massengill and Dr. Evermann on behalf of Dr. Ridpath. The report is included at the end of this report.

Strategies for BVDV Control in the United States

There was a brief overview of BVDV defining populations at risk, aim of control programs, and use of vaccination. Populations included feedlots and cow calf production units and reduction of disease from transient infection in feedlots and persistent infection in cow/calf operation. Emphasis was placed on: 1) shifting BVDV sub genotypes prompting reanalysis of vaccine efficacy;
2) engaging producers and veterinarians in utilization of BVDV test for PI detection.

**Introduction of the BVD Website “BVD CONSULT”**
Bob Larson, Kansas State University

A short description of the interactive web based educational resource for producers and veterinarians. BVD CONSULT provides information on the various options available for the control of PI risk. The web address is: www.bvdinfo.org

**Introduction of a New Subcommittee on Trichomoniasis**
Keith Roehr, Colorado State Veterinarian, Colorado Dept. of Agriculture

Dr. Roehr offered a historical perspective of Trich control and regulatory programs in the Western States. The importance of education of producers and practitioners was emphasized. He described the need for each state to develop their program in conjunction with the cattle industry of that state to address the unique production methods within that state. He suggested that the subcommittee would serve to share current knowledge. Dr. Bud Dinges, Texas A&M University and Carl Heckendorf, Colorado Department of Agriculture agreed to serve as co-chairs.

**Utah’s Continued Effort on Trichomoniasis**
Kerry Rood, Extension Veterinarian, Utah State University

Dr. Rood summarized the current status of TRICH control in the State of Utah. Control programs have reduced prevalence in Utah bulls from approximately 5% in 1990 to 0.3% in 2012. Economic losses from the disease have been reported as high as $650 million nationally. It was pointed out that complete eradication is not feasible at this time due to several factors, including lack of compliance by producers, lack of assay sensitivity, sample collection and storage issues, co-grazing on public land, and the inability to identify infected cows. Dr. Rood reported on a slaughter sample collection trial used to compare sensitivity of polymerase chain reaction (PCR) and culture. They found PCR disclosed 38/241 samples positive and culture disclosed 24/241 positive. Ninety five percent of the positive samples had 100 or greater trichomonads/ml. A pooled sample trial revealed that if one sample with 100 trichomonads/ml was included in a pool with four negative samples, the PCR showed a sensitivity of 94.9%. The conclusion from the trial was that with individual sample PCR, 1.7% of infected bulls were not detected and with pooling of five samples, 3.6% of infected bulls were not detected. The Utah state veterinarian asked the Utah State University (USU) extension to set up meetings with veterinarians and producers to discuss control programs for trichomoniasis this Fall.
**Johne’s Disease Vaccination: How Close Are We?**

Murray E. Hines, II  
University of Georgia, Tifton

Current vaccines for Johne’s disease (JD) are highly problematic. A *Mycobacterium avium* subspecies *paratuberculosis* (MAP) vaccine that reduced the rate or eliminated disease or fecal shedding would be useful in control of JD. Efficacy of four vaccine combinations, including cell-wall competent (CWC) alum adjuvant, CWC-QS21 adjuvant, cell-wall deficient (CWD) alum adjuvant and CWD-QS21 adjuvant vaccines at were evaluated. Baby goats were vaccinated at one and four weeks of age with each vaccine or a sham control vaccine consisting of alum adjuvant. Kids were challenged orally with approximately 6.0 X 10^9 organisms in four divided doses (1.5 X 10^9 organisms per dose) using a confirmed goat isolate of MAP. Eighty kids were used with each experimental group consisting of ten kids and each control group six kids. Half of the kids within each group were necropsied at six months post challenge and remaining kids were necropsied at nine months post challenge. Gross and microscopic lesions, as well as, relative number of acid-fast bacilli were evaluated and scored at necropsy. Results indicated all challenged kids had some lesions compatible with JD suggesting none of the vaccines prevented infection. Results suggested that three vaccines (CWC-alum, CWC-QS21 and CWD-QS21) reduced lesion scores resulting in 45.6 - 50.6% reduction of lesion scores at the nine-month period. CWD-alum vaccine resulted in a more severe (+33.5%) lesion score than sham-vaccinated challenged control. Lesion scores increased from the six to nine-month necropsy period in the sham-vaccinated challenged group and CWD-alum vaccinated group, while lesion scores were generally stable with remaining vaccines. Mean fecal CFU/g were significantly different across time from challenge to nine month necropsy (p=0.043) and the CWC-QS21 vaccine group had a marked reduction in fecal CFU/g at all time points post challenge. A reduction in MAP CFU/g was also detected in necropsy tissues from kids given the CWC-alum, CWC-QS21 and CWD-QS21 vaccines, and increased CFU/g were detected in tissues from kids given the CWD-alum vaccine.


**Vaccine Model Standardization**

Other Vaccine Studies:
Evaluation of immune responses and protective efficacy in a goat model following immunization with a cocktail of recombinant antigens and a polyprotein of *Mycobacterium avium* subsp. *paratuberculosis*.


JDIP Vaccine Development Project Phase III Study

A *Mycobacterium avium* subspecies *paratuberculosis* (MAP) vaccine that reduced the incidence of clinical disease and/or reduced fecal shedding of MAP would aid control of Johe’s disease (JD). The objectives of this study were 1) to evaluate the efficacy of 5 attenuated strains of MAP as vaccine candidates alongside one commercially available MAP vaccine (Silirum®, Pfizer) using the protocols and endpoints proposed by the Johe’s Disease Integrated Program (JDIP) Animal Model Standardization Committee (AMSC), and 2) to validate the AMSC Johe’s disease goat challenge model (see Hines et al., 2007b). Eighty goat kids were vaccinated orally twice at 8 and 10 weeks of age with one of the experimental vaccines or once subcutaneously at 8 weeks with Silirum®, or an oral sham control vaccine consisting of goat milk. Kids were challenged orally with a total of approximately 1.44 X 10^9 CFU divided in 2 consecutive daily doses using a bovine MAP K10-like isolate (ATCC-700535). Immunological tests performed included Agar Gel Immunodiffusion (AGID), ELISA, and cell mediated response by comparative purified protein derivative (PPD) skin testing (*M. avium*, Johnin and *M. bovis* PPD’s). Kids within each group were euthanized and necropsied at 13 months post challenge. Results indicated all challenged kids had gross and/or
microscopic lesions compatible with JD suggesting none of the vaccines prevented infection. However, there was a marked reduction in fecal CFU/g and necropsy lesion score in the group given the Silirum® vaccine and a lesser reduction in the 329 vaccine group. A marked reduction in MAP CFU/g and PCR percent positivity was also detected in necropsy tissues from kids given the Silirum® vaccine, and increased CFU/g were detected in tissues from kids given the 315 and 319 vaccines vs. the positive control group. Vaccination also resulted in false-positive PPD skin test reactions for M. avium PPD and Johnin. These data show Silirum® was the best performing vaccine followed by attenuated vaccine strain 329. Furthermore, the goat challenge model for Johne’s disease has been validated.

Where are we?

We are within striking distance of developing a more efficacious vaccine, but are not yet where we need to be. Mycopar® is currently the only licensed vaccine within the U.S., it is only licensed for cattle, and it requires approval by each State Veterinarian.

Bovine Viral Diarrhea Virus (BVDV) Infection in Free-Ranging Wildlife in Nevada
Peri Wolff, Nevada Department of Wildlife

The detection of BVDV was observed coincidentally during an investigation of a die-off event in Big Horn Sheep in Eastern Nevada. This prompted further surveillance of the population of wild ungulates including Mule Deer and Mountain Goats. Some populations had elevated antibody titers in greater than 80% of the animals tested. The titer patterns were unique in that the titers were negative or extremely high. Populations of wild ungulates in other parts of the state were found to have no serological activity. Further surveillance is planned in coordination with hunter harvested animals to determine the significance of these findings. Currently the effect of BVDV on wild ungulates is undetermined.

Committee Business:

A resolution was introduced, discussed and passed unanimously to ask State Milk Regulatory Agencies in states which allow the retail sale of raw milk, to initiate a Coxiella burnettii surveillance in herds producing raw milk for retail sale. The resolution has been shared with the Committee on Sheep and Goats and the Committee on Public Health and Rabies.
Strategies for BVDV Control in the United States

There was a brief overview of BVDV defining populations at risk, aim of control programs, and use of vaccination. Populations included feedlots and cow calf production units and reduction of disease from transient infection in feedlots and persistent infection in cow/calf operation. Emphasis was placed on: 1) shifting BVDV sub genotypes prompting reanalysis of vaccine efficacy; 2) engaging producers and veterinarians in utilization of BVDV test for PI detection.

Introduction of the BVD Website “BVD CONSULT”

Bob Larson, Kansas State University

A short description of the interactive web based educational resource for producers and veterinarians. BVD CONSULT provides information on the various options available for the control of PI risk. The web address is: www.bvdinfo.org

No other subcommittee business was conducted.
REPORT OF THE COMMITTEE ON INFECTIOUS DISEASES OF HORSES
Chair: W. Kent Fowler, CA
Vice Chair: Andy Schwartz, TX

Helen Acland, PA; George Badley, AR; Debbie Barr, CAN; Tony Benz, MO; C. Black, GA; Becky Brewer-Walker, AR; Charlie Broaddus, VA; Stan Bruntz, CO; Suzanne Burnham, TX; Clarence Campbell, FL; Craig Carter, KY; Stephen Crawford, NH; Glenda Davis, AZ; Brandon Doss, AR; Edward Dubovi, NY; Adam Eichelberger, SC; Dee Ellis, TX; J Amelita Facchiano, TX; Katie Flynn, CA; Edward ‘Rusty’ Ford, KY; Tony Frazier, AL; Robert Gerlach, AK; Paul Gibbs, FL; Kristin Haas, VT; Steven Halstead, MI; William Hare, MI; Greg Hawkins, TX; Carl Heckendorf, CO; Terry Hensley, TX; Michael Herrin, OK; Floyd Horn, MD; Bruce King, UT; Don Knowles, WA; Paul Kohrs, WA; Maxwell Lea, Jr., LA; Donald Lein, NY; Mary Lis, CT; Francine Lord, CAN; Kevin Maher, IA; Patrick McDonough, NY; Richard Mitchell, CT; Linda Mittel, NY; Lee Myers, GA; Cheryl Nelson, KY; Jeffrey Nelson, IA; Sandra Norman, IN; Don Notter, KY; Eileen Ostlund, IA; Boyd Parr, SC; Angela Pelzel-McCluskey, CO; Jewell Plumley, WV; Jeanne Rankin, MT; Anette Rink, NV; Keith Roehr, CO; Dennis Schmitt, MO; Jack Shere, NC; Michael Short, FL; Marilyn Simunich, ID; David Smith, NY; Diane Stacy, LA; Robert Stout, KY; Manoel Tamassia, NJ; Rodney Taylor, NM; Peter Timoney, KY; Susan Trock, GA; Charles Vail, CO; Ellen Mary Wilson, CA; Ernest Zirkle, NJ.

The Committee met on October 21, 2013 at the Town and Country Hotel, San Diego, California, from 1:00 to 5:50 p.m. There were 33 members and 28 guests present. The meeting was chaired by Dr. Kent Fowler. The mission statement was reviewed and the Committee decided no changes were necessary at this time. The monthly National Equine Conference Call was discussed and reported by Dr. Fowler to have an average of 54 call-ins on each monthly call. There are three proposed resolutions to be discussed in the business session. Dr. Fowler also mentioned a retrospective evaluation of the Committee’s resolutions from 2009-12 would be presented by himself and Dr. Andy Schwartz in today’s session.

NAHMS Equine 2015 Needs Assessment
Josie Traub-Dargatz, USDA-APHIS-VS, Center for Epidemiology and Animal Health (CEAH) National Animal Health Monitoring System (NAHMS) has conducted two previous equine studies (1998 and 2005). A third study is planned for 2015. Objectives for the NAHMS 2015 Equine study will be determined through a needs assessment process. Input on priorities for the study will be obtained through discussions and presentations at veterinary conferences, through contact with leadership on several groups including the American Association of Equine Practitioners (AAEP), members of the American Horse Council Health and Regulatory committee, members of the USAHA Infectious Diseases of Horses committee, leadership of the State Horse Council coalition, National Assembly of State Animal Health Officials
REPORT OF THE COMMITTEE

(NASAHO), participants on the National Equine Industry Monthly conference calls and Veterinary Services (VS) Equine Group members. Once input from these groups is summarized, a broader survey of the industry regarding priorities for the NAHMS Equine 2015 study will be collected this fall. A summary of the group needs assessment survey was presented to the Committee facility further discussion by this committee related to their recommendations for focus areas for the upcoming study.

Equine Herpes Virus-1 Workshop Summary
Katie Flynn, California Department of Food and Agriculture

The American Association of Equine Practitioners Foundation (AAEP) and the USAHA Committee on Infectious Diseases of Horses sponsored the Equine Herpesvirus-1 Workshop held on October 19, 2013. Dr. Flynn presented a summary of the EHV-1 Workshop and that summary is presented in its’ entirety at the end of this report.

Interlaboratory Comparison of Equine Herpesvirus type 1 Polymerase Chain Reaction Techniques Utilized in North American Diagnostic Facilities
Tim Baszler, Director of the Washington Animal Disease Diagnostic Workshop Laboratory in the College of Veterinary Medicine, Washington State University

In 2013, the USDA-APHIS National Veterinary Services Laboratory (NVSL) and American Association of Veterinary Laboratory Diagnosticians (AAVLD) conducted a joint interlaboratory comparison (ring trial) of neuropathogenic equine herpesvirus type 1 (nEHV-1) polymerase chain reaction (PCR) techniques in an effort to standardize testing methodology for equine herpesvirus myeloencephalopathy (EHM) carried out at state/university/provincial diagnostic facilities in North America.

A total of 28 state diagnostic facilities from the USA and Canada evaluated a ring test “panel” of field EHV isolates. Reference materials for all test panels consisted of EHV-2, EHV-4, EHV-5, wild-type EHV-1, and three strains of nEHV-1. The 28 participating laboratories used 38 different procedures (some laboratories tested multiple procedures) based upon modifications of ten peer-reviewed published methods for EHV-1 PCR. Two genes were utilized as PCR targets, the EHV-1 glycoprotein B gene, and the EHV-1 ORF 30, viral DNA polymerase gene which also is the gene including the neuropathogenic marker that has been associated with large outbreaks of EHM.

Glycoprotein B gene-based PCR assays, which are fundamentally designed as screening assays that detect wt-EHV-1 and nEHV-1, were used by 15 participating laboratories and had excellent diagnostic sensitivity for both wt-EHV-1 (100%; 30/30 samples identified correctly), and nEHV-1 (98.8%; 89/90 samples identified correctly), as well as excellent diagnostic specificity (98.3%; 59/60 non-EHV-1 samples identified correctly). As predicted, none of the glycoprotein B gene-based assays differentiated wt-EHV-1 from nEHV-1 and as such serve as excellent diagnostic tools to identify EHV-1 infected horses from non-EHV-1 infected horses but do not identify nEHV-1 specifically.
ORF 30 (viral DNA polymerase) gene-based PCR assay had more variable results from testing of the ring trial samples. Three published ORF 30 A/G\textsubscript{2254} assays: 1) Allen et al, 2007, 2) Pusterla et al, 2009, and 3) Smith et al, 2012), which differentiate wt-EHV-1 from nEHV-1 by detecting the A\textsubscript{2254} (wt-EHV-1) or G\textsubscript{2254} (nEHV-1) polymorphism, were used by 21 participating laboratories. The three assays had diagnostic sensitivity (based upon correct identification of nEHV-1 samples) of 93.1\% (67/72 samples, Allen 2007), 100\% (36/36 samples, Pusterla 2009) and 94.4\% (17/18 samples, Smith 2013). The diagnostic specificity (based upon correct identification of non-nEHV-1 samples) was 88.9\% (64/72 samples, Allen 2007), 72.2\% (26/36 samples, Pusterla 2009), and 100\% (18/18 samples, Smith 2013). Nearly all (17/18) of the “false positive” results for ORF 30 A/G assays 1 & 2 resulted from the nEHV-1 specific ORF 30G assay identifying wt-EHV-1 as nEHV-1.

Tim Baszler\textsuperscript{1}, Eileen Ostlund\textsuperscript{2}, Beate Crossley\textsuperscript{3}, Udeni Balasuriya\textsuperscript{4}, Dan Bradway\textsuperscript{1}, Erdal Erol\textsuperscript{5}, Donna Johnson\textsuperscript{2}, Dianne Rodman\textsuperscript{2}, Steven Sells\textsuperscript{5}

1. Washington Animal Disease Diagnostic Laboratory, College of Veterinary Medicine, Washington State University, Pullman, WA
2. Diagnostic Virology Laboratory, USDA-APHIS National Veterinary Services Laboratories, Ames, IA
3. California Animal Health and Food Safety Laboratory, University of California-Davis, Davis, CA
4. Gluck Equine Research Center, Department of Veterinary Science, University of Kentucky, Lexington, KY
5. University of Kentucky Veterinary Diagnostic Laboratory, Lexington, KY

Genesis of the Equine Disease Communication Center
Nathaniel A. White, Professor Emeritus of Equine Surgery at Virginia Tech's Marion duPont Scott Equine Medical Center

In late April 2011, horses attending an equine event in Ogden, Utah, were exposed to equine herpesvirus-1. Three months later, when USDA, Animal and Plant Health Inspection Service (APHIS) declared the outbreak contained, more than 2,000 horses had been exposed. Of those, 90 tested positive for its neurologic form, equine herpesvirus myeloencephalopathy (EHM). A total of 242 exposed premises in 19 states, stretched from Oklahoma to California.

When this type of disease outbreaks occur in the horse industry rumors and misinformation create panic and can cause further spread of disease. Significant losses including horse loss and loss due to restricted horses movement and use affect many segments of the economy. Because horse owners are not aware of the disease risks or needed biosecurity to prevent or contain disease outbreaks, there is a high risk of disease spread.

The EHM outbreak in Utah stimulated the American Association of Equine Practitioners (AAEP) and the American Horse Council (AHC) to move forward with creating a National Equine Health Plan (NEHP), which was conceived at a combined USDA and AHC workshop, held in June 2010. One of NEHP’s goals is to establish the roles of the horse industry for infectious disease containment...
and prevention. Specifically how the horse industry needs to respond to a disease outbreak in concert with the state animal health officials (SAHO) and USDA. Using the Utah outbreak as an example an AAEP task force recommended creating an Equine Disease Communication Center (EDCC) organized and supported by the horse industry.

The goal of the EDCC is to provide a call center, which can provide real time information about disease outbreaks; an alert system for industry organizations about the current status of disease outbreaks; and a website with updates about disease outbreaks, biosecurity recommendations and information about equine diseases. Working with a group of state animal health officials, a plan for flow and exchange of information for the EDCC has been developed. Currently the horse industry is working to set up a call center and website. After it’s functioning the decision tree for evaluation and distribution of information will be created to enable the EDCC to be the chief source of information flowing to and from SAHO and USDA during a disease outbreak. The goal is to make the EDCC “the source” of equine disease information for the horse industry.

Contagious Equine Metritis 2013 Incident Findings
Katie Flynn, California Department of Food and Agriculture
California CEM Incident Summary

In February 2013, a 17-year-old Lusitano mare in California was confirmed positive at the National Veterinary Services Laboratories (NVSL) for *Taylorella equigenitalis*, the bacterium that causes contagious equine metritis (CEM). She was detected positive on samples collected as part of a pre-breeding infertility examination. The positive mare was born in Brazil in 1996 and entered the United States as a foal.

In addition to the index mare, three other horses in California were subsequently found positive for *T. equigenitalis* at the NVSL; their isolates match the index mare’s isolate. Using pulsed-field gel electrophoresis (PFGE), the NVSL determined that the isolate does not match any other isolates from previous CEM detections in the United States, and does not match any *T. equigenitalis* isolates ever found on post-entry CEM quarantine testing of horses entering the United States from CEM-affected countries. All four positive horses, two mares and two stallions, have now been treated, re-tested with negative results, treated again, and released from quarantine. Additionally, a filly foal born in June 2013 to one of the positive mares has been tested with negative results, treated, and released from quarantine along with her dam.

One positive stallion was a 20-year-old Lusitano imported from Brazil in 2003 that bred the index mare in 2012 both by artificial insemination (AI) and live cover. The other positive stallion was a domestic 25-year-old Lipizzaner that had semen collected at the same facility as the positive Lusitano stallion in 2012. The second positive mare was a domestic 13-year-old Andalusian-cross that was bred to the positive Lusitano by AI in 2012 and became pregnant. None of the positive horses have yet been identified as the source of the outbreak. The epidemiologic investigation is ongoing.
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Along with the positive horses, a total of 18 exposed horses have been identified and quarantined, including the foal of the positive mare. Twelve exposed stallions, including one in Texas and eleven (including one gelding exposed as a stallion) in California, have been tested with negative results, treated, and released from quarantine. All exposed stallions had semen collected between 2008 and 2012 at one of two facilities in California where the imported positive stallion was also collected. Finally, there are five exposed mares in quarantine for testing and treatment in California, Illinois, and New Mexico. Four of the exposed mares received semen from the imported positive stallion by AI between 2007 and 2012. The fifth mare is required, by established CEM protocols, to be tested because she received semen by AI from an exposed stallion that is now a gelding and cannot be test bred.

The lessons learned by regulatory officials during the incident included:

- Variability in viability with CEM strains. The original sample from the index mare was not stored in appropriate CEM culture media however, was easily cultured. Additionally, the exposed mare samples were shipped with ice and still managed to culture positive.
- CEM organism can be detected in frozen semen. All thirty straws of frozen semen collected and processed in 2009 were heavily infected and positive on culture and PCR.
- Pregnant positive mare can have negative foal offspring.
- PCR tests on semen and swabs would be a beneficial tool in future investigations to shorten the time under quarantine.

The detection of CEM in California impacted the equine industry with increased testing requirements for exported horses and the loss of breeding revenue by stallion collection station and stallion owners. Exposed horses owners were significantly impacted by cost of quarantine specifically the costs associated with veterinary sampling and treatments and loss of breeding seasons. In California, veterinary costs for exposed horses ranged from $900 to $3,200 for exposed stallions and $500 to $800 for exposed mares.

Puerto Rico Incident Summary

In May 2013, a 2-year-old Thoroughbred filly in Puerto Rico was confirmed positive at the National Veterinary Services Laboratories (NVSL) for *Taylorella equigenitalis*, the bacterium that causes contagious equine metritis (CEM). The filly was born in central Florida in 2011 and moved to Puerto Rico in late April 2013. She was tested for *T. equigenitalis* relative to that move; direct swabs were cultured positive after an initial complement fixation test and a follow-up were both found positive.

A thorough epidemiologic investigation of the positive horse has now been completed. More than 30 potentially exposed horses were tested in Puerto Rico, Florida, Kentucky, and New York. No additional positive horses were detected and no relationship was found between the positive filly and any horses associated with previous U.S. cases of CEM. The positive filly was treated, retested with negative results, and released from quarantine in July.
Discussion on 2009-2012 Resolutions
Kent Fowler, California Department of Food and Agriculture

2009 - Resolution #5 (eight USAHA committees)
Background: United States (U.S.) livestock exporters are facing an escalation of animal health requirements by importing countries that make it difficult or impossible to export U.S. genetic material.
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 initiate all trade negotiations on import and export protocols with reference to compliance with World Organization for Animal Health (OIE) guidelines and Sanitary and Phytosanitary (SPS) rules.
Response: USDA will continue to promulgate a science-based approach and compliance with OIE guidance during all trade negotiations. However, not all countries have the same level of confidence in current science and OIE guidance, and some take a less scientific and more rigid approach to the risk associated with a certain commodity.
Results: National Center for Import and Export (NCIE) negotiates with foreign governments to the best of their ability on import and export issues. Politics may play a significant role in some of these decisions.

2009 - Resolution #8
Background: The 2009 United States contagious equine metritis (CEM) incident involving 48 states and 991 exposed equids initiated “The First Conference of Experts on CEM” at the United States Animal Health Association (USAHA) meeting in San Diego on October 9, 2009. The conference purpose and intent was to review recent developments concerning the national incident of CEM, discuss CEM protocols, review ongoing *Taylorella equigenitalis* research, and to discuss possible further CEM research and regulatory actions at the state and federal level. Concerns were addressed on the lack of consistent CEM testing and treatment protocols at both a state and federal level.
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 immediately implement the recommendations of the 2007 Contagious Equine Metritis Working Group in a VS Memorandum.
Response: The U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Service (VS) has undertaken and completed the majority of the recommendations of the 2007 Contagious Equine Metritis (CEM) Working Group. Some recommendations cannot be addressed through a VS memorandum.
For example, recommended changes in the testing protocols for mares and stallions require amending the existing regulations. APHIS anticipates publication of an interim rule incorporating those changes later this year. We have completed training for laboratory personnel and State CEM coordinators. We will be using the Emergency Management Response System (EMRS) as a database for tracking imported horses subject to CEM testing. We have drafted a new VS memorandum regarding testing and treatment of mares and stallions; however, the memorandum includes the revised testing protocols and will not be finalized until after the interim rule is published.

The recommendations included some elements that VS cannot implement. For example, the Review Group recommended hiring a full-time employee to oversee the CEM program, which the APHIS budget and workload could not justify. Recommendations that were best incorporated in a VS memorandum will be included in the revised testing and treatment memorandum, such as communication of horse movement and test results, revised testing protocols, and standards for CEM facilities.

Results: A CEM Subcommittee has been formed to identify unresolved issues and report next year at USAHA to the Committee membership. There are a number of CEM issues yet unresolved from the recommendations set forth by the 2007 CEM Working Group.

2010 - Resolution #28

Background: The equine industry incurs costs during disease outbreaks due to enhanced testing, movement restrictions, treatment required for sick animals, cancellation of equine events, and equine mortality. To optimize equine health through the control of equine infectious diseases, a framework document is required to develop a comprehensive United States Equine Health Plan.

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) dedicate the necessary resources for continued collaboration with industry to develop a framework document for an Equine Health Program, with an initial emphasis on prevention and control of infectious diseases.

Response: VS also appreciates the interest of the United States Animal Health Association (USAHA) in developing a national framework to address equine health issues and is supportive of this concept. Such a framework could be a first step toward addressing potential vulnerabilities in a safeguarding system for the equine industry. However, immediate and long-term budget uncertainties prevent VS from making any substantial commitment to, or additional funding requests for, equine health at this time. VS will continue to work closely with USAHA’s Committee on Infectious Diseases of
Horses and other external stakeholder groups as we move forward on this framework.

Results: The Committee should continue to endorse this resolution and support this year’s draft resolution for formation of an Equine Disease Communication Center in collaboration with equine stakeholder groups, including AAEP and AHC.

2011 - Resolution #4

Background: Diagnostic capacity is a critical asset in case of major animal disease events, and any reduction in the National Animal Health Laboratory Network (NAHLN) budget places our animal industries, the security of our food supply, and consequently our citizens’ health and the United States (U.S.) economy at enormous risk.

Resolution: The United States Animal Health Association (USAHA) and American Association of Veterinary Laboratory Diagnosticians (AAVLD) request that the Secretary of Agriculture support and that Congress authorize $30 million in annual funding for the National Animal Health Laboratory Network (NAHLN). We further request that in order to adequately sustain the network to ensure food safety and security, animal and public health, and the United States economy, Congress fund the NAHLN through a stable funding mechanism.

Response: APHIS and National Institute of Food and Agriculture (NIFA) - We appreciate your support of NAHLN and will keep your suggestion in mind as we develop the FY 2013 budget.

Results: AAVLD has been working hard to try to get it included in the farm bill, but that process is still in the works. At this point, most of the efforts on NAHLN funding is trying to maintain what they have (in the neighborhood of $9M) in the NIFA line item for diagnostics, which is shared with the plant side. It is still actively being pursued and that is an issue USAHA continues to monitor and support.

2012 - Resolution #7

Background: The National Assembly of State Animal Health Officials (National Assembly) requested in early 2012 that the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), National Veterinary Services Laboratory (NVSL) perform a brief survey of United States (U.S.) veterinary diagnostic laboratories across the country to determine the type of test methods in use for detection of neuropathic strains of Equine Herpes Virus-1 (nEHV-1). This survey highlights the National Assembly assumption that laboratories across the country were using different test methods to diagnose nEHV-1 infection.

Resolution: The United States Animal Health Association (USAHA) and the American Association of Veterinary Laboratory Diagnosticians (AAVLD) request that the United States Department of Agriculture
INFECTIOUS DISEASES OF HORSES

(USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), National Veterinary Services Laboratory (NVSL) proceed with the neuropathic strains of Equine Herpes Virus-1 (nEHV-1) ring trial and make every effort to standardize testing methodology for nEHV-1 polymerase chain reaction testing at diagnostic facilities in the United States.

Response: The National Veterinary Services Laboratories (NVSL) has implemented a collaborative effort with the American Association of Veterinary Laboratory Diagnosticians (AAVLD) to establish a working group whose goal is to design and implement an inter-laboratory comparison test (ring test) that will allow laboratories to test existing polymerase chain reaction (PCR) assays used for the detection and typing of EHV isolates and neuropathogenic EHV-1, and to establish their performance limits.

Results: Dr. Baszler's presentation highlights the results of the ring test trial. "Glycoprotein B gene-based PCR assays, which are fundamentally designed as screening assays that detect wt-EHV-1 and nEHV-1, were used by 15 participating laboratories and had excellent diagnostic sensitivity for both wt-EHV-1 (100%; 30/30 samples identified correctly) and nEHV-1 (98.8%; 89/90 samples identified correctly), as well as excellent diagnostic specificity (98.3%; 59/60 non-EHV-1 samples identified correctly). ORF 30 (viral DNA polymerase) gene-based PCR assay had more variable results from testing of the ring trial samples. Nearly all (17/18) of the “false positive” results for ORF 30 A/G assays 1 and 2 resulted from the nEHV-1 specific ORF 30G assay identifying wt-EHV-1 as nEHV-1."

2012 - Resolution #19

Background: In April 2012, a USDA Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), National Center for Import and Export (NCIE) policy change was instituted dictating that the USDA-APHIS-VS, National Veterinary Services Laboratory (NVSL) would no longer test horses residing in the U.S. for dourine or glanders, unless they were suspected of having the disease or were required to be tested by law (e.g., plasma donor horses). USDA-APHIS-VS-NVSL, the only U.S. laboratory that performs these tests, is now prohibited from doing so on healthy horses residing in the US. So, despite the USDA recommendation that U.S. horses be tested for these diseases prior to shipping out of the country, there is no longer a way to test them and the passive surveillance for these diseases is lost. This USDA-APHIS-VS-NCIE testing policy change was not communicated to diagnostic laboratories or equine exporters.

Resolution: The United States Animal Health Association urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) to re-evaluate the dourine and glanders testing policy change for United States domestic equids and allow this testing recommended by USDA-
APHIS-VS, National Center for Import and Export upon request (NCIE), at the owner’s expense. This testing provides United States (U.S.) owners exporting horses the opportunity to pre-test domestic horses and possibly avoid a domestic horse returning home from being denied entry into the U.S. due to a false positive test. Reinstitution of the USDA-APHIS-VS, National Veterinary Services Laboratory testing of domestic equids for these diseases is necessary and valuable for the passive surveillance of our national equine herd.

**Results:** VS will allow horses originating in the U.S. to be pretested for dourine and glanders before export. This policy will apply only to horses exported from the U.S. with the intention of future re-import.

**2010 Resolution # 29**

**Background:** Recently, there has been increased concern over the differences in the United States and Canadian import test requirements for equine piroplasmosis (EP). In testing of EP-positive horses in the United States, the cELISA has been more sensitive than the IFA in detecting sero-positive animals.

**Resolution:** The United States Animal Health Association strongly urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), National Center for Import and Export (NCIE) to meet with the Canadian Food Inspection Agency (CFIA) to discuss equine piroplasmosis (EP) import testing and the maintenance of EP freedom in North America. This meeting should be dedicated exclusively to the topic of EP and, if necessary, be facilitated by USDA traveling to Canada.

**Interim Response:** The U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) recognizes that standardizing equine piroplasmosis testing methods between the United States and Canada could be beneficial to both countries. VS is requesting a technical meeting with the Canadian Food Inspection Service to discuss the sensitivity of assays used in each country for detecting seropositive horses and how import testing might be further harmonized.

**Final Response:** The U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) recognizes the concerns of the United States Animal Health Association (USAHA) and appreciates the opportunity to respond. USDA-APHIS-VS recognizes that standardizing equine piroplasmosis (EP) testing methods between the United States and Canada could be beneficial to both countries. VS has scheduled a technical meeting with the Canadian Food Inspection Agency on September 15, 2011. Meeting participants will discuss the sensitivity of assays used in each country for detecting seropositive horses and how
import testing might be further harmonized to achieve the maintenance of EP freedom in North America. 

Results: The technical meeting between NCIE and the Canadian Food Inspection Agency did occur. Canada requires immunofluorescence assay (IFA) test for import.

2010 Resolution #30

Background: In November 2009, the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) established an Equine Piroplasmosis Working Group (EPWG) to study the occurrence of equine piroplasmosis (EP) in the United States and to make recommendations for its management.

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 consider submitted public comments on the April 2010 Equine Piroplasmosis Working Group Long-Term Recommendations and promptly accept and implement those recommendations.

Interim Response: The U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) appreciates the interest of the United States Animal Health Association (USAHA) in addressing equine piroplasmosis (EP) in the United States. VS has reviewed the long-term recommendations for managing EP submitted by the Equine Piroplasmosis Working Group (EPWG). VS is also identifying what resources are available to implement those recommendations in light of immediate and long-term budget uncertainties.

VS will continue to work closely with the EPWG, the membership of the USAHA Infectious Diseases of Horses Committee, and other external stakeholder groups as we determine how best to implement the EPWG’s recommendations.


VS has reviewed the long-term recommendations for managing EP submitted by the Equine Piroplasmosis Working Group (EPWG). VS is also identifying what resources are available to implement those recommendations in light of immediate and long-term budget uncertainties. VS will continue to work closely with the EPWG, the membership of the USAHA Committee on Infectious Diseases of Horses, and other external stakeholder groups as we determine how best to implement the EPWG’s recommendations.
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Results: Most of the recommendations have been implemented. A Program Standards document is being written to pull all the implemented practices and procedures together. Reorganization of VS currently underway should allow key staff more time to complete the standards document.

2010 Resolution #31
Background Information: The identification of EP-positive imported equids and the recent large-scale EP incident in a domestic population of horses have increased the need and interest for an effective treatment in the management of EP-positive equids identified in the United States.
Resolution: The United States Animal Health Association (USAHA) requests the United States Department of Agriculture (USDA), Agricultural Research Service (ARS) to prioritize and fund the research for a safe and effective treatment for elimination of the carrier state for Babesia caballi and Babesia equi and for the development and validation of a post-treatment clearance assay for establishing and monitoring the status of equids following approved equine piroplasmosis treatment protocols.
Response: As you know, ARS has an active research program at our Pullman, Washington location to solve problems related to equine piroplasmosis. We agree that this work is critical to ensuring the protection of the U.S. horse population. Although immediate and long-term budget uncertainties prevent us from making any commitments regarding funding requests, we will consider your input as we formulate future budget initiatives for Congress.
Results: ARS produced and validated a Western Blot clearance test, which has been included in the policy for release of test negative treated horses. There is a dire need to validate and establish this test at NVSL for greater accessibility.

2010 Resolution #32
Background Information: In August 2005, the official test for equine piroplasmosis (EP) on equids entering the United States was changed from Complement Fixation (CF) to the competitive Enzyme-Linked Immunosorbtent Assay (cELISA). This change was a result of disclosure that the rate of false negative CF test results was unacceptably high.
Resolution: The United States Animal Health Association requests the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), National Center for Import and Export (NCIE) to provide, upon request, individual states with owner and animal information for all equids imported into the United States since 1995. USDA-APHIS-VS-NCIE should provide owner and imported horse information to the respective
chief animal health official of the state of destination of the imported horse at the time of release of the equid from the United States equine import facilities.

Interim Response: The U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), National Center for Import and Export (NCIE) agrees with the United States Animal Health Association’s request, NCIE will provide the information to States that request it.

Final Response: The U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) recognizes the concerns of the United States Animal Health Association (USAHA) and appreciates the opportunity to respond. USDA-APHIS-VS, National Center for Import and Export (NCIE) agrees with the United States Animal Health Association’s request. To date, VS has received one request from one State for information about horses previously imported. The requested information has been provided to that State. VS has agreed to provide information upon request from the appropriate State officials.

Results: In the one state requesting the information, owners were contacted and offered a test at no cost if they still had the imported horse(s). No positive horses were disclosed through this effort, but the process raised awareness of the potential disease threat and provided an opportunity to educate equine owners.

2011 Resolution #21
Background Information: Over the past two years, approximately 170 Equine Piroplasmosis (EP) affected horses in the United States were enrolled in an approved treatment plan for Theileria equi (T.equi) designed by the United States Department of Agriculture (USDA), Agriculture Research Service (ARS). Preliminary reports on the treatment outcome are very encouraging.

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) develop and publish guidelines for Equine Piroplasmosis (EP) Theileria equi test negative horses after completion of an approved EP treatment plan and that have met the following conditions to be considered for state quarantine release:

- Enrolled in the USDA-APHIS-VS/ USDA, Agriculture Research Service (ARS) treatment research program as per VS Memo 555.20; and
- Treated using the USDA-ARS published imidocarb treatment protocol under state or federal supervision; and
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- Be identified with ISO-compliant microchip and that the identification number be held in a repository accessible by states; and
- Nested real-time reverse transcriptase polymerase chain reaction and complement fixation test negative on post-treatment testing; and
- Negative by transfusion to a splenectomized horse OR negative by the USDA-ARS Western Blot clearance test; and
- Competitive Enzyme-Linked Immunosorbent Assay (cELISA) negative at USDA-APHIS-VS National Veterinary Services Laboratory.

Additionally, annual cELISA tests should be conducted for the first three years after release as added assurance of disease freedom.

Interim Response: The U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) recognizes the concerns of the United States Animal Health Association (USAHA) and appreciates the opportunity to respond.

VS is reviewing the data on equine piroplasmosis (EP) affected horses that test negative after being treated according to the program that the Agricultural Research Service (ARS) designed for *Theileria equi*. We will report on this data review at the 2012 annual USAHA meeting and will develop a policy on the disposition of EP-affected horses that test negative after treatment.

Results: A Concurrence Memorandum was signed by Dr. Clifford, USDA in February 2013, with two additional nested polymerase chain reaction (PCR) tests added to the protocol. A letter from Dr. Clifford to State Veterinarians and area veterinarian in charge (AVICs) making the Concurrence Memo public is with the federal technical writers. The letter will likely state that either nested PCR or real-time PCR could be used for the series of three negative PCRs taken at least 30 days apart.

2011 Resolution #22

Background Information: An upgraded competitive enzyme linked immunosorbent assay (cELISA) test was specified as the "official test" on August 22, 2005, and is highly unlikely to yield "false negative" results on chronically equine piroplasmosis (EP) infected adult horses. While the cELISA has a significantly higher sensitivity in detecting the chronically infected EP horse, the sensitivity to detection of the acutely infected horse is much lower when compared to the complement fixation (CF) test.

Resolution: The United States Animal Health Association (USAHA) urges the United States Department of Agriculture (USDA), Animal and
Plant Health Inspection Services (APHIS), Veterinary Services (VS), National Center for Import and Export (NCIE), a negative Complement Fixation test and a negative competitive enzyme linked immunosorbent assay test for Equine Piroplasmosis (*Theileria equi* and *Babesia caballi*) prior to importation of equids into the United States. **Interim Response:** The U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) concurs with this recommendation. In the second quarter of calendar year 2012, the VS, National Center for Import and Export (NCIE) plans to formally incorporate complement-fixation testing into the standard equine import testing protocol, which already includes the competitive enzyme-linked immunosorbent assay. Before implementing this change, VS must notify brokers and importers about the new requirement and associated costs. Further, the National Veterinary Services Laboratories (NVSL) must prepare additional reagents to supply foreign laboratories that conduct pre-export screening tests. **Results:** Final response is needed. The cELISA is required for import, but National Center for Import and Export (NCIE) has not officially added the complement fixation (CF) test requirement. The CF is being conducted at U.S. expense post entry, and multiple cases of equine piroplasmosis (EP) have been confirmed by this test that would have been missed by cELISA alone.

**Committee Business:**
Following conclusion of the scientific program, the Committee went into Business Session. Three resolutions were considered, approved and forwarded to the Committee on Nominations and Resolutions for approval by the general membership. One of these resolutions requests USDA-APHIS-VS dedicate the necessary resources for continuing collaboration with the horse industry and state animal health officials (SAHOs) to develop the Equine Disease Communication Center (EDCC). The second resolution urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Services (APHIS), Veterinary Services (VS) and Agricultural Research Services (ARS) and the National Veterinary Services Laboratory (NVSL) to research, develop and validate genetic strain typing capabilities for both Equine Piroplasmosis (EP) organisms (*Theileria equi* and *Babesia caballi*). The third resolution urges the USDA-APHIS-VS to prioritize what research is required to validate and secure World Animal Health Organization (OIE) approval of a polymerase chain reaction (PCR) assay for the detection of *T. equigenitalis*. Dr. Fowler announced the newly formed EHV-1 and CEM Subcommittees would be chaired by Dr. Katie Flynn and Mr. Rusty Ford, respectively. Dr. Fowler also thanked the Committee on Infectious Diseases of Horses membership for their excellent work over the past five years and welcomed Dr. Andy Schwartz as the incoming Chair. The meeting was adjourned at 5:50 p.m.
Equine piroplasmosis (EP) continues to be a disease of concern in the United States with continued efforts in surveillance and research. EP testing of horses continues to be driven primarily by industry but some regulatory testing is occurring as well. Industry testing continues to occur through multiple routes including, sanctioned race tracks and breed sponsored events and sales. The majority of regulatory testing is being done through disease investigations and international export with some interstate testing occurring.

According to the September, 2013 National EP Situation Report, there have been more than 231,664 U.S. horses tested for EP since November 2009, with approximately 41,000 tested in the past year. Since 2009 there have been 215 horses determined to be positive for EP, with 26 detected in the past 12 months, (excludes the horses detected as positive during the investigation of the 2009 Texas ranch outbreak). All but one of the positive EP horses have been in one of two high risk categories; horses imported prior to August 2005 using the CF test and those involved in racing, primarily Quarter Horse racing.

During the past year the EP Subcommittee held one meeting which took place via conference call. The primary discussion points and continued areas of interest and concern of the subcommittee are:

- Recent USDA support for treatment of EP reactors in the U.S.
  - In February 2013, APHIS-VS established a policy to support the quarantine release of treated, cleared, test-negative horses that have been enrolled in the APHIS-VS, Agricultural Research Service (ARS) EP treatment research program and have met specific post-treatment testing criteria to prove organism clearance. These criteria were established based on treatment results from 163 treated horses in the 2009 Texas ranch outbreak and recommendations from the 2011 USAHA Resolution #21.

- EP Uniform Standards Document
  - The USDA-VS is working on an EP Uniform Standards document to include the current guidance in VS Memo 555.20, the Long-term recommendations from the EP Working Group and the laboratory EP testing approval notice, in one comprehensive document.

- Need for development of a method to strain type the EP organism
  - The identification of EP-positive imported equids and the recent large-scale EP incident in a domestic population of horses have increased the need to identify the genotypic strains of organisms in positive EP equids detected in the United States. While natural, endemic transmission of
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Equine Piroplasmosis is occurring at a very low level in the United States, a small number of EP positive horses continue to be detected. Many of these positive EP horses have direct ties to foreign countries endemic for EP, where the horse was believed to be infected. Currently, however, there is no validated method to determine different strains of each organism (Theileria equi and Babesia caballi) complicating the epidemiological and trace back investigations.

- South Texas EP Surveillance Program
  - In March of 2013, the Texas Animal Health Commission (TAHC) designated Kleberg County equine as high risk for exposure to Equine Piroplasmosis. As a result, the TAHC began mandatory testing of all equine in Kleberg County in April. Surveillance testing is continuing, however, at the end of May, 283 premises with a total of 747 horses had been tested. Of the 747 horses tested 19 tested positive on six premises.

EP positive horses continue to be detected at low levels in the U.S. horse population. Since November of 2009 more than 231,664 U.S horses have been tested for EP with a total of 215 positive horses identified that are unrelated to the 2009 Texas ranch outbreak. Of the 215 positive horses, no more than 73 are still alive with 32 of those horses enrolled in the EP treatment research program. All but one of the positive horses has been in one of two high-risk categories: horses imported prior to August 2005 using the complement fixation (CF) test and those involved in racing, primarily Quarter Horse racing.

Since January 1 of this year, 26 positive horses have been detected in the U.S. Twenty five were racing Quarter Horses and one was a Thoroughbred racehorse. Most were involved in unsanctioned racing. At least two of the EP positive horses were also positive for Equine Infectious Anemia (EIA).

Until recently, equine owners and state animal health officials were faced with one of three options for managing positive EP reactors as provided in USDA Veterinary Services (VS) Memorandum 555.20. Memorandum 555.20 states that the regulatory options available for management of these positive horses are permanent quarantine (which may include chemotherapy), exportation, or euthanasia. However, based on recent treatment research and published efficacy data concerning the effective clearance of T. equi infected horses (Efficacy of imidocarb dipropionate in eliminating Theileria equi from experimentally infected horses, Grause et. al. 2012), the USDA, VS has recently (February 2013) established a policy in support of quarantine release of treated, cleared, and test-negative horses. These horses must be enrolled in the APHIS-VS, ARS EP treatment research program and meet specific post-treatment testing criteria to prove organism clearance. These criteria were established based on treatment results from 163 treated horses in the 2009
Texas ranch outbreak and recommendations from the 2011 USAHA Resolution #21.

**Texas EP Report**
Thomas Lansford, Texas Animal Health Commission

Equine piroplasmosis was first diagnosed in south Texas in October 2009, as part of the diagnostic work-up on a clinically ill horse. Testing of equine on adjacent premises ensued during the following year and disclosed no additional cases. In January 2012, a positive horse, unrelated to the original premises, was disclosed in Kenedy County. Subsequent epidemiological investigation led to the testing of all of the equine in the county, disclosing 17 horses on three separate premises as positive for *Theileria equi*.

Based on the high level presence of competent tick vectors and common equine movement practices of equine in both counties, the Texas Animal Health Commission designated Kleberg County as a high risk county for equine piroplasmosis in March 2013. A county-wide test of all equine in Kleberg County was conducted during the spring and summer of 2013. A total of 987 equine on 358 premises were tested for both *Theileria equi* and *Babesia caballi*. The county-wide testing disclosed 19 horses (1.9% prevalence) on 6 premises as positive for *T. equi*. 
Equine Infectious Anemia Proposed Rule

A decision memorandum on the issue of continuing progress and publication of a draft proposed rule on equine infectious anemia (EIA) was prepared by USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) staff and presented to the Deputy Administrator on June 7, 2012.

- Option 1 was to continue the rulemaking process and publish a proposed rule. This option would give all stakeholders the opportunity to comment on the proposed rule in a transparent manner. This option would satisfy the USAHA resolutions (2006) requesting codification of the Uniform Method and Rules. Additionally, this option would allow the USDA to move one step closer in addressing numerous issues with not having EIA regulations in the CFR.

- Option 2 was to discontinue the current EIA proposed activities. APHIS would continue to require that EIA reactors be officially documented on Veterinary Services Form 1-27 for interstate movement purposes, and would continue to approve individual laboratories. This option would satisfy stakeholders who prefer a State-based approach.

The Deputy Administrator made the decision to pursue Option 1, though as of this report the rule has not been published for comment.

Electronic EIA Test Documents

In 2004, a USAHA resolution was passed requesting USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) provide laboratory connectivity to all states wishing to utilize or develop the electronic equine infectious anemia (EIA) form with digital identification. The background information provided in the resolution indicated acceptance by practitioners in Florida, Wisconsin, Missouri, Iowa, and Texas, the first states to implement the GlobalVetLink electronic document on a test basis. Laboratory connectivity was established, facilitating the use of the GVL product and the electronic EIA form made available through USDA-APHIS-Veterinary Services Process Streamlining.

Over the past year there has been some interest among state animal health officials to develop and standardize an electronic EIA form for possible presentation to and acceptance by all states. The concept is to have a form that allows importation of digital images of horses in lieu of a description and hand drawn representation of unique markings. The concept does not include laboratory connectivity at this point. Some work has been done by Colorado, with input from Kansas and Texas.
Equine Passports

There was a brief presentation made at the Committee meeting in 2012 on Equine Passports. A number of states in the south have signed a Memorandum of Understanding (MOU) allowing the movement of equine between their states for a six month period if there is a current EIA test and veterinary inspection, and the owner keeps an itinerary detailing events attended. The MOU effectively takes the place of a veterinary inspection every 30 or 45 days. There are similar agreements in place between some western states. There seemed to be enough interest to warrant future consideration of a passport agreement between all states.

Equine Herpes Virus-1 Workshop Summary

Katie Flynn, Ellen Wilson, Kent Fowler
California Department of Food and Agriculture

The American Association of Equine Practitioners Foundation (AAEP) and USAHA Committee on Infectious Diseases of Horses sponsored the Equine Herpesvirus-1 Workshop held on October 19, 2013.

The recent outbreaks of Equine Herpes Virus-1 (EHV-1) in North America highlight regulatory infectious disease control issues and the importance of biosecurity. The outbreaks also identify regulatory disease control challenges for animal health officials across the country. The challenges include lack of national definition of a reportable EHV-1 case, lack of national case database, inconsistencies in regulatory mitigation (quarantines, monitoring and movement), lack of standardization of diagnostic tests, inconsistent and inaccurate dissemination of information and gaps in knowledge about disease agent. Increasing knowledge of the disease and biosecurity practices benefits all animal health officials addressing the challenges of EHV-1. The morning workshop speakers provided state animal health officials an overview of the virus, the diagnostics, vaccination and mitigation measures. The presentation summaries are in the EHV-1 Workshop proceedings.

The afternoon panel discussion, facilitated by the Chair, Dr. Kent Fowler, provided state animal health officials and industry representatives an opportunity to discuss regulatory control of EHV-1 with experts. The panel discussion topics included EHV-1 as a reportable disease, strain variations of EHV-1, vaccination in the face of an EHV-1 outbreak, diagnostic testing, quarantine, communications and horse show biosecurity.

1. Reportable Disease: Why do we want to report EHV-1? Are we merely counting cases or are we doing something with the data? Panel members agree that there is a need for consistency across states with respect to what is or should be reportable. However, reportable does not necessarily mean actionable. States can evaluate each reported situation to determine what action, if any, is necessary to stop the spread of disease. The group consensus is that neurologic horses, regardless of EHV-1 strain type, should be reportable to state animal health officials.
2. **Strain Variation:** Science and field experience demonstrate the variation in transmission, clinical presentation and disease outcome for the neuropathogenic and non-neuropathogenic strains of EHV-1. Research and field EHV-1 incidents demonstrate a higher viral load and increased shedding with the mutated strain as compared to the wild type. The pre-workshop state veterinarian survey and published research data suggest a higher mortality rate with the neuropathogenic strain of EHV-1. Some variations in strain type, such as why some horses develop neurologic disease and others display milder respiratory signs, are unknown. From a clinical perspective, strain type does not impact treatment decisions, but does impact client education and the animal health official response, specifically the quarantine and recommended biosecurity parameters. The question of why some horses develop neurologic disease and others develop respiratory signs remains. Research is needed to identify specific risk factors for Equine Herpesvirus Myeloencephalopathy (EHM).

3. **Vaccination in the Face of an Outbreak:** Panel members shared varying opinions on vaccinating exposed horses in the face of an EHV-1 outbreak. The panel members recognized the need for research to demonstrate the effect of vaccination in an outbreak. Current vaccines are not labeled for prevention of EHM therefore; the use of vaccination in EHM incidents would not be supported. However, some panel members support vaccination, as a means of decreasing viral shedding and viremia, with the understanding that high antigenic mass vaccines may cause adverse reactions in the healthy horse. The panel agrees that vaccination is NOT a substitute for good biosecurity.

4. **Diagnostic Testing:** Knowing why you are conducting a test and what you are going to do with the results are essential for the appropriate use of any diagnostic tests. Sample collection and handling influence validity of the test result. Therefore, the panel recommends contacting the laboratory for guidance on sample handling, such as recommended type of swab to use (synthetic swab preferred) and the ideal storage (refrigeration) of sample. When evaluating test results, it is important to remember that sample results represent the animal status at the time of sample collection. During an investigation, the panel recommends testing both nasal swabs and whole blood from symptomatic exposed horses. Testing of asymptomatic exposed horses may be appropriate for determining quarantine release; for example, negative test results on an asymptomatic exposed horse sampled twice ten days apart with negative results may be the criteria for release from quarantine. Due to the lack of standardization and quality control of diagnostic PCR assays, state animal health officials are more comfortable taking action on results obtained.
from a NAHLN approved laboratory. Laboratories report qualitative (positive or negative) and/or quantitative results (viral load and/or CT values). According to the panel, the quantitative results would have no impact on treatment of clinical horses, but would impact guidance provided to the horse owner on exposure risks and necessary biosecurity measures.

5. Quarantine: Isolation is critical for the control of EHV-1 and should be a component specified with the quarantine. Effective isolation does not have to be expensive. Panel members emphasized the need for pre-planning to be able to address adequate isolation of sick horses or movement to emergency veterinary clinics. The session highlighted the lack of science-supported quarantine biosecurity recommendations and release parameters. Panel members agreed that asymptomatic exposed horses on a quarantined premise could be released from quarantine without testing after 21 days. In general, panel members agree that quarantine release parameters should be cased-based. The panel suggests the collation and analysis of outbreak data to develop science-based guidance for quarantine protocols and quarantine release parameters.

6. Communications: With the advance of social media, communication is a challenge during any EHV-1 incident. Stakeholders recognize the need for accurate, clear, consistent messaging. For successful communications during an incident, panel members urge media training for individuals involved in EHV-1 message communication. To encourage cooperation of all parties, the panel strongly recommends face-to-face meetings with horse owners, veterinarians and the state animal health official. Inclusion of the regulatory officials helps to give the perspective of “we are all in” for the welfare of the horse and the industry. Communication should target those impacted by the detection, such as the individual horse owners, whose concern is how the detection affects their horse.

7. Horseshow Biosecurity: Since 2011, there has been an increase in awareness of biosecurity at equine events; however, panel members agree that there is not a recognizable change in practices at these events. Recently, the United States Equestrian Federation recognized the need for biosecurity and is developing good practices for implementation at equine events. Some panel members believe that buy in and support of the private practitioner, specifically the horse show veterinarian, is necessary for successful implementation of horse show biosecurity measures. Veterinarians need to set the example with routine use of good biosecurity practices. In the United Kingdom, farms which comply with the Codes of Practice receive reduced insurance rates. This concept could be applied to the equine event
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biosecurity with the potential for reduction in insurance rates for events implementing biosecurity measures.

Moving Forward
The USDA Equine Herpesvirus Myeloencephalopathy (EHM) Mitigation Experiences, Lessons Learned and Future Needs document published in 2008 identified knowledge gaps, which were similar to those presented at this workshop. Those areas of future focus are:

1. **Regulatory official consensus on case definitions, outbreak definition, quarantine parameters, diagnostic testing and biosecurity practices for Equine Herpes Myeloencephalopathy (EHM) incidents.** As the recent state veterinarian survey results indicate, there are numerous inconsistencies and variations in EHV-1 regulatory mitigation. Some states indicate lack of understanding and guidance related to EHV-1 as part of the challenges of EHV-1 control. As the USAHA Committee on Infectious Diseases of Horses contains a cross section of regulatory officials interested in equine infectious diseases, it would be most appropriate to appoint a subcommittee to develop consensus documents related to EHV-1 regulatory mitigation.

2. **Comprehensive validation and standardization of real-time PCR assay for the detection and differentiation of EHV-1 strains from nasal swabs and blood.** The NVSL initiated the ring trial study with results to be presented at the 2013 USAHA Committee on Infectious Diseases of Horses Meeting. However, there is a need for continued discussion to ensure a validated, standardized PCR assay can be used to provide consistent equivocal results from laboratories across the states. State animal health officials should be provided guidance for interpretation of qualitative and quantitative results to enable the most appropriate and effective EHV-1 mitigation.

3. **Development of new vaccine for EHV-1 and evaluation of efficacy of current vaccines against EHM.** There is limited evidence that vaccination is effective against the neurologic form of EHV-1. Currently, there is no commercial EHV-1 vaccine labeled for the prevention of neurologic disease. Development of a vaccine that could prevent latency and the neurological form of EHV should be a top research priority.

4. **Encourage EHV-1 research to address the knowledge gaps specifically related to prevalence, risk factors, disease outcomes, latency and treatment.** Historically, EHV-1 has been considered a ubiquitous organism in the environment. However, research has not demonstrated the prevalence of the various strains in the equine population. It would be interesting to know if two EHV-1 strains can coexist in the same horse. If they can, is there an impact of one on the other for reactivation and recrudescence? Is EHM truly an emerging condition? Can an increase in prevalence be documented? Unfortunately, the pathogenesis of EHM is still not well understood. As has been described, not all horses that develop viremia develop EHM, but viremia is required.
for EHM to develop. Latency is an aspect of all herpes virus infections, but there has not been research on the role of latency in the development of EHM. Several incidents involving the neuropathogenic strain of EHV-1 have animal health officials wondering why some horses develop EHM and others with significant viral loads don’t develop EHM. It would help animal health officials to know what factors, favorably or unfavorably, influence the development of EHM. Additional, studies designed to investigate the role of antivirals in the prevention of EHM and overall decrease of viral load would be of value to regulatory officials. As there are a small number of EHM cases associated with individual outbreaks, it is essential that all pertinent data is gathered during these outbreaks for future analysis. Panel members encourage states to collect data on all EHM cases, as this would be beneficial for future analysis.
The Committee met on October 21, 2013 at the Town and Country Hotel, San Diego, California, from 1:00 to 5:00 p.m. There were 12 members and 17 guests present. The committee’s agenda had to be revised a number of times in the weeks leading up to the meeting and the failure to resolve the U.S. government shutdown in a timely manner resulted in the absence of three speakers.

**Presentations & Reports**

**USDA Report on the OIE’s 81st General Session**

John Clifford, Deputy Administrator, USDA-APHIS-VS

Dr. Clifford reported that there were 178 member nations represented in Paris at the meeting in May with over 800 in attendance. Each year a technical item is presented to the membership and this year’s topic was “Modern approaches and the use of new technologies for the control and eradication of aquatic and terrestrial animal diseases that fully consider animal welfare and minimize the impact of food security”. The World Animal Health Organization (OIE) Scientific Commission recognized that Italy, Israel, Japan, The Netherlands, Slovenia and the United States were upgraded from controlled to negligible risk for BSE and Bulgaria and Costa Rica were granted controlled risk. Fifty-nine countries including the U.S. were granted historical freedom from African Horse Sickness (AHS). The Scientific Commission also announced two new diseases for country recognition in 2013—Peste de Petits Ruminants and Classical Swine Fever (CSF). In the future they will be considering Newcastle Disease and Glanders.

The issue of transparency was discussed and Dr. Clifford related that availability of country dossiers once a desired classification has been granted was recommended. The Terrestrial Animal Health Commission (Code Commission) announced the delisting of vesicular stomatitis and swine...
vesicular disease and also announced changes in avian influenza terminology. This year, an animal welfare chapter on broilers was adopted and a chapter on housing and production of dairy cattle is due for publication in 2014.

Dr. Clifford reported on the Laboratory Commission activities as Bev Schmit was unable to attend due to the government shutdown. The U.S. has eight OIE collaborating centers including National Veterinary Services Laboratory (NVSL), Centers for Epidemiology and Animal Health (CEAH) and a unit within the Centers for Disease Control and Prevention (CDC). The Laboratory Commission approved a reference laboratory for equine piroplasmosis and will be reviewing Manual chapters 15-20 in the future. The next Regional Commission of the Americas conference will be held in Mexico in 2014.

Dr. Clifford noted that while the U.S. is actively involved with the OIE at many levels, when it comes time to sending in the U.S. position on the various Code chapters to the OIE, we engage and seek the input from our stakeholders to formulate that position. Not only do our own technical staffs provide that input, but we also seek it from other federal and state agencies, associations such as the USAHA and the American Veterinary Medical Association (AVMA), academia, and the many industry groups you see listed here. Your input is critical for ensuring that well-grounded, scientifically valid and economically feasible health standards are developed and presented to the OIE. Through our OIE coordinator, the U.S. continues to actively engage all pertinent stakeholders. Ensuring we receive appropriate input on any OIE issue so that the United States can present a unified and sound position is critical. Thus, having stakeholder input is important to our work.

Dr. Clifford reported further that Our Centers for Veterinary Biologics, also an OIE Collaborating center, provided a number of supportive functions to OIE Member countries:

- In collaboration with IICAB (the Institute for International Cooperation in Animal Biologics), co-sponsored the veterinary biologics training program – which was attended this year by representatives (both industry and government) from several countries;
- IICAB updated the edition of its Emerging and Exotic Diseases textbook, has offered several training modules on the subject, has translated these into Spanish and has now provided the Spanish versions of the accreditation supplemental training modules for veterinary accreditation;
- Participated in international harmonization initiatives aimed at improving standards and testing procedures for veterinary biologics, such as the annual Committee of the Americas for the Harmonization of the Registration and Control of Veterinary Medicines (CAMAVET) meeting in the Americas and the Veterinary International Committee on Harmonisation (VICH) meeting (with Japan and the E.U.). The VICH has added outreach for to encourage and enhance the use of guidance documents it has developed by countries not part of the VICH.
In closing, Dr. Clifford noted that the OIE will host the 3rd Global Conference on Animal Welfare in Kuala Lumpur, Malaysia on November 6-8, 2013. This follows two OIE global conferences on this topic (2004, Paris and 2008 Cairo, Egypt). The theme ‘Implementing the OIE standards - addressing regional expectations’ demonstrates the OIE’s understanding of the challenges faced by members when implementing the adopted animal welfare standards and the willingness of the OIE, working in collaboration with governments and donors, to provide support within the framework of its global capacity building initiatives.

Update on the North American Animal Health Laboratory Network (NAAHLN)
Beth Lautner, National Veterinary Services Laboratory (NVSL)

Dr. Lautner provided an update on the harmonization efforts for diagnostic tests of the NAAHLN. Avian influenza diagnostic tests are considered harmonized for all three countries - the U.S., Canada and Mexico. Diagnostic tests under harmonization efforts for Newcastle Disease include: virus isolation and identification; hemagglutination test; hemagglutination inhibition test; rRT-PCR; intracerebral pathogenicity index; and nucleotide sequencing and molecular pathotyping. For vesicular diseases, diagnostic tests considered harmonized for the national laboratories in three countries: rRT-PCR – FMD, Antigen ELISA – FMD, Virus Neutralization – FMD; and Virus Isolation - FMD. For Classical Swine Fever, diagnostic tests still under harmonization effort in the three countries include:

- Fluorescent antibody virus neutralization (FAVN), neutralizing peroxidase-linked assay (NPLA), or immuno-peroxidase Virus Neutralization test (IPVN), Virus isolation, rRT-PCR.
- For bovine tuberculosis, diagnostic tests considered harmonized for the national laboratories in all three countries include:
  - Histopathology
  - Tuberculin skin test
- Diagnostic tests still under harmonization effort:
  - Bacterial Culture and Identification
  - Formalin fixed tissue PCR
  - Bovine Gamma Interferon Assay
- Special projects include: pigeon paramyxovirus pathotyping in poultry and development and distribution of a NDV rRT-PCR panel by the Mexico’s CPA.

European Union Animal Health Law
Francisco Reviriego-Gordejo, European Commission, Health and Consumers Directorate General

Dr. Reviriego-Gordejo reported that the 28 member countries of the European Union (E.U.) are beginning consideration of an animal health law for all the member nations. The European Commission needs to first make a proposal to the European Parliament and Council of Ministers which, if approved, is implemented by national and local authorities. The animal health
strategy for the E.U., 2007-2013, is based on the premise that prevention is better than cure. The E.U. animal health law aims to have a more risk-based approach and will provide for a single, robust framework to simplify existing rules. The animal health proposal will apply to transmissible animal diseases in kept and wild animals and their products, including terrestrial, aquatic and other categories of animals. What is not in the scope of the proposal is animal welfare, feed or medicated feed, veterinary checks and controls, or veterinary education. New elements include biosecurity at farms, enhanced surveillance and requirements for export. Rules for listed diseases include four categories: 1) diseases for immediate eradication such as FMD; 2) diseases for eradication and disease freedom with measures in trade and movements such as brucellosis; 3) diseases with voluntary control and eradication and additional guarantees for trade such as pseudorabies; and 4) diseases with general monitoring control measure such as BVD. Interestingly, antimicrobial resistant pathogens will be considered as “disease agents”.

General health requirements will apply to all movements of kept animals with disease-specific requirements applying to movements between member states. Requirements for entry into the E.U. will be as stringent as those within the E.U. or recognized as equivalent.

With respect to timing, the animal health law proposal was adopted by the Commission on May 6, 2013. Discussions in the Council and the European Parliament are on-going. The expected time of implementation is 36 months from the date of approval by the Councils and Parliament.

ISO and Animal Welfare Standards
Paul Sundberg, National Pork Board

Dr. Sundberg reported on the status of the International Standards Organization (ISO) foray into the animal welfare arena. In addition to ISO, the players include the Safe Supply of Affordable Food Everywhere coalition, a group of partners such as Coca Cola, Pfizer, McDonald’s and Cargill; the OIE; and the American Oil Chemists’ Society (AOCS). Dr. Sundberg noted that the OIE and ISO have a cooperative agreement in which the OIE provides science based international standards and the ISO develops tools to help organizations implement the Terrestrial Animal Health Code. Resolution 64/2012 of the ISO TC34 created a working group on animal welfare whose outcome would be a technical standard rather than a full standard. ISO TC34 (food products) is overseen by the AOCS. Seventeen countries including the U.S. are participating in this work group known as WG (working group) 16. A first draft proposal has been considered by WG 16 but was rejected in 2012. A subsequent substitute draft was also rejected in 2013. A new draft will have to be developed and accepted for this process to move forward. ISO has been asked to postpone the project until all OIE animal welfare standards are done which include laying hens, dairy and swine. The outcome may be ISO certification available for animal welfare based on OIE standards. Its impact will certainly be affected by pork chain customer adoption.
Foreign Animal Disease Research and the Global Foot and Mouth Disease (FMD) Regional Alliance
Luis Rodriguez, USDA-ARS, Plum Island

Dr. Rodriguez provided the committee with an overview of “leaderless” FMD vaccine trials. The FMD leaderless vaccine (FMD LL3B3D) may provide a platform for domestic FMD vaccine with DIVA markers. Leaderless FMD virus does not cause clinical disease in cattle. Inactivated vaccines prepared with FMD LL3D and FMD LL3D3B induced complete protection against challenge. The vaccine is fully attenuated and non-transmissible in cattle and pigs and has been granted a provisional patent. Dr. Rodriguez reported further on the assessment for the potential for recombination between this vaccine strain and a bovine rhinovirus. No recombination was detected in either virus. This may represent a new paradigm for FMDv in the U.S. by allowing domestic production of FMD vaccine and increasing national security.

Dr. Rodriguez and Bryan Chapman then discussed GFRA and a meeting which was held in Tanzania Oct. 8-10, 2013. One rather significant piece of news is that the Gates Foundation has started to express an interest in FMD control and eradication.

Committee Business
There was no formal business acted upon by the Committee.
REPORT OF THE COMMITTEE ON JOHNE’S DISEASE
Chair: Elisabeth Patton, WI
Vice Chair: Vacant

John Adams, VA; Bruce Addison, MO; Paul Anderson, MN; Marilyn Balmer, MD; Richard Breitmeyer, CA; Charles Brown II, WI; Todd Byrem, MI; James Carroll, MO; Michael Collins, WI; Thomas Conner, OH; Stephen Crawford, NH; Evelyn Crish, PA; Ria de Grassi, CA; Anita Edmondson, CA; William Fales, MO; Kathy Finnerty, NY; Keith Forbes, NV; Mallory Gaines, DC; Robert Gerlach, AK; William Hare, MI; William Hartmann, MN; Linda Hickam, MO; Donald Hoening, ME; David Hunter, MT; Carla Huston, MS; Annette Jones, CA; Jamie Jonker, VA; Karen Jordan, NC; Susan Keller, ND; John Lawrence, ME; Donald Lein, NY; Tsang Long Lin, IN; Mary Lis, CT; Laurent O’Gene Lollis, FL; Beth Mamer, ID; Chuck Massengill, MO; Jeffrey Nelson, IA; Dustin Oedekoven, SD; Kenneth Olson, IL; Lanny Pace, MS; Elizabeth Parker, ITA; Boyd Parr, SC; Janet Payeur, IA; Kris Petrini, MN; Jewell Plumley, WV; Suelee Robbe-Austerman, IA; Paul Rodgers, WV; Allen Roussel, Jr., TX; Patricia Scharko, SC; Andy Schwartz, TX; William Shulaw, OH; Kathryn Simmons, DC; Marilyn Simunich, ID; Shri Singh, KY; Judy Stabel, IA; Scott Stuart, CO; Robert Temple, OH; Charles Thoen, IA; Brad Thurston, IN; Jesse Vollmer, ND; James Watson, MS; Gary Weber, MD; Scott Wells, MN; Diana Whipple, IA; Robert Whitlock, PA; Ching Ching Wu, IN.

The Committee met on October 20, 2013 at the Town and Country Hotel, San Diego, California, from 12:30 to 5:30 p.m. There were nine members and 14 guests present. Welcome and review of last year’s resolution and action items was provided.

Presentations & Reports

The Role of Animal and Plant Health Inspection Service in the Future of Johne’s Disease Control
Michael Carter
USDA-APHIS-VS

In the Animal and Plant Health Inspection Service (APHIS) FY 2012 budget, livestock commodities regulated by USDA were organized into ‘Commodity Health Line’ structures or groupings. APHIS’ Cattle Health line supports efforts to protect the health and thereby improve the quality and productivity of the cattle industries. For fiscal year 2013, the President’s proposal recommended numerous cuts to APHIS’ budget line items and the Johne’s line item (as part of the Cattle Health line item) was no exception. Under the Cattle Health line item, Johne’s disease is no longer a specified activity, and so APHIS would like to identify what will continue as part of Veterinary Services’ function.

The National Veterinary Services Laboratories (NVSL) will continue to manage the proficiency tests for milk and serum ELISA, fecal culture and fecal polymerase chain reaction (PCR). The cost of proficiency testing will be covered by User Fees. NVSL will also continue to maintain the lists of
approved laboratories for various Johne’s disease tests. The Center for Veterinary Biologics will continue its evaluation, approval, licensure and monitoring of diagnostic test kits for Johne’s disease since APHIS will need to continue this activity regardless of where the funding comes from.

To a lesser extent, APHIS will provide minimal coordination activities limiting itself to hosting but not organizing the periodic conference calls for the USAHA Committee on Johne’s Disease and the designated Johne’s coordinators. APHIS will also continue to participate in the USAHA Committee on Johne’s Disease and the National Johne’s Working Group. APHIS will act as a reference point for international import and export negotiations and provide Veterinary Accreditation with guidance as necessary.

Since Johne’s is a cattle health disease, minimal field activities can continue such as being involved with State education activities but APHIS will not be the driver of State Johne’s programs and will not act in the designated coordinator roles. APHIS will continue to enforce 9 Code of Federal Regulations (CFR) part 80 banning the interstate movement of Johne’s disease positive animals unless requirements are met for moving directly to slaughter. And lastly, APHIS will also stay involved with the Mycobacterial Disease of Animals Multistate Initiative both as a Johne’s disease and a tuberculosis disease stakeholder to the project.

NJWG Treasurer’s Report
Ken Olson
Johne’s Disease Integrated Program (JDIP)

Review of NJWG income and expenses from the previous year. Presently, the NJWG had approximately $14,000 in available funds.

National Dairy FARM Program – Updates and Johne’s Disease
Jamie Jonker
Vice President Scientific & Regulatory Affairs, National Milk Producers Federation

The National Dairy FARM (Farmers Assuring Responsible Management) Program was created four years ago to establish a national, voluntary dairy animal care program to bring consistency and uniformity to the practices used on America’s dairy farms. The original reference manual was used to guide animal care practices on farms that have enrolled in the program since 2009. After a 15-month comprehensive review, an updated and revised FARM Animal Care Reference Manual was released in July 2013.

The National Dairy FARM program now has participant farms producing more than 70% of the nation’s milk supply, through 53 cooperatives and proprietary processors enrolled in the program. Over 8,300 on-farm second-party evaluations have been conducted with about 270 Third-Party Verifications conducted by the end of 2013.

The FARM Program’s wide-ranging guidelines and best practices help a dairy producer address Johne’s disease control. The best practice of a written Herd Health Plan developed in conjunction with a licensed veterinarian is a
REPORT OF THE COMMITTEE

comprehensive program for disease prevention, identification, and treatment for all ages of dairy animals. The written Herd Health Plan will include Johnes' Disease control if deemed necessary by veterinarian and farm manager. The FARM Program also uses the Johne’s Disease Risk Assessment Program (sponsored in part by the National Milk Producers Federation) as an additional tool for dairy producers to understand Johne's disease risk on their farms.

NCBA Johne’s Disease Presentation Overview
Kathy Simmons
NCBA

It has been estimated that eight percent of all beef cattle herds may be infected with Johne’s disease. The presence of Johne’s disease in a cattle herd can result in economic losses through decreased milk production and lighter weaning weights, decreased reproductive efficiency, increased culling rates and death. Beef cattle producers understand the need to take proactive steps to prevent and control Johne’s disease in their cattle herds. Johne’s disease should be managed as a herd problem and not treated as an individual cow disease.

In the last year, the National Cattlemen’s Beef Association (NCBA) policy concerning Johne’s disease has shifted from the support of governmental disease programs to the promotion of individual herd security against this disease. The NCBA Cattle Health and Well-Being Committee facilitates a Herd Security working group which brings together producers, state affiliates, veterinarians, government employees, educators and researchers to have an open exchange of ideas, information and differing perspectives concerning herd biosecurity measures. Herd security is not about one disease, but rather about keeping the herd safe and secure from all diseases, including Johne’s disease. NCBA continues to support research and improved diagnostic procedures for Johne’s disease. Additionally, NCBA encourages the use of the Beef Quality Assurance (BQA) best management procedures checklist for herd security in controlling Johne’s disease. Producers are encouraged to work with their veterinarians to develop a risk assessment and to establish appropriate risk management practices to prevent and control Johne’s disease in their cattle herds. Both NCBA and the beef industry are committed to taking steps to prevent Johne’s disease from entering low risk herds and controlling the disease in already infected herds as part of our commitment to total quality management.

An Update on the New York Cattle Health Assurance Program and its Johne’s Module:
David Smith
New York State Department of Agriculture and Markets

The New York State Cattle Health Assurance Program (NYSCHAP) is a pioneering effort to improve the health, productivity and profitability of dairy and beef herds. The program focuses on bringing herd owners and managers
together with advisors to craft herd health programs that are tailored to each herd's own goals and resources. There were 890 active participants at the end of 2012, 84 of which were beef herds and 806 which were dairy. The advisory team consists of veterinarians from Cornell University, and the New York State Department of Agriculture, as well as cooperating private veterinarians.

The Johne's component of NYSCHAP remains strong, despite the elimination of federal support. The State of New York recognizes the value of Johne's control and supports its producers primarily through subsidization of diagnostics costs. Testing has moved away from individual culture and now rRT PCR is the mainstay of the New York Johne's program. Many farms have had very good results with significant reduction in Johne's prevalence, but serious attention to management details is critical to achieving this benefit. Interest in Johne's vaccine has been light in New York. NYSCHAP does offer the option, but with significant restrictions. Overall NYSCHAP strives to anticipate producer's evolving needs and roll out new module to meet them. Recent examples include Foot Health and Calf Health. We anticipate adding a Drug Residue Awareness/Avoidance module soon.

**JDIP Vaccine Development Project Phase III Study Update**

Murray Hines
University of Georgia


A *Mycobacterium avium* subspecies *paratuberculosis* (MAP) vaccine that reduced the incidence of clinical disease and/or reduced fecal shedding of MAP would aid control of Johne's disease (JD). The objectives of this study were 1) to evaluate the efficacy of five attenuated strains of MAP as vaccine candidates alongside one commercially available MAP vaccine (Silirum®, Pfizer) using the protocols and endpoints proposed by the Johne’s Disease Integrated Program (JDIP), Animal Model Standardization Committee (AMSC), and 2) to validate the AMSC Johne’s disease goat challenge model (see Hines et al., 2007b). Eighty goat kids were vaccinated orally twice at eight and ten weeks of age with one of the experimental vaccines or once subcutaneously at eight weeks with Silirum®, or an oral sham control vaccine consisting of goat milk. Kids were challenged orally with a total of approximately 1.44 X 10⁹ CFU divided in two consecutive daily doses using a bovine MAP K10-like isolate (ATCC-700535). Immunological tests performed included Agar Gel Immunodiffusion (AGID), enzyme-linked immunosorbent assay (ELISA), and cell mediated response by comparative purified protein derivative (PPD) skin testing (*M. avium*, Johnin and *M. bovis* PPD’s). Kids within each group were euthanized and necropsied at 13 months post challenge. Results indicated all challenged kids had gross and/or microscopic lesions compatible with JD suggesting none of the vaccines prevented infection. However, there was a
marked reduction in fecal CFU/g and necropsy lesion score in the group given the Silirum® vaccine and a lesser reduction in the 329 vaccine group. A marked reduction in MAP CFU/g and PCR percent positivity was also detected in necropsy tissues from kids given the Silirum® vaccine, and increased CFU/g were detected in tissues from kids given the 315 and 319 vaccines vs. the positive control group. Vaccination also resulted in false-positive PPD skin test reactions for M. avium PPD and Johnin. These data show Silirum® was the best performing vaccine followed by attenuated vaccine strain 329. Furthermore, the goat challenge model for Johne’s disease has been validated.

Johne’s Disease Integrated Project (JDIP) / Mycobacterial Diseases of Animals (MDA) Diagnostics Update
Vivek Kapur
Pennsylvania State University

While considerable advances have been made in Johne’s disease (JD) diagnostics over the past decade, progress seems to be plateauing. The primary factors that continue to impede progress in JD diagnostics include: (i) Pathogen or pathogenesis related factors. These include a protracted incubation period with latent infection, and a growing recognition that adult infection may be important; Unpredictable disease progression and considerably lower frequency of shedding as compared with infection, and this is also manifested by low pathogen loads in tissues and feces of many animals and intermittent shedding of the organism. (ii) Technological factors, including the need for continued improvement in sensitivity and the fact that multiple types of assays are required to meet the needs for optimal sensitivity and specificity of existing pathogen detection or serological assays; and, (iii) Implementation or Operational factors, including those with quality control, standards, and cost-benefit considerations. The JDIP program had initiated and the MDA is continuing to work on the improvements in JD diagnostics through the development of a sample repository of materials (serum, milk, feces) from well characterized animals to be used as a means for new diagnostics assay development and standardization. In addition, JDIP/MDA has embarked on a diagnostic assays benchmarking study that used a blinded study design with head-to-head comparisons of serological (ELISA), as well as pathogen detection (PCR and culture) assays in a community wide study. It appears that the community is at a key inflection point as relates to JD diagnostics, and that to move beyond incremental progress, there is a need to help redefine the strategic objectives, and perhaps explore opportunities to leverage between JD and bovine TB diagnostics and to help clarify the role of MAP in human Crohn’s disease. A progress report was provided on diagnostic efforts made in JDIP and future goals for the newly formed multi-state initiative for Mycobacterial Diseases of Animals (MDA).
DHI efforts in Johne’s disease control
Jay Mattison
National Dairy Herd Information Association
Mr. Mattison provided an update on the Dairy Herd Information Association’s Johne’s activities. No details of the summary were provided.

NVSL Serum/Milk Check Test Results
Charles Lewis
National Veterinary Services Laboratories (NVSL), USDA, Animal and Plant Health Inspection Service (APHIS)
In 2013, 82 laboratories participated in the Johne’s Serologic Proficiency Testing process. Of these, 71 were domestic laboratories within the United States and 11 were international laboratories (representing Canada, Chile, The Netherlands, New Zealand, and Northern Ireland). Forty-four (44) laboratories participated in the Johne’s Milk ELISA Proficiency Testing process, including 38 domestic and six international laboratories (Canada and The Netherlands). For the 2013 proficiency panel, the National Veterinary Services Laboratories (NVSL) approved 30 laboratories to perform the Prionics ELISA and 48 laboratories to perform the IDEXX ELISA for serum testing. NVSL approved 46 laboratories to perform the milk ELISA, 14 for the Prionics and 32 for the IDEXX ELISA assays.
The total number of laboratories approved to perform the serologic assay decreased from 81 total laboratories in 2012 to 78 laboratories in 2013. There was an increase in the number of laboratories approved to perform the milk ELISA test, from 44 total laboratories in 2012 to 46 laboratories in 2013.

NVSL Fecal Check Test Results
Suelee Robbe-Austerman
National Veterinary Services Laboratories (NVSL), USDA-APHIS
A total of 63 laboratories participated in the 2013 Johne’s Disease Fecal Proficiency Panel (seven Canadian, three European Union, one New Zealand, one Australian and 51 USA laboratories). Overall, the number of laboratories that requested individual proficiency panels for direct polymerase chain reaction (PCR) and liquid culture methods increased from 2012 and decreased for solid culture methods. Overall, 93% passed using direct PCR on their initial attempt if a commercial kit was used and 65% passed if an in house procedure was used. For liquid culture, 95% passed using the TREK system, and 56% passed using the MGIT system. For solid media, 95% passed. False positive results with either direct fecal PCR or confirmatory culture PCR continue to be the most common cause of failure.

Multi-State Initiative-Mycobacterial Diseases of Animals update
Ken Olson
The multi-state initiative, approved by USDA, National Institute of Food and Agriculture (NIFA) in September, 2012, is focused on two mycobacterial disease complexes - paratuberculosis (Johne’s disease; JD) and the
tuberculosis complex of diseases (TBc; i.e bovine tuberculosis). It provides a vehicle to maintain and expand the networking, collaboration and basic infrastructure developed through JDIP, allowing participants to identify, obtain and share resources needed to address issues related to Johne’s and other mycobacterial diseases. Projects within each of its five objectives will be designed to address the major animal, human, and societal issues surrounding detection and control of mycobacterial infection, including how these organisms move and spread within cattle, small ruminant and wildlife populations.

The American Association of Mycobacterial Diseases, Inc. (AAMD)  
Ken Olson  
The American Association of Mycobacterial Diseases (AAMD) is a new, not-for-profit organization, incorporated in Pennsylvania. Its’ objective is "To assist producer groups, researchers, regulators, and funding agencies by promoting scientific research, education and extension activities in developing and implementing science based solutions for the prevention and control of mycobacterial diseases".

Group Discussion  
Discussion of current programs, usage and needs for further advancing the program. Summary of suggestions will be forwarded to the Multi-State Initiative-Mycobacterial Diseases of Animals and age-related macular degeneration (AMD) for consideration in their program.

Committee Business:  
No resolutions or recommendations were made. Further, there was not a quorum present at the time of the Committee business meeting.
REPORT OF THE COMMITTEE ON LIVESTOCK IDENTIFICATION
Chair: Tony Forshey, OH
Vice Chairs: Kevin Maher, IA; Steven Halstead, MI

Sara Ahola, CO; J Lee Alley, AL; Joan Arnoldi, WI; James Averill, MI; Rich Baca, CO; Lowell Barnes, IN; Bill Barton, ID; Karen Beck, NC; Tony Benz, MO; C. Black, GA; Richard Breitmeyer, CA; Paul Brennan, IN; Becky Brewer-Walker, AR; Gary Brickler, CA; Charlie Broadus, VA; William Brown, KS; James Carroll, MO; Jon Caspers, IA; Alan Clark, WI; Robert Cobb, GA; Michael Coe, UT; Jim Collins, GA; Karen Conygham, TX; Fred Cunningham, MS; Brandon Doss, AR; Anita Edmondson, CA; James England, ID; J Amelita Facchiano, TX; Kathy Finnerty, NY; Betsy Flores, VA; Robert Fourdraine, WI; W. Kent Fowler, CA; Tony Frazier, AL; Mallory Gaines, DC; Chelsea Good, MO; Rod Hall, OK; Neil Hammerschmidt, MD; William Hartmann, MN; Nephi Harvey, UT; Greg Hawkins, TX; Bill Hawks, DC; Jay Hawley, IN; Carl Heckendorf, CO; Kristi Henderson, IL; Bob Hillman, ID; Donald Hoenig, ME; Joseph Huff, CO; Dennis Hughes, NE; John Huntley, WA; Russell Iselt, TX; Jon Johnson, TX; Jamie Jonker, VA; Susan Keller, ND; Bruce King, UT; Diane Kitchen, FL; Maxwell Lea, Jr., LA; James Leafstedt, SD; Mary Lis, CT; Jim Logan, WY; Laurent O'Gene Lollis, FL; Francine Lord, ONT; Brett Marsh, IN; Stu Marsh, AZ; David Marshall, NC; Michael Martin, SC; Jay Mattison, WI; Paul McGraw, WI; James McKean, IA; Thomas McKenna, WI; Ronald Miller, PA; Ernie Morales, TX; Henry Moreau, LA; Jim Niewold, IL; Richard Odom, VA; Kenneth Olson, IL; Elizabeth Parker, ITA; Boyd Parr, SC; Jewell Plumley, WV; John Ragan, MD; Valerie Ragan, MD; Jeanne Rankin, MT; Tom Ray, NC; Kay Riddell, AL; Justin Roach, OK; Nancy Robinson, MO; Keith Roehr, CO; Larry Samples, PA; Bill Sauble, NM; A. David Scarfe, IL; Shawn Schafer, ND; Stacey Schwabenlander, MN; Andy Schwartz, TX; Charly Seale, TX; Laurie Seale, WI; Craig Shultz, PA; Richard Sibbel, IA; Kathryn Simmons, DC; David Smith, NY; Robert Stout, KY; Nick Striegel, CO; Scott Stuart, CO; Paul Sundberg, IA; Beth Thompson, MN; Arnaldo Vaquer, VA; Rick Wahlert, CO; Mark Walter, PA; James Watson, MS; Patrick Webb, IA; Richard Wilkes, VA; John Williams, MD; Kyle Wilson, TN; Josh Winegarner, TX; Cindy Wolf, MN; Ernest Zirkle, NJ.

The Committee met on October 22, 2013 at the Town and Country Hotel in San Diego, California from 8:00 a.m. to 12 p.m. There were 53 members and 50 guests present.

Opening comments included a review of the committee mission/purpose and general rules for participation. Dr. Tony Forshey offered comments and perspective of the Animal Disease Traceability (ADT) Forum that was held in Denver in August 2013, and summarized key challenges.

Animal Disease Traceability (ADT) Report - Monitoring and Compliance
Neil Hammerschmidt, USDA-APHIS-VS

The “Traceability for Livestock Moving Interstate” regulation establishes requirements for the official identification of livestock and documentation for
certain interstate movements at title 9 of the Code of Federal Regulations (9 CFR), part 86. Covered livestock include cattle and bison; horses and other equine species; poultry, sheep, and goats; swine; and captive cervids. Animals of these species, unless otherwise exempt, are required to be officially identified and accompanied by an Interstate Certificate of Veterinary Inspection (ICVI) or other movement document.

Tracing capability is directly associated with levels of compliance; that is, State and Federal animal health officials will not have information to support traceback investigations if they do not meet the regulation’s requirements. Animal and Plant Health Inspection Service (APHIS) has placed a priority on obtaining a high level of compliance with the traceability regulations through efficient and effective use of existing resources, including field personnel. Federal animal health officials will take the lead in enforcing the Federal requirements. However, States are encouraged to help oversee the various requirements. Likewise, accredited veterinarians have a key role regarding compliance with our regulations.

APHIS, Veterinary Services unit (VS), through the efforts of a State-Federal working group, has drafted a document to help unify the processes and practices that will be used to monitor traceability regulation compliance. The monitoring and compliance report provides general guidelines that VS, State, and Tribal animal health officials may use to help ensure high levels of compliance. Official identification and movement documentation requirements provide basic information essential for traceability and are the main elements for monitoring compliance with the traceability regulation. The report guidelines offer administrative processes that can be carried out by reviewing various records. The guide also recommends field activities for supporting compliance monitoring.

Approved Livestock Facilities

Animal health programs and associated surveillance activities can run more efficiently when State and Federal animal health officials have access to locations and facilities where animals are commingled from various sources. This is particularly important when animals move to multiple destinations from those locations. APHIS has established regulations to support the administration of animal health and disease programs at some of these locations when livestock move interstate. One important regulation is at 9 CFR 71.20, “Approval of Livestock Facilities.” This section applies mainly to livestock markets and stockyards.

Several of the requirements in 9 CFR 71.20 were based on the needs of disease eradication and control programs. For example, the regulation establishes requirements for handling brucellosis reactor, suspect, or exposed cattle and for handling cattle from States with different brucellosis class designations. As the United States has reached brucellosis-free status, 9 CFR 71.20 as written has become less relevant to the needs of State and Federal animal health officials. State licensing as well as Federal approval of livestock markets may subject markets to duplicate inspections. Other changes, including the availability of market veterinarians, have compelled APHIS to
LIVESTOCK IDENTIFICATION

examine and possibly modernize the regulations to meet current and changing livestock marketing practices.

APHIS established a State-Federal working group to review 9 CFR 71.20. The group prepared a report with recommendations for revising the regulation to meet current needs and marketing environments. Key points in the working group’s report include:

• Giving State and Federal animal health official’s access to facilities and records, including facilities that are not approved.
• Making all interstate movement requirements applicable to all facilities, regardless of approval status.
• Allowing market owners or managers to choose if they want to have their facility "approved."
• Approval status is not a requirement to be eligible to handle livestock moved interstate.
• Per the existing traceability regulations, certain exemptions apply only if a facility is approved, e.g., for cattle:
  o Using backtags in lieu of official ID for cattle moving directly to slaughter through one approved livestock facility.
  o Requiring an ICVI unless moving to an approved livestock facility.

APHIS would continue to administer approval agreements in cooperation with States, but the agreement would not be contained in the Code of Federal Regulations.

Discovering Value from Traceability beyond Animal Disease Traceability (ADT)

Dan Buskirk, Michigan State University

There are three primary objectives for creating traceability systems: 1) improving supply chain management; 2) facilitating traceback; and 3) differentiating and marketing credence attributes. Efforts to facilitate traceback, such as ADT, may be enhanced as the other two objectives are expanded. In other words, voluntary use of individual, unique identification (ID) of cattle may be increased if there were monetary returns associated with various ID applications. A number of applications using ID have been developed that may be classified as improving supply chain management with live cattle, but to date commercial use has been limited. Differentiating and marketing credence attributes of beef has the potential to derive value from consumers who are seeking to buy local and understand the origin of their food. Radio frequency identification (RFID), barcodes, web databases and mobile devices may provide tools which will help share our story, add value, and increase participation in animal traceability. A local beef supply chain initiative in Michigan has used these tools to develop a farm-to-consumer traceability model with the objective of marketing credence attributes.
ADT – Working Together to Address State Inconsistencies, Implementation Challenges and the State Veterinarian Survey Analysis
Chelsea Good, Vice President of Government and Industry Affairs, Livestock Marketing Association

Chelsea Good discussed some of the implementation challenges with the federal ADT rule. One major challenge is increasing knowledge and understanding of the rule both within state and federal animal health staffs and especially within the regulated community. Additional challenges include ensuring easy producer access to tags and issues with having to rework cattle, especially dairy steers, to read tags. Despite not being required by the federal ADT rule, some states require dairy individual IDs for dairy steers to be listed on the health certificates. This has caused difficulty for markets who have worked with producers to get the dairy steers officially identified before they get to the market.

Ms. Good discussed the need for consistent application of the federal rule. She emphasized the need to recognize this rule as it applies to all cattle and not just those moving through markets, and that when enforcement occurs, it should be applied consistently regardless of method of selling the livestock.

While ADT was designed to provide flexibility, variables across states increase the challenges to transition and implement the new approach. Ms. Good reviewed the results of an ADT implementation survey that was conducted in July 2013 by USAHA, the National Institute of Animal Agriculture (NIAA), the United States Department of Agriculture (USDA), and Livestock Marketing Association (LMA). As anticipated, the survey, which was completed by 43 states, showed a great deal of variation in what states were accepting to meet the federal ADT requirements as well as a variety of additional state-specific identification requirements.

Another challenge is the fact that this ADT rule is in addition to other state-specific identification, documentation, and disease-specific requirements. There is frustration with no easy resource to know what all the requirements are for moving to different states, especially when the response to “call the state veterinarian’s office” doesn’t work for markets with weekend sales.

USDA-APHIS Modeling livestock movement in the United States and its applicability to traceability
Katie Portacci, USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS)

When this project began in 2009, there were no quantitative data available on how livestock move in the United States. Efforts to improve the National Bovine Tuberculosis program were underway and a pathways assessment revealed some disease spread may be contributed to cattle movement within the United States. Without a way to evaluate disease spread and cattle movement together, it was challenging to evaluate strategies to combat this pathway.

USDA initiated an effort to develop a data-driven cattle movement model and apply disease simulation models to enhance the ability to evaluate
mitigations options at the national scale, prioritize tracing, establish regions, and model disease spread. This effort became a partnership between several universities and (State and Federal) government agencies.

The most comprehensive data source on cattle movement is the Interstate Certificate of Veterinary Inspection (ICVI). Because electronic ICVIs represented less than 4% of cattle movements in 2009, paper records were collected from 48 States (one state did not participate and one state did not have cattle records). Each state provided at least 10% of their records, resulting in over 19,000 records from 2,433 counties. It took several students over 1,500 hours to enter this data.

Each state has its own ICVI and the differences in these ICVIs were evaluated. Assessment of Paper Certificates of Veterinary Inspection to Support Animal Disease Tracing; Katie Portacci, et al.; Journal of the American Veterinary Medical Association. 2013

Across all 49 states, origin address was present 90% of the time, but a destination address was only present 55% of the time. Official identification was present 33% of the time, although most ICVIs do not specifically request an official identification.

The data from the states was used to describe the network of cattle movements in the United States. A national-scale picture of U.S. cattle movements obtained from Interstate Certificate of Veterinary Inspection data; MG Buhnerkempe, DA Grear, K Portacci, RS Miller, JE Lombard, CT Webb; Preventive Veterinary Medicine. 2013.

The majority of shipments were 0-10 animals, with very few shipments larger than 300 animals. The ICVIs contained short and long distance movements, but many short distance movements were noticed. When comparing the network at the county versus state scale, it is apparent that the county scale is more informative of movement. There are many counties with few shipments, but a few counties with many shipments. This effect gets diluted at the state scale.

The network described above is informative, but only reflects the records collected from 2009. Developing a model of cattle movement allows us to scale up these movements and incorporate uncertainty. A Bayesian Approach for Modeling Cattle Movements in the United States: Scaling up a Partially Observed Network; Tom Lindström, Daniel A. Grear, Michael Buhnerkempe, Colleen T. Webb, Ryan S. Miller, Katie Portacci, Uno Wennergren; PloS One. 2013.

The United States Animal Movement Model (USAMM) incorporates the distance kernel derived from the 2009 data, along with National Agricultural Statistics Service (NASS) inflow and farm density data to model the movement of cattle between two counties. The 2009 observed network is used for county and state level validation of the model predictions.

For traceability, we can use the model information in situations where no information is available about a diseased animal. The model will help us understand the most likely origin or destination counties for that animal.
pair that with disease simulations, we can start to prioritize these tracing or surveillance efforts.

Recognizing the dynamic nature of the cattle industry, the USAMM is continuously improving. We have entered 100% of records from California, Texas and Michigan from 2009 which improves our confidence in the adequacy of the 10% sample size. We are also working with some states to validate the within state model predictions and collecting additional years of data from eight states to improve the temporal depth. We have also collected a sample for swine to begin building a national movement model for swine.

USAMM is being used in conjunction with the United States Disease Outbreak Simulation (USDOS) to understand the impact of mitigations on an FMD outbreak at the national scale. We are also applying USAMM to help improve our understanding of bovine TB spread.

**Effects of Current ADT Rules on Livestock Markets**

Chuck Adami, Equity Cooperative Livestock Sales

Mr. Adami discussed two market studies of the work flow and associated costs at Monroe, Wisconsin and Waukon, Iowa, markets.

In cases where animals are tagged on arrival to the market, they use a squeeze chute prior to sale and the process causes a bottleneck. It takes about 30% greater time and if they read tags, it is 40% greater time required over normal processing, not including man hours and related costs.

They would like to find a way to move animals more efficiently within an efficient space and facility – with the use of affordable technology. No technology is available to read electronic identification (EID) tags and associate or integrate the ID information with their sales management system.

Automating the "wanding" of animals with EID on arrival, and again after leaving ring, to associate animals with the new buyer and to integrate the ID information into their sales system - as well as with the vet for a printout of IDs on an ICVI is needed.

The manual process currently requires them to correlate the back tag to bright-tags.

Age of market facilities is an issue as well as technology. In their current system, manual IDs are read three times and causes extra costs that need to be reduced.

**Data Transfer Standards Committee Update**

Mr. John Picanso, USDA-APHIS-VS and Mr. Michael McGrath, Trace First

Mr. Picanso reviewed work of three U.S. initiatives specific to: (1) the principles of data sharing, (2) standardizing data elements used with Interstate Certificates of Veterinary Inspection (ICVI) for interstate movement, and (3) data exchange standards, for moving standardized data used for ICVI’s.

Picanso mentioned that APHIS, Veterinary Services (VS) should soon be publishing the document related to standardized data elements to the Federal Register. Look for an email soon to lead to this document. Two topics which
were not completed with this work include standardizing both breed and species codes.

Mr. Picanso reviewed the working group product which was developed in collaboration with federal and state partners. This document called “Principles for Animal Health Information Sharing” was chartered by the Veterinary Services Leadership Team in 2012. This work was undertaken to ensure animal officials have access to information and seamless information sharing capabilities when needed to carry out their responsibilities.

Mr. McGrath presented the latest update for the subcommittee of the committee on Animal Health Surveillance and Information Systems. He indicated that the work of the subcommittee should be completed sometime in January of 2014. The product will be a technical XML schema which can be used by providers of ICVI’s and the ability to move information seamlessly between information management systems.

Committee Business:

No old business was brought forth.

New business resulted in the following resolution that passed during the business meeting:

“Support of the creation and maintenance of a publically-accessible resource that compiles identification, documentation, disease-specific, and other requirements for moving livestock interstate.”
REPORT OF THE USAHA/AAVLD COMMITTEE ON NATIONAL ANIMAL HEALTH LABORATORY NETWORK (NAHLN)
Chair: Barbara Powers, CO
Vice Chair: Harry Snelson, NC

Helen Acland, PA; John Adaska, CA; Bruce Akey, NY; Gary Anderson, KS; Marianne Ash, IN; A. Catherine Barr, TX; Bill Barton, ID; Tim Baszler, WA; Tammy Beckham, TX; Steven Bolin, MI; Richard Breitmeyer, CA; James Britt, AR; Sandra Bushmich, CT; Beverly Byrum, OH; Craig Carter, KY; Estela Cornaglia, CAN; Marie Culhane, MN; Sherrill Davison, PA; Francois Elvinger, VA; Mallory Gaines, DC; Joseph Garvin, VA; Patrick Halbur, IA; Timothy Hanosh, NM; Jim Kistler, CA; Bob Hillman, ID; Stephen Hooser, IN; Holly Hughes-Garza, TX; Pamela Hullinger, CA; Bill Johnson, OK; Jay Kammerzell, CO; Jim Kistler, FL; Elizabeth Lautner, IA; Christina Loiacono, IA; David Marshall, NC; Barbara Martin, IA; Terry McElwain, WA; Michael McIntosh, NY; Thomas McKenna, WI; Dustin Oedekoven, SD; Kristy Pablonia, CO; Lanny Pace, MS; Elizabeth Parker, ITA; Roger Parker, TX; Amar Patil, NJ; Jewell Plumley, WV; Robert Poppenga, CA; Keith Roehr, CO; Jeremiah Saliki, GA; Kathryn Simmons, DC; Marilyn Simunich, ID; Bruce Stewart-Brown, MD; Rodney Taylor, NM; Sarah Tomlinson, CO; David Zeman, SD.

The Committee met on October 20, 2013 at the Town and Country, San Diego, California, from 1:00 to 2:20 p.m. There were 19 members and 28 guests present.

NAHLN Update
Beth Lautner, USDA-NVSL

The National Animal Health Laboratory Network (NAHLN) Concept paper received 42 comments. They will be responding and then moving forward with Code of Federal Regulations (CFR) posting. Comments were supportive and expressed concerns about funding and terminology (calling the laboratories “levels” which some thought could be confusing). There is a specialty laboratories section included in the concept paper. Aquaculture is being included in the NAHLN.

a. Methods Technical Working Group
b. Validation studies were completed inter-laboratory comparison and cohort studies on milk tanks and moving forward with pen-side tests. FMD serology tests are also targeted for validation. Pan-H7 testing has been initiated.
c. Capacity estimation model was developed in partnership with FAZD and deployed to NAHLN laboratories in 2012.
d. Veterinary Services (VS) reorganization has been delayed to November 3, 2013. National Veterinary Services Laboratory (NVSL) and Center for Veterinary Biologics (CVB) will report to Larry Granger. Centers for Epidemiology and Animal Health (CEAH) and the Office of Interagency Coordination will report to Beth Lautner.
e. Budget: Continuing resolution (CR) until January. 2014 proposed budget is favorable if approved.

NAHLN Funding Efforts
Brad Mollet, American Association of Veterinary Laboratory Diagnosticians (AAVLD) Lobbyist

Mr. Mollet discussed that the House budget for FY14 is marked up at $7 million, the Senate at $5.98 million, and also a separate line item in fiscal budget (FB) at $15 million. If approved, we would then need to push for appropriations. AAVLD will visit the Hill in February. The white paper is available for use by anyone visiting with their Congressional representatives.

FAZD Presentation
Keith Biggers and Lindsey Holmstrom, FAZD Center

Engage to Excel (E2E) is an application to support business continuity (supporting continued movement of non-infected animals and products during an outbreak). This is a three year project coupled with Emergency Response Support System (ERSS) to establish linkages with necessary datasets during peacetime so that they are ready to activate following an outbreak. Emphasis is on premises identification number. FAZD conducted a pilot project collecting data from: state animal health officials (SAHO) in Iowa, Iowa State University (ISU), Veterinary Diagnostic Laboratory (VDL) and an Iowa pork producer. Proof of concept was successful. We will be moving forward with four states: Colorado, Indiana, Iowa, and Kansas and USAHerds to demonstrate scalability. Key is that FAZD only connects datasets, they do not actually possess any information – all the data continues to reside on the individual databases at the producer, laboratory or SAHO. Value to producers is the ability to access and manipulate their data real-time for multiple sources.

Interstate Certificate of Veterinary Inspection (ICVI) is an iPad app allowing for the veterinarian to complete a certificate of veterinary inspection on site and submit it electronically.

Enhanced Passive Surveillance (EPS), integrated disease surveillance, is an early disease detection that focuses on syndromic surveillance and is scalable. Cattle and small ruminant pilot projects have been undertaken for a proof of concept. This provides mobile technology that allows practitioners to collect data on-site and electronically submit the information into an established dataset with a common operating system; currently based on an iPad format.

State Animal Laboratory Messaging Service (SALMS)
Bruce Akey, Cornell University

SALMS is laboratory messaging software. It does not store any message content but fills a missing link to facilitate communication between laboratories. Laboratories often can’t transmit the data between laboratories, but SALMS provides a secure mechanism to access USDA’s Laboratory Messaging System (LMS). SALMS is active and currently available for use. It can send
messages between any registered users (including other laboratories, USDA, private practitioners, (state animal health officials (SAHOs), etc). Established conduits include U.S. Animal Laboratory Information Management System (USALIMS) and USAHerds-capable systems. Access to practice management systems is the next goal of the SALMS effort. The ultimate goal is to have the messaging router service convert a message from one format to a different receiving format or serve as a “pass through” for messages regardless of format. There is no cost for the service.

USDA Information Technology (IT)
John Picanso, USDA-APHIS-VS

USDA IT has hired a person on the technical team in Fort Collins to work on existing issues. Laboratory Messaging Services (LMS) replaces NAHLN IT. Swine influenza virus (SIV) results are now going directly to the LMS repository. The ultimate goal is to message any disease result into the LMS which should be functional by spring 2014. There has been much integration and collaboration on many fronts since the 2012 USAHA meeting. We are within a couple of months of being able to bring in National Veterinary Services Laboratory (NVSL) data, including working on pseudorabies virus (PRV) and classical swine fever (CSF) through Wildlife Services. USDA is undergoing the second round of testing through veterinary diagnostic laboratories (VDLs) at Iowa State University (ISU) and University of Minnesota (UMN). We are working with Trace First to bring data into USDA platforms. Caveat: standardization is important. Currently we are working on standardization of data exchange mechanisms and also working on publication of data standards.

Methods Technical Working Group (MTWG) Update
Bruce Akey, Cornell University (MTWG co-chair with Sarah Tomlinson)

MTWG was established to define testing technologies/methodologies used in NAHLN laboratories as outlined:

a) What is the role of the MTW group in emerging disease diagnostics?

b) Standardization of De Novo (polymerase chain reactions (PCRs) developed from scratch) PCR method development – methodology for validating disease PCR.

c) Defining guidelines for technical considerations associated with identifying an emerging disease within two weeks and necessary diagnostics. What is the NAHLN’s role?

d) Consideration of concerns regarding using NAHLN PCR methods for non-target testing.

Committee Business:

Dr. Powers updated the committee on the success of previous resolutions particularly regarding obtaining Congressional support for NAHLN funding.

The Committee considered a resolution from the Committee on Diagnostic Laboratory and Veterinary Workforce Development (DLVWD) entitled National
Diagnostic Laboratory and Veterinary Workforce Assessment. The Committee made some minor wording changes and moved to approve the amended resolution. The motion was seconded and approved by voice vote.
REPORT OF THE COMMITTEE ON NOMINATIONS AND RESOLUTIONS  
Chair: David Marshall, NC

J Lee Alley, AL; George Badley, AR; Philip Bradshaw, IL; Richard Breitmeyer, CA; William Brown, KS; Jones Bryan, SC; Clarence Campbell, FL; Joe Finley, TX; Robert Gerlach, AK; Thomas Hagerty, MN; Steven Halstead, MI; Bob Hillman, ID; Heather Hirst, DE; Donald Hoenig, ME; Maxwell Lea, Jr., LA; James Leafstedt, SD; Donald Lein, NY; Bret Marsh, IN; Michael Marshall, UT; Richard McCapes, CA; Lee Myers, GA; John Ragan, MD; Glenn Rea, OR; Scott Stuart, CO; H. Wesley Towers, DE; Max Van Buskirk, PA; Richard Willer, HI; Larry Williams, NE; Ernest Zirkle, NJ.

Nominations

OFFICERS

PRESIDENT.................................................Stephen K. Crawford, Concord, NH
PRESIDENT-ELECT........................................Bruce L. King, Salt Lake City, UT
FIRST VICE-PRESIDENT………….…….............….... David D. Schmitt, Des Moines, IA
SECOND VICE-PRESIDENT........................... Boyd H. Parr, Columbia, SC
THIRD VICE-PRESIDENT----------------------Barbara C. Determan, IA
TREASURER.................................................Annette M. Jones, Sacramento, CA

DISTRICT DELEGATES

NORTHEAST.................................S. “Buzz” Klopp, DE; Bruce Akey, NY
NORTH CENTRAL..................…………Velmar Green, MI; Howard Hill, IA
SOUTH..........................L. “Gene” Lollis, FL; A. Gregario Rosales, AL
WEST..........................Bill Sauble, NM; H. M. Richards, HI

Resolutions

RESOLUTION NUMBER: 1 AND 5 COMBINED - APPROVED
SOURCE: USAHA/AAVLD COMMITTEE ON DIAGNOSTIC LABORATORY AND VETERINARY WORKFORCE DEVELOPMENT; USAHA/AAVLD COMMITTEE ON NATIONAL ANIMAL HEALTH LABORATORY NETWORK

SUBJECT MATTER: NATIONAL DIAGNOSTIC LABORATORY AND VETERINARY WORKFORCE ASSESSMENT

BACKGROUND INFORMATION:

The purpose of the United States Animal Health Association (USAHA)/American Association of Veterinary Laboratory Diagnosticians (AAVLD) Committee on Diagnostic Laboratory and Veterinary Workforce Development (DLVWD) is to educate policy makers and influence North America’s policy on the supply of and demand for veterinarians and laboratory diagnosticians as well as animal health laboratory facility needs. To effectively accomplish these goals, the committee members must analyze the gaps in
The National Association of Federal Veterinarians (NAFV) and the American Veterinary Medical Association (AVMA) are interested in assessing the nation’s veterinary workforce to identify veterinary workforce gaps between needs and demand. The Committee proposes that a joint effort between the NAFV, AVMA, USAHA, AAVLD, other veterinary associations, and the state and federal governments, be initiated and completed to assess the gap between the current demand and need for state and federal and animal health laboratory veterinarians in the national veterinary workforce needs. This information can be used to analyze needs and workforce gaps. The resulting analysis can then be used to better educate policy makers, develop strategies to resolve the needs identified, and ensure the nation is prepared to effectively respond to emerging and emergency animal health diseases.

RESOLUTION:

The United States Animal Health Association (USAHA) and American Association of Veterinary Laboratory Diagnosticians (AAVLD) urge the National Association of Federal Veterinarians, American Veterinary Medical Association, federal and state governments, and other veterinary associations to develop and participate in a joint national effort in assessing and effectively addressing national veterinary workforce needs and animal health laboratory needs before the next USAHA and AAVLD annual meeting in 2014.

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RESOLUTION NUMBER:  2 - APPROVED
SOURCE: USAHA/AAVLD COMMITTEE ON ANIMAL EMERGENCY MANAGEMENT
SUBJECT MATTER: NATIONAL FOOT AND MOUTH DISEASE PREPAREDNESS WORKING GROUP

BACKGROUND INFORMATION:

If the United States experiences a foot-and-mouth disease (FMD) outbreak within its borders, a prepared response will be required for optimum control of the disease and continuity of business for agricultural producers and associated industries. The scope and severity of the outbreak will determine the particular strategy of response, control, and mitigation chosen. The North American Foot-and-Mouth Disease Vaccine Bank (NAFMDVB) has limited veterinary workforce and facility needs. However, the committee does not have accurate data on the nation’s veterinary workforce and animal health laboratory facility needs. In the past 12 months, there have been two veterinary workforce assessments completed - one for federally employed veterinarians and one for private veterinary practitioners. These assessments are missing data on state employed veterinarians, academicians, and industry veterinarians. In addition, there has not been a needs assessment conducted on animal health laboratories.
quantities of vaccine available. Emergency vaccine stocks are far below what would be required to address a livestock-dense state or multi-state outbreak. The public-private-academic partnerships formed as part of the Secure Food Supply projects and work that has been conducted have brought the need for additional FMD vaccine and other response strategies and capabilities to a broader audience. In addition, there are other corollary issues that surround the decision to use FMD vaccine in an outbreak that need broad stakeholder input prior to an outbreak.

In August 2013, the National Institute of Animal Agriculture, the United States Animal Health Association (USHAHA), and the United States Department of Agriculture, Animal and Plant Health Inspection Service took the initial steps to form an FMD Preparedness Working Group comprised of Federal and State animal health officials, academia, and livestock and allied industry representatives. The working group will facilitate dialogue between all potentially impacted business sectors to accelerate modernization and implementation of efforts to prevent, detect, contain, eradicate, and recover from an FMD outbreak in the United States. The working group will consider current capacities and future needs to ensure continuing advancement of United States FMD preparedness, including emergency vaccination.

RESOLUTION:

The United States Animal Health Association (USHAHA) and the American Association of Veterinary Laboratory Diagnosticians (AAVLD) urge the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS) to:

- Support, collaborate with, and provide guidance and information to the National Foot and Mouth Disease (FMD) Preparedness Working Group in all aspects of planning and preparedness for response to a FMD outbreak in North America.
- Receive and carefully consider integrating information from the National FMD Preparedness Working Group into USDA-APHIS-Veterinary Services emergency preparedness and response planning.

The USAHA and the AAVLD urge the National FMD Preparedness Working Group to:

- Provide a mechanism for gathering broad stakeholder input to enhance FMD preparedness and response planning which would include assessing present capabilities, laying strategy for addressing preparedness and response gaps, and implementation of exercises to test the plans.
- Evaluate FMD vaccine quantity and capability, times to delivery, methods of distribution, electronic identification of vaccinates, and other vaccine priority issues to meet FMD response needs.
- Develop consensus among stakeholders on a plan of action, prepare a list of response needs, and initiate action to generate funding support for enhanced animal emergency preparedness.
RESOLUTION NUMBER: 3 AND 20 COMBINED - APPROVED
SOURCE: COMMITTEE ON INFECTIOUS DISEASES OF CATTLE, BISON, AND CAMELIDS; COMMITTEE ON PUBLIC HEALTH AND RABIES
SUBJECT MATTER: Q FEVER

BACKGROUND INFORMATION:
The increasing public demand for raw milk combined with the threat of re-emerging *Coxiella burnetti* infection raises the need for a nationwide program to prevent Q Fever. The lack of a widespread surveillance program necessitates action by State and Federal milk regulatory agencies to protect the public health.

RESOLUTION:
The United States Animal Health Association urges each State Milk Regulatory Authority in states which allow retail sale of raw milk to include *Coxiella burnetti* surveillance in their raw milk inspection program. The programs should also include a public awareness campaign about Q Fever.

RESOLUTION NUMBER: 4 - APPROVED
SOURCE: USAHA/AAVLD COMMITTEE ON AQUACULTURE
SUBJECT MATTER: AQUATIC ANIMAL DRUG APPROVAL PARTNERSHIP PROGRAM

BACKGROUND INFORMATION:
Due to budgetary constraints, the United States Fish and Wildlife Service (U.S. FWS) has discontinued funding for the Aquatic Animal Drug Approval Partnership (AADAP) program.

The AADAP program is an integral component in the drug approval process. Its goal is to “… ensure continued progress towards obtaining Food and Drug Administration (FDA) approved and Environmental Protection Agency (EPA)-compliant new animal drugs for Federal, State, tribal and private aquaculture programs in the United States....”

The AADAP program administers the compassionate Investigational New Animal Drug (INAD) program that allows access to drugs which would be otherwise unavailable to those involved in aquaculture. The AADAP program also generates drug efficacy and safety data necessary to support FDA approval of new drugs for aquatic species. It has been involved in almost all aquatic animal drug approvals since its inception. The program also plays an important role in dissemination of information and drug use guidance though its newsletter, website, Aquaculture Drug Update list-serve, and the annual drug approval coordination workshop. Aside from U.S. FWS facilities, the private aquaculture industries, the veterinary profession, and animal health and welfare have all benefited from the AADAP program.
The drug approval process is long and expensive, with limited returns on the investment for pharmaceutical companies. However, approved drugs are an integral component of the management and control of diseases, while at the same time ensuring the quality and safety of our aquaculture products. Loss of this critical component for the drug approval process would further hamper the development and success of the U.S. aquaculture industry and deepen our dependence on foreign imports. The availability of FDA-approved drugs would enhance the harvest of safe and wholesome aquaculture products to meet growing consumer demand.

RESOLUTION:
The United States Animal Health Association strongly recommends that the United States Fish and Wildlife Service acknowledge the critical role that the Aquatic Animal Drug Approval Partnership program plays for federal, state, tribal and private aquaculture by restoring the financial support for the program for 2014 and beyond.

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RESOLUTION NUMBER: 6 - APPROVED
SOURCE: COMMITTEE ON BLUETONGUE AND RELATED ORBVIRUSES
SUBJECT MATTER: VACCINE AND VECTOR CONTROL METHODS FOR THE VARIOUS STRAINS OF BLUETONGUE AND RELATED ORBVIRUSES

BACKGROUND INFORMATION:
Bluetongue and Epizootic Hemorrhagic Disease viruses have become a concern to both traditional and non-traditional livestock producers and wildlife biologists because of new serotypes, increased reports of clinical disease in cattle, farmed cervids and several wildlife species, and increased geographical range. The committee encourages the United States Department of Agriculture, Agricultural Research Service to develop a vaccine and vector control methods that will protect against all known strains of these viruses.

RESOLUTION:
The United States Animal Health Association (USAHA) requests the United States Department of Agriculture, Agricultural Research Service allocate resources to support Bluetongue and Epizootic Hemorrhagic Disease (EHD) research at the Arthropod-Borne Animal Diseases Research Unit in Manhattan, Kansas, focusing on understanding the pathogenesis of the disease to facilitate the development of a vaccine and/or vector control methods to adequately protect the livestock industry from all strains of EHD.

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RESOLUTION NUMBER: 7 AND 14 COMBINED - APPROVED
SOURCE: COMMITTEE ON PARASITIC DISEASES; COMMITTEE ON INFECTIOUS DISEASES OF HORSES
SUBJECT MATTER: EQUINE Piroplasmosis (EP) - Genetic Strain Typing of EP Organisms

BACKGROUND INFORMATION:
Equine piroplasmosis (EP) is classified as a foreign animal disease. The identification of EP-positive imported equids and the recent large-scale EP incident in a domestic population of horses have increased the need to identify the genotypic strains of organisms in positive EP equids detected in the United States. While natural, endemic transmission of EP is occurring at a very low level in the United States, a small number of EP positive horses continue to be detected. Many of these positive EP horses have direct ties to foreign countries endemic for EP, where the horse was believed to be infected. Currently, however, there is no validated method to determine different strains of each organism (Theileria equi and Babesia caballi) complicating the epidemiological and trace back investigations.

RESOLUTION:
The United States Animal Health Association (USAHA) urges the United States Department of Agriculture, Animal and Plant Health Inspection Services, Veterinary Services and Agricultural Research Services and the National Veterinary Services Laboratory to research, develop and validate genetic strain typing capabilities for the equine piroplasmosis organisms Theileria equi and Babesia caballi.

RESOLUTION NUMBER: 8 - APPROVED
SOURCE: COMMITTEE ON TRANSMISSIBLE DISEASES OF SWINE
SUBJECT MATTER: INFORMATION SHARING FOR HERD HEALTH

BACKGROUND INFORMATION:
The introduction of Porcine Epidemic Diarrhea Virus (PEDv) into the United States swine herd has resulted in the identification of gaps related to securely gathering and sharing premises, herd and laboratory data. The lack of premises identification numbers (PIN) and incomplete herd information on submission forms, along with variability in veterinary diagnostic laboratories’ capacity to capture PINs and share herd and diagnostic information between laboratories limits the timeliness and value of the information derived from shared data. A concerted effort to address this gap is needed.

RESOLUTION:
The United States Animal Health Association (USAHA) urges the United States Department of Agriculture (USDA) to work with the American Association of Veterinary Laboratory Diagnosticians (AAVLD) and its
membership to enhance the capabilities to capture premises identification numbers (PIN) from laboratory submission forms and require PINs when forms are submitted with swine samples.

USAHA also urges the USDA’s National Animal Health Laboratory Network Coordinator to facilitate working with member laboratories to develop and implement a comprehensive solution for timely and seamless electronic gathering, collation and reporting of premises, herd and laboratory data needed for analysis and disease surveillance.

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RESOLUTION NUMBER: 9 - APPROVED
SOURCE: COMMITTEE ON TRANSMISSIBLE DISEASES OF SWINE
SUBJECT MATTER: EMERGING DISEASES RESPONSE INFRASTRUCTURE AND PLANNING

BACKGROUND INFORMATION:
Since the mid-1980s the United States pork industry has experienced multiple emerging animal issues that have adversely affected swine health and production resulting in economic losses to the industry. The discovery of melamine in feed inputs incorporated into swine diets, porcine reproductive and respiratory syndrome, porcine circovirus 2, novel H1N1 influenza and porcine epidemic diarrhea virus have made it clear that the industry is vulnerable to disease introductions and feed adulterations from global sources. These vulnerabilities need to be rapidly addressed to protect the United States pork industry.

RESOLUTION:
The United States Animal Health Association (USAHA) urges the United States Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services to provide the infrastructure necessary to support the response to emerging diseases and support the pork industry as it develops an emerging diseases response plan.

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RESOLUTION NUMBER: 10 - APPROVED
SOURCE: COMMITTEE ON TRANSMISSIBLE DISEASES OF SWINE
SUBJECT MATTER: RISK ANALYSES

BACKGROUND INFORMATION:
Since the mid-1980s the United States pork industry has experienced multiple emerging animal issues that have adversely affected swine health and production resulting in economic losses to the industry. The discovery of melamine in feed inputs incorporated into swine diets, porcine reproductive and respiratory syndrome, porcine circovirus 2, novel H1N1 influenza and porcine epidemic diarrhea virus have made it clear that the industry is vulnerable to disease introductions and feed adulterations from global sources.
These vulnerabilities need to be rapidly addressed to protect the United States pork 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 work cooperatively and urgently with the appropriate Federal, State and industry stakeholders to undertake timely and proactive risk analyses regarding the introduction of diseases or adulterations via production inputs sourced from outside of the United States and assist industry in identifying the factors enabling disease introductions such as porcine epidemic diarrhea virus into the United States swine herd. USDA-APHIS-VS should provide the outcomes of the risk analyses to the Swine Committee at the National Institute of Animal Agriculture’s 2014 annual meeting.

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RESOLUTION NUMBER: 11 - APPROVED

SOURCE: COMMITTEE ON BRUCELLOSIS

SUBJECT MATTER: BRUCELLOSIS PROOF OF VACCINATION

BACKGROUND INFORMATION:

While the practice of vaccinating for brucellosis has declined in much of the United States, many western states, especially those in or around the Greater Yellowstone Area still utilize vaccination as a principle component of their brucellosis mitigation programs.

In some states, vaccination requirements are part of importation and change of ownership and movement regulations. Unfortunately, states’ regulations differ on what is considered proof of vaccination, with some requiring a legible tattoo even in animals with a vaccination tag, thereby creating issues for interstate commerce.

Traditionally, proof (and time) of vaccination helped differentiate a brucellosis infected reactor from an animal vaccinated with Strain 19. Now that RB51 is the only approved vaccine for cattle and bison, proof of vaccination is only necessary for compliance reasons. In these cases, lack of proof can be remedied with re-vaccination without risk of causing test interpretation problems. In fact, data support that a second dose of vaccine will result in enhanced protection.

It is well documented that tattoos are often not permanent and are difficult to read on older cattle. Further, correct application of National Uniform Eartagging System (NUES) or radio frequency identification (RFID) individual official tags often allows these tags to have greater longevity than the tattoo and may be used as proof of vaccination if the orange color is used.

RESOLUTION:
REPORT OF THE COMMITTEE

The United States Animal Health Association (USAHA) urges all states to uniformly recognize a vaccination tattoo or an official brucellosis vaccination identification device as proof of brucellosis vaccination for the purposes of movement or importation.

USAHA further urges the United States Department of Agriculture to modify brucellosis regulations to require a vaccination tattoo only if an official brucellosis vaccination identification device is not applied during brucellosis vaccination.

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RESOLUTION NUMBER: 12 - APPROVED
SOURCE: COMMITTEE ON BRUCELLOSIS
SUBJECT MATTER: BRUCELLOSIS TESTING IN FARMED CERVIDAE

BACKGROUND INFORMATION:
Since the 1950’s several researchers have experimentally infected white-tailed deer with *Brucella abortus* (*B. abortus*) and they are susceptible to the agent, but in no single case, either experimentally or naturally, have white-tailed deer been shown to transmit *B. abortus* to cattle or any other species. Only once in over 50 years has a free ranging wild white-tailed deer been shown to be infected with *B. abortus*. During this same time period, thousands of farmed white-tailed and mule deer have been tested as a requirement for interstate shipments without identifying any problems concerning brucellosis in these species.

RESOLUTION:
The United States Animal Health Association (USAHA) urges the United States Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services and state regulatory officials to eliminate brucellosis testing requirements for interstate movement of farmed white-tailed deer and mule deer.

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RESOLUTION NUMBER: 13 - APPROVED
SOURCE: COMMITTEE ON INFECTIOUS DISEASES OF HORSES
SUBJECT MATTER: CONTAGIOUS EQUINE METRITIS - POLYMERASE CHAIN REACTION TESTING

BACKGROUND INFORMATION:
Contagious Equine Metritis (CEM) is classified as a foreign animal disease. Since 2009, there have been several costly CEM incidents in the United States. The 2013 California incident reaffirmed the interest in and need for a rapid, validated, and economical diagnostic test for detection of the *Taylorella equigenitalis* (*T. equigenitalis*) organism in swab specimens from stallions and mares as well as in semen and vaginal exudates from mares. Current CEM
investigation protocols require bacteriologic culture, isolation, and identification of the organism for diagnostic confirmation of the disease organism. This can be a slow process that on occasion is complicated by bacterial overgrowth on culture plates and also by the fastidious growth characteristics of the organism. Although *T. equigenitalis* colonies are typically visible 72 hours after plating of a positive sample, in some cases it may take up to a week for colonies to appear. A rapid, robust confirmatory test, such as the Polymerase Chain Reaction (PCR) test, that does not have as stringent sample transport requirements as when submitting swabs for culture, would be highly beneficial to state animal health officials and diagnosticians. A validated PCR test would be a more economical, quicker means of screening stallions for the carrier state than conventional culture and test breeding. The PCR assay for *T. equigenitalis* requires additional research to ensure that it is fully validated for the determination of the status of stallions, mares and geldings based on screening swabs and perhaps other clinical specimens i.e., vaginal exudate or semen in the course of a CEM investigation.

**RESOLUTION:**

The United States Animal Health Association (USAHA) urges the United States Department of Agriculture, Animal and Plant Health Inspection Services, Veterinary Services to prioritize research that is required to validate and subsequently secure World Organization for Animal Health (OIE) approval of a polymerase chain reaction assay for the detection of *Taylorella equigenitalis*.

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**RESOLUTION NUMBER: 15 - APPROVED**

**SOURCE: COMMITTEE ON INFECTIOUS DISEASES OF HORSES**

**SUBJECT MATTER: NATIONAL EQUINE COMMUNICATION CENTER**

**BACKGROUND INFORMATION:**

The United States horse industry is unique in the livestock sector for its broad diversity of activities in all regions of the country and the world. Horses involved in business, sport, recreation, entertainment, gaming and environmental support add to the agribusiness economic engine. In addition to an annual economic impact of over $102 billion, the equine industry produces other public benefits, including recreation, exercise, working animals, stress reduction and entertainment.

The horse industry is at continuous risk of a disease outbreak of such proportion as to widely imperil the health of horses and threaten the economic viability of the industry. Equine industry reliance on the frequent and timely movement of healthy horses compounds this ever-present risk; the ability to move horses is critical to the industry. Compared to other livestock, horses are unique because they move much more frequently for breeding, competition, recreation and for import/export on both a temporary and permanent basis. Regulation of intrastate, interstate and international movement of horses is
through multiple mechanisms, including policies overseen by the United States Department of Agriculture (USDA), Animal Plant Health Inspection Service (APHIS), Veterinary Services (VS), State Animal Health Officials (SAHOs), privately-owned facilities or events, and foreign countries. An infectious disease outbreak in the United States can result in federal or state restrictions on horse movement to stop the spread of the disease. The economic burden of equine disease outbreaks may include costs incurred associated with movement restrictions, enhanced testing, disease-specific treatment requirements, cancellation of equine events and equine mortality.

Effective management of equine infectious disease incidents requires preplanning and communication between all entities involved in monitoring and protecting horse health, including individual owners, venue managers, industry associations, SAHOs and USDA-APHIS-VS. A June 2010 Impact of Equine Diseases workshop, co-hosted by USDA-APHIS-VS and the American Horse Council (AHC), highlighted the need for the equine industry to have a comprehensive national equine health plan (NEHP) outlining the prevention, diagnosis and control of equine infectious disease and the responsibilities and roles of the USDA-APHIS-VS, SAHOs, practicing veterinarians and individual horse owners. The AHC subsequently developed a NEHP framework document. One part of the NEHP is the need for a comprehensive national Equine Disease Communication Center (EDCC) for providing accurate, real-time information on equine infectious diseases to regulatory officials and all segments of the industry to control disease and optimize equine health. The American Association of Equine Practitioners in conjunction with the AHC devised a plan and initiated creation of the infrastructure for an EDCC, which is a pivotal part of a NEHP. For the NEHP EDCC to be effective, identification and coordination of communication roles of USDA-APHIS-VS, SAHOs and the horse industry are essential.

RESOLUTION:

The United States Animal Health Association (USAHA) urges the United States Department of Agriculture, American Horse Council, American Association of Equine Practitioners, other equine industry representatives and the National Assembly of State Animal Health Officials to collaborate in the establishment of the Equine Disease Communication Center.

RESOLUTION NUMBER: 16 - APPROVED
SOURCE: COMMITTEE ON CAPTIVE WILDLIFE AND ALTERNATIVE LIVESTOCK
SUBJECT MATTER: NATIONAL REVIEW OF RESEARCH NEEDS FOR CHRONIC WASTING DISEASE

BACKGROUND INFORMATION:

In the absence of an approved live animal test, vaccine, or recognition of genetically resistant animals, depopulation and indemnity of the herd mates is
our only method of prevention to stop the spread of Chronic Wasting Disease (CWD) to other animals.

A Federal CWD Rule has been implemented with the purpose of controlling the spread of CWD versus eradication. To insure a successful program more tools are needed to manage this disease.

RESOLUTION:
The United States Animal Health Association (USAHA) requests that the United States Department of Agriculture, and United States Department of Interior arrange a diversified blue-ribbon panel (including: industry stakeholders, university and federal researchers, Federal and State regulatory agencies) to determine research needs and identify and prioritize intervention strategies for the control of Chronic Wasting Disease.

RESOLUTION NUMBER: 17 AND 18 COMBINED - APPROVED
SOURCE: COMMITTEE ON SALMONELLA; COMMITTEE ON TRANSMISSIBLE DISEASES OF POULTRY AND OTHER AVIAN SPECIES
SUBJECT MATTER: OBJECTION TO SALMONELLA LINKED TO HUMAN ILLNESSES BEING DECLARED ADULTERANTS

BACKGROUND INFORMATION:
In May 2011, The Center for Science in the Public Interest (CSPI) petitioned the United States Department of Agriculture (USDA), Food Safety Inspection Service asking them to declare antibiotic-resistant strains of Salmonella Heidelberg in ground meat and ground poultry products as adulterants. On October 17, 2013, CSPI, as part of a coalition of consumer activist groups (collectively known as the Safe Food Coalition), submitted a letter to Mr. Tom Vilsack, Secretary of the USDA, urging him to immediately act on the 2011 CSPI petition, but to expand it so as to declare all Salmonella serotypes linked to human illness as adulterants when found in all poultry products (including raw intact poultry meat and bone-in parts).

Because there are more than 2400 different serotypes of Salmonella officially recognized and because human virulence or pathogenicity and antimicrobial resistance determinants are not readily identifiable, this request would effectively result in all or nearly all Salmonella isolates being declared adulterants in poultry products that are intended to be fully cooked before being consumed. This action would likely lead to a crippling economic burden on the poultry industry resulting in a reduced supply of poultry meat and increased food cost to the consumer with little to no demonstrable reduction in salmonellosis rates nationwide.

The salmonellosis burden in the United States is not solely attributable to consumption of raw poultry meat, but can also be contracted from consuming a wide variety of fruits, vegetables, eggs, pork, beef, and even some processed food products as diverse as peanut butter, dry dog food, scraped tuna, and
tahini sesame paste along with exposure to pet dogs, cats, hedgehogs, reptiles (turtles, water frogs and African dwarf frogs) and mail order chicks and ducklings. [Ref: http://www.cdc.gov/salmonella/outbreaks-2013.html]

In January 2013, the Centers for Disease and Prevention (CDC) released an analysis of the reported foodborne illness cases in the Foodborne Disease Outbreak Surveillance System during 2009 – 2010. The pathogen-commodity pairs responsible for the most outbreak-related illnesses reported to CDC in 2009 – 2010 were Salmonella Enteriditis and eggs followed by Salmonella sp. in sprouts and Salmonella sp. in vine-stalk vegetables. Salmonella sp. in poultry meat was not identified as a significant contributor to the overall salmonellosis rate. [Ref: CDC MMWR Vol 62 No 3 January 25, 2013 Surveillance for Foodborne Disease Outbreaks – United States, 2009 - 2010]. Therefore, unilaterally imposing such a draconian measure on the poultry industry alone creates an unfair economic burden that will likely result in little public health benefit.

RESOLUTION:

The United States Animal Health Association urges the United States Department of Agriculture to refrain from declaring any serotype of Salmonella an adulterant of raw poultry meat products, intact or ground, because this action is scientifically unwarranted and unlikely to result in measurable reductions in the national salmonellosis burden.

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RESOLUTION NUMBER: 19 - APPROVED
SOURCE: COMMITTEE ON PUBLIC HEALTH AND RABIES
SUBJECT MATTER: INCREASED FISCAL YEAR 2015 FUNDING FOR THE UNITED STATES DEPARTMENT OF AGRICULTURE, ANIMAL AND PLANT HEALTH INSPECTION SERVICE, WILDLIFE SERVICES ORAL RABIES VACCINATION PROGRAM

BACKGROUND INFORMATION:

Rabies control continues to be the embodiment of a One Health initiative and the United Nations Food and Agriculture Organization now believes that terrestrial rabies and foot-and-mouth disease should be the next global diseases targeted for eradication. The United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS), oral rabies vaccine (ORV) program continues to reduce transmission of wildlife rabies to domestic pets, livestock, and humans. The United States Animal Health Association agrees with the World Organization for Animal Health (OIE) that the best place to address rabies control is at the animal source. Regular distribution of ORV to immunize target wildlife species increases the percentage of rabies immune animals in ORV baiting zones. Creating a reservoir population of immune animals results in a decrease in rabies cases and prevents the spread of rabies to new areas. Rabies programs
in the United States that have integrated ORV with traditional public and animal health measures have successfully eliminated the transmission of the canine variant of rabies in south Texas coyote populations, halted the westward expansion of raccoon rabies variant at the Appalachian Mountains, and resulted in one reported non-reservoir case of gray fox rabies variant in Texas since May of 2009 and eliminated raccoon rabies on Long Island, New York in 2011. Today, federal, state and local sponsored and funded ORV programs continue to monitor areas where rabies variants have been eliminated while addressing new challenges. The funding level requested would allow the USDA to maintain ongoing logistical support and wildlife rabies case surveillance necessary for the program, while maintaining existing operational programs to control rabies in target wildlife populations and increased funding will allow new investigation into control of skunk rabies. Even in the recent dire economic environment, new states and counties have expressed interest in ORV projects.

RESOLUTION:
The United States Animal Health Association (USAHA) requests the 113th Congress to appropriate at least $28 million in the FY2015 budget line item for the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS), Oral Rabies Vaccine Program.

RESOLUTION NUMBER: 21 - APPROVED
SOURCE: COMMITTEE ON SHEEP AND GOATS
SUBJECT MATTER: STATE OR REGIONAL BRUCELLOSIS AND TUBERCULOSIS CLASSIFICATION FOR SHEEP AND GOATS

BACKGROUND INFORMATION:
The United States Department of Agriculture (USDA) has established disease classification systems for Program Diseases that help determine the risk of those diseases within states or regions. Brucellosis classifications cover cattle, bison, and swine. Tuberculosis classification covers cattle, bison, and captive cervids. Goats and sheep are susceptible to both brucellosis and tuberculosis but the current disease classification system does not address these species. These diseases rarely occur in sheep or goats in the United States (US). USDA currently lists the status of the US as “Free” of \textit{B. melitensis} for diseases reportable to the World Organization for Animal Health (OIE). Attempts to determine the prevalence of brucellosis and tuberculosis in US goats and sheep identified two reports of disease. In 1999 a South Texas herd of goats and 1 sheep were diagnosed with \textit{Brucella melitensis} (\textit{B. melitensis}). Tuberculosis was diagnosed in 1991 and 1992 in two pygmy goats housed in zoos.
Despite the lack of any evidence of brucellosis or tuberculosis in dairy sheep or goats, the Pasteurized Milk Ordinance (PMO) was modified in 1997 to require annual whole herd brucellosis and tuberculosis tests. A resolution from the United States Animal Health Association in 1998 requested a delay in the 1999 implementation of these requirements. A policy letter from the American Association of Small Ruminant Practitioners the same year recommended that no test requirements be placed on sheep or goats. The end result of these concerns was the addition of the “random statistical herd sampling” option to the PMO in 2001 which sets a minimum sample size based on herd or flock size.

Animal health rules from the 2011 PMO exempt cattle and bison from any testing requirements if they are from an Area which has a Certified Brucellosis-Free status and a Modified Accredited Advanced Tuberculosis or greater status. Since these classifications do not include sheep and goats the PMO testing requirements for these species remain in effect.

Establishing a brucellosis and tuberculosis classification for sheep and goats would allow State Veterinarians and USDA Veterinarians in Charge to develop appropriate brucellosis and tuberculosis surveillance and testing requirements for sheep and goats while still protecting public health.

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 conduct a risk analysis pertaining to brucellosis and tuberculosis (TB) in sheep and goats and to coordinate with the Food and Drug Administration to determine the need for testing for TB and brucellosis in these species.

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RESOLUTION NUMBER: 22 - APPROVED
SOURCE: COMMITTEE ON SHEEP AND GOATS
SUBJECT MATTER: SEPARATE SHEEP AND GOAT COMMODITY HEALTH LINE ITEM

BACKGROUND INFORMATION:

In FY2011, the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) primarily addressed sheep and goat health/disease issues through the National Scrapie Eradication Program (NSEP) and National Animal Health Monitoring System (NAHMS) studies. For FY2012, USDA-APHIS-VS requested that Congress approve commodity-based funding which would include horses, cervids, sheep, and goats in a single line item where funding could be transferred between the commodities based on priorities identified by USDA-APHIS-VS and its partners. The proposed grouping of these species is reminiscent of the failed Miscellaneous Diseases line item in the USDA-APHIS-VS budget of over 20 years ago.
The United States Animal Health Association is concerned that sheep and goat funding may be diverted to address needs of other species, which could jeopardize the eradication of scrapie from the United States and the health and well-being of sheep and goats.

The currently proposed species grouping of Equines, Cervids, and Small Ruminants (sheep and goats) is not appropriate to serve the health and disease needs of such a diverse group of animals. Equines and Cervids have very few common health and disease issues with Sheep and Goats. Emerging diseases in each of the species in the proposed grouping will most likely result in even less commonality in disease/health priorities among these species.

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 establish a separate funding line item for Sheep and Goat Health.

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RESOLUTION NUMBER: 23 - APPROVED
SOURCE: COMMITTEE ON SHEEP AND GOATS
SUBJECT MATTER: Q-FEVER (Coxiella burnetti) VACCINE FOR SHEEP AND GOATS AND FOR HUMANS IN THE UNITED STATES

BACKGROUND INFORMATION:

Q fever is a zoonotic disease caused by the bacterium *Coxiella burnetti*. *Coxiella* infection is found in many species in many countries of the world, including the United States. The disease is a major cause of abortion in sheep and goats, which results in significant economic losses to producers, but also results in significant risk of transmission to human beings. Exposure to the products of abortion (or raw milk products) either directly or through environmental contamination poses a significant public health risk, as demonstrated by the recent Q fever epidemic (human and goat) in the Netherlands.

Currently there is no vaccine available in the United States to prevent *Coxiella burnetti* infection or abortion in sheep and goats. Such a vaccine is available in Europe. The availability/approval of a safe and effective sheep and goat vaccine for *Coxiella burnetti* in the United States would serve to safeguard human health and prevent production losses due to this potentially devastating disease. Humans not in direct contact with aborting animals also face some risk of indirect environmental exposure, so effective vaccination of sheep and goats could play a key role in minimizing human exposure. Additionally, the availability and approval of a safe and effective human vaccine would provide protection for those with occupational risk of exposure to *Coxiella burnetti*.
RESOLUTION:
In priority order:

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 facilitate the licensure of a safe and effective Q Fever (Coxiella burnetti) vaccine for sheep and goats.

In addition, the USAHA encourages the Food and Drug Administration to facilitate the licensure of a safe and effective Q Fever (Coxiella burnetti) vaccine for humans.

The USAHA also encourages USDA-APHIS-VS, Center for Veterinary Biologics to facilitate the importation, for investigation and research, of available animal Q Fever (Coxiella burnetti) vaccines from the European Union and Australia.

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RESOLUTION NUMBER: 24 - 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 the United States 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.

It is further noted that the Minor Use/Minor Species (MUMS) Grant Program which is referenced in the interim response in 2012 relates only to projects with protocol concurrence, and that the MUAD Program is critical in providing information essential to food safety and animal care and welfare of sheep, goats and other minor species.

RESOLUTION:

The United States Animal Health Association urges Congress to include a permanent funding mechanism for the National Research Support Program-7 (NRSP-7) and urges the United States 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 use and minor species requests.

RESOLUTION NUMBER: 25 - APPROVED
SOURCE: COMMITTEE ON FOREIGN AND EMERGING DISEASES
SUBJECT MATTER: ERADICATION OF FOOT-AND-MOUTH DISEASE FROM THE AMERICAS

BACKGROUND INFORMATION:
Although vaccines have been instrumental in eliminating foot-and-mouth disease (FMD) from most South American countries, viral circulation still persists in some countries. The current Pan American Foot and Mouth Disease Center (PANAFTOSA) Plan of Action 2011–2020 for the elimination of FMD is based on the experience acquired by the countries and PANAFTOSA over the past 60 years. While several challenges need to be overcome, there is increasing confidence that FMD can be eradicated from the Americas by 2020.

RESOLUTION:
The United States Animal Health Association (USAHA) requests that the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS) support the completion of the eradication of foot-and-mouth disease from the Americas by 2020 as outlined in the Pan American Foot-and-Mouth Disease Center (PANAFTOSA) action plan.

RESOLUTION NUMBER: 26 - APPROVED
SOURCE: COMMITTEE ON LIVESTOCK IDENTIFICATION
SUBJECT MATTER: SUPPORT OF THE CREATION AND MAINTENANCE OF A PUBLICLY-ACCESSIBLE RESOURCE THAT COMPiles IDENTIFICATION, DOCUMENTATION, DISEASE-SPECIFIC, AND OTHER REQUIREMENTS FOR MOVING LIVESTOCK INTERSTATE

BACKGROUND INFORMATION:
The United States (U.S.) government’s final Traceability for Livestock Moving Interstate rule that established general regulations for improving the traceability of U.S. livestock moving interstate took effect March 11, 2013. While the Federal rule, commonly called the Animal Disease Traceability (ADT) rule, stipulates a uniform set of minimum national standards for states and tribes to follow, each state and tribe is charged with administering traceability activities that align with the federal rule and have the flexibility to make a variety of decisions within the rule. For example, states and tribes have the ability to agree to accept as official identification registered brands, tattoos or other breed-specific identification methods. Additionally, states and tribes have the ability to agree to alternative documentation, as opposed to an Interstate Certificate of Veterinary Inspection (ICVI), to meet the ADT rule requirements.
While ADT was designed to provide this flexibility, variables among states increase the challenges in implementing the new approach. An ADT implementation survey was conducted in July 2013 by the United States Animal Health Association (USAHA), the National Institute of Animal Agriculture (NIAA), the United States Department of Agriculture (USDA), and Livestock Marketing Association (LMA). As anticipated, the survey, which was completed by 43 states, showed a great deal of variation in what states were accepting to meet the federal ADT requirements as well as a variety of additional state-specific identification requirements.

In addition to varying identification requirements, state livestock importation, movement documentation, and disease-specific requirements vary. Often, the answer to the question of what is required to move livestock from one state to another is to call the state veterinarian’s office in the receiving state. However, in many situations, such as livestock sold at a Saturday sale, the veterinarian who calls a state veterinarian’s office does not receive an immediate response.

Discussion at the USAHA and NIAA joint meeting on ADT in August 2013 and at other meetings have identified an industry need for one resource to find requirements for moving livestock of different classes from one state to another. Ideally, the resource could be available online and as a mobile app.

It was discussed in the Animal Identification committee at USAHA in October 2013 that this effort could begin with cattle movement requirements and then expand into other species. Also discussed at this meeting was the possibility of building a system that has uses in an animal health emergency situation in addition to its day-to-day uses. For example, perhaps this system could be used to provide information about new livestock and commodity movement requirements in the event of an emergency, such as secure milk requirements to allow the milk supply to continue flowing despite a disease event.

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) and the National Assembly of State Animal Health Officials (NASAHO) collaborate with USAHA and private and public stakeholders to create and maintain an easy-to-use, publically-accessible resource that compiles identification, documentation, disease-specific, and other movement requirements for livestock moving interstate.

Furthermore, the USAHA supports the development of this resource being created in a manner that would allow for additional uses such as emergency response.

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RESOLUTION NUMBER: 27 - APPROVED
SOURCE: COMMITTEE ON PARASITIC DISEASES
SUBJECT MATTER: CONSTRUCTION OF NEW FACILITIES FOR THE UNITED STATES DEPARTMENT OF AGRICULTURE, AGRICULTURAL RESEARCH SERVICE, KNIPLING-BUSHLAND UNITED STATES LIVESTOCK INSECTS LABORATORY

BACKGROUND INFORMATION:

The Knipling-Bushland United States Livestock Insects Research Laboratory (KBUSLIRL) of the United States Department of Agriculture (USDA), Agricultural Research Service (ARS), located in Kerrville, Texas since 1963, does critical research and delivers game-changing technologies in support of the Cattle Fever Tick Eradication Program (CFTEP) and the Screwworm Eradication Program (SEP), which have proven essential to maintain the health and well being of the nation’s livestock industries. The CFTEP and the SEP are monuments to the success of science, and a fine example of how productive cooperative efforts between federal and state governments, and the private sector can benefit mankind. Recent impactful and innovative agricultural research at the USDA-ARS KBUSLIRL, which is recognized as a global center of excellence in livestock insect science, done in collaboration with universities and the animal health industry include: the development of an anti-tick vaccine for the CFTEP; a transgenic screwworm for the SEP; and a system commercially available for the remote delivery of insecticide gel capsules to control horn flies infesting cattle. The USDA-ARS published its Capital Investment Strategy in April 2012. Investment in the construction of new facilities for the KBUSLIRL was recommended as part of this investment strategy. Construction of the new KBUSLIRL facilities was listed in priority group 4 and it was estimated to cost $45 million then. Whereas the Administration has proposed to fund this project, the inclusion of funding in the budget by Congress remains to be done.

RESOLUTION:

The United States Animal Health Association (USAHA) urges the Congress of the United States to provide appropriate funding to the United States Department of Agriculture (USDA), Agricultural Research Service (ARS) for construction of the new facilities for the Knipling-Bushland United States Livestock Insects Laboratory (KBUSLIRL) in the area of Kerrville, Texas. This will ensure continued protection of the United States livestock industry by fully supporting research activities which translate into technologies that minimize the impact of high-consequence pests. Construction of the new KBUSLIRL facilities will benefit human and animal health, and food and environmental safety while promoting sustainability in animal agriculture, and an abundant supply of affordable food for our nation and global partners.

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REPORT OF THE COMMITTEE

RESOLUTION NUMBER: 28 - APPROVED
SOURCE: COMMITTEE ON TUBERCULOSIS
SUBJECT MATTER: CLASSIFICATION OF CERVIDS FOR TUBERCULOSIS STATUS

BACKGROUND INFORMATION:
There is a lack of information on the use of the Dual Path Platform in the extensive general captive cervid population.

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 allow the Designated Tuberculosis Epidemiologist (DTE) to consider the herd and animal history in addition to test results when arriving at the final tuberculosis classification of a cervid.

RESOLUTION NUMBER: 29 - APPROVED
SOURCE: COMMITTEE ON TUBERCULOSIS
SUBJECT MATTER: IMPROVING REPORTING AND TRACEABILITY OF TUBERCULOSIS (TB) SUSPECT LESIONS

BACKGROUND INFORMATION:
Surveillance for bovine tuberculosis (TB) in United States cattle is largely dependent on the efforts of State and Federal meat inspectors to submit TB suspect lesions detected in slaughter cattle to the diagnostic laboratory for evaluation. Success in tracing TB suspect lesions confirmed to be positive to their respective herds of origin is directly related to the quality of identification collected from the animal and submitted with the sample.

At times, TB suspect lesions are submitted without official identification devices, resulting in the inability to successfully trace the sample to the origin herd. Through the collection and reporting of all animal identification devices, the Granuloma Submission Report may improve tracing of TB positive lesions. This effort may serve as a more immediate means of augmenting and prioritizing ID collection at cattle slaughter plants.

RESOLUTION:
The United States Animal Health Association (USAHA) urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service, Veterinary Services (APHIS) and USDA, Food Safety and Inspection Service to improve the collection of animal identification devices and the recording of animal identification device information on the existing Granuloma Submission Report. In addition, USAHA requests that the Granuloma Submission Report be submitted to State Animal Health Officials.
RESOLUTION NUMBER: 30 - APPROVED
SOURCE: COMMITTEE ON TUBERCULOSIS
SUBJECT MATTER: APPROVAL OF THE USE OF THE CHEMBIO DUAL PATH PLATFORM (DPP®) VETTB ASSAY FOR REPLACEMENT OF THE ELEPHANT TB STAT-PAK® ASSAY AS A PRESUMPTIVE OR SCREENING TEST FOR TUBERCULOSIS SURVEILLANCE IN CAPTIVE ELEPHANTS

BACKGROUND INFORMATION:

The Elephant TB STAT-PAK® Assay is recommended for use in surveillance for tuberculosis in elephants. As with the Elephant TB STAT-PAK® Assay, the DPP® VetTB Assay is Center for Veterinary Biologics approved for use in the detection of tuberculosis in elephants. The DPP® VetTB Assay provides equivalent sensitivity [100 % (95% CI, 84-100%)] and superior specificity [100% (95% CI, 97-100%) vs 95% (95% CI, 90-98%)] to the Elephant TB STAT-PAK® Assay (Greenwald et al., 2009). With the DPP® VetTB Assay, seroreactivity to MPB83 and CFP10/ESAT-6 are independently evaluated; thereby, improving the ability to distinguish exposure to non-tuberculous Mycobacteria spp. from infection with Mycobacterium tuberculosis complex organisms as compared to the Elephant TB STAT-PAK® Assay (all 3 antigens are included in a single test line). With the DPP® VetTB Assay, the test sample and antibody detection reagents are each applied to separate nitrocellulose strips allowing independent migration of the sample and detection reagents to the antigen and control lines. Separate migration of the sample and detection reagents reduces interference associated with impurities in the test sample (e.g., red blood cells, hemolysis, contaminants, etc.). Only 5 microliters of test sample is required for the DPP® VetTB Assay as compared to 30 microliters for the Elephant TB STAT-PAK® Assay, thus, minimizing the impact of sample impurities on test performance. Similarly, smaller colloidal gold particles (30-40 nm gold particles vs 300 nm latex beads) used with the DPP® VetTB Assay limit the possibilities for interference with impurities within the test sample. For detection of antibody, protein A/G is used with the DPP® VetTB Assay whereas blue latex beads coated with test antigen are used for detection with the Elephant TB STAT-PAK® Assay. Thus, the DPP® VetTB Assay detects only IgG reactive with M. tuberculosis complex antigens whereas the Elephant TB STAT-PAK® Assay detects all isotypes of antibody, increasing the possibility of detection of non-specific IgM responses. Each of these aspects (i.e., independent antigen detection, separate migration of antibody detection reagents and test sample, smaller sample volume, smaller colloidal gold particles, and protein A/G conjugate to detect IgG responses only) improves the specificity of the assay. The DPP® VetTB Assay also has operational benefits as compared to the Elephant TB STAT-PAK® Assay. These include: (1) ease of use with enhanced visibility of test bands for determining test status and (2) availability of a reader to provide an objective measure of band intensity, thereby, affording better communication between
diagnostic laboratory staff and regulatory agencies, attending veterinarians, and clients.

The Elephant Tuberculosis Subcommittee of the USAHA Tuberculosis Committee has recommended the replacement of the Elephant TB STAT-PAK® Assay with the DPP® VetTB Assay as a presumptive or screening test for tuberculosis in elephants.

RESOLUTION:

The United States Animal Health Association (USAHA) requests that the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Services (APHIS), Animal Care (AC) replace the Elephant TB STAT-PAK® Assay, with the DPP® VetTB Assay as a presumptive or screening test for tuberculosis in elephants.

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RESOLUTION NUMBER: 31 - APPROVED
SOURCE: COMMITTEE ON TUBERCULOSIS
SUBJECT MATTER: APPROVAL OF THE CERVIDTB STAT-PAK AND DUAL PATH PLATFORM AS OFFICIAL TESTS FOR SIKA AND MULE DEER IN THE CERVID TUBERCULOSIS ERADICATION PROGRAM

BACKGROUND INFORMATION:

Advances in the science of tuberculosis (TB) testing have led to the development of antibody tests. The approval of antibody tests for farmed cervids has decreased the need for handling of these species and increased the interest in TB testing by farmed cervid producers.

The United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Center for Veterinary Biologics (CVB) previously licensed the CervidTB Stat-Pak for use in elk, red deer, and white-tailed deer. In October 2012, the USDA-APHIS-CVB licensed the Dual Path Platform (DPP) as a secondary test for bovine TB. USDA-APHIS-CVB approved both tests for use in series in elk, red deer, white tailed deer, fallow deer, and reindeer.

In 2013 additional serum samples have been collected in the TB Serum Bank from sika and mule deer for validation with the Stat-Pak and DPP test.

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) evaluate the CervidTB Stat-Pak and DPP for use in sika and mule deer in the Cervid Tuberculosis Eradication Program.

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RESOLUTION NUMBER: 32 - APPROVED
SOURCE: COMMITTEE ON TRANSMISSIBLE DISEASES OF SWINE
SUBJECT MATTER: COMPREHENSIVE AND INTEGRATED SURVEILLANCE SYSTEM

BACKGROUND INFORMATION:
Critical for implementation of Comprehensive and Integrated Surveillance System (CISS) is the role of the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), National Surveillance Unit to balance surveillance objectives with available surveillance streams, estimate costs and provide analysis back to the United States pork industry. For various reasons due to issues with infrastructure and resources, which have recently been addressed with targeted funding for CISS, this process has not occurred for previously identified surveillance objectives thus limiting CISS implementation.

The United States Animal Health Association’s (USAHA) resolution 39 in 2011 urged the USDA-APHIS-VS National Surveillance Unit to make the implementation of industry surveillance priorities, through appropriate surveillance streams and the communication of the results, a high priority to be completed in the first quarter of calendar year 2011. It requested that a progress report from USDA-APHIS-VS be provided to the Swine Species Committee at the 2011 National Institute of Animal Agriculture annual meeting and to USAHA Committee on Transmissible Diseases of Swine.

In its final response to the 2011 resolution, USDA-APHIS-VS indicated that they had:
1. begun developing a surveillance plan for African swine fever (ASF)
2. preliminary results of studies evaluating the suitability of tonsil for ASF diagnosis
3. developed national protocols to monitor slaughter condemn data for health anomalies
4. purchased off-the-shelf software for surveillance and disease management, and are integrating it into their information system

In the opinion of the USAHA Committee on Transmissible Diseases of Swine, inadequate progress has been made to achieve development and implementation of CISS since the 2011 meeting.

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) National Surveillance Unit to make the implementation of industry surveillance, through appropriate surveillance streams and the communication of the results, a high priority. The committee asks USDA-APHIS-VS to update the Swine Species Committee during the 2014 National Institute for Animal Agriculture Annual Meeting.
RESOLUTION NUMBER: 33 - APPROVED  
SOURCE: COMMITTEE ON ANIMAL WELFARE  
SUBJECT MATTER: THE PREVENT ALL SORING TACTICS (PAST) ACT, HR 1518/S1406  

BACKGROUND INFORMATION:  
Soring of horses is the practice of purposely and deliberately causing pain to a horse’s front legs and hooves that results in exaggeration of the horse’s natural gait in show competition. The Horse Protection Act (HPA) of 1970 made the sale, auction and exhibition of sored horses illegal. Unfortunately, soring continues and, as USDA’s ability to detect it has improved, methods used to sore horses have become more creative and deceptive.  
Chemical methods of soring involve applying caustics (e.g., kerosene, mustard oil) to the horse’s lower leg; the leg is then covered with plastic and a leg wrap for several days to allow the chemicals to penetrate the skin. The chemicals cause the horse’s leg to be sensitive to ‘action devices’ and their hoof to be sensitive to striking the ground. This method usually leaves obvious scars, which may be burned off using a chemical stripping agent (causing the horse additional pain).  
Physical methods result in pain when the horse’s hoof strikes the ground. This causes the horse to lift its legs in an exaggerated high-stepping gait. Methods of physical soring include grinding or trimming of the hoof and/or sole to expose sensitive tissues or removal of the normal support structures of the hoof wall; inserting hard objects between the pads and the sole to place pressure on this sensitive area of the hoof; over-tightening of metal hoof bands to cause excessive pressure; improper shoeing techniques that violate the HPA; and purposefully causing laminitis.  
Unethical trainers and owners use various tricks to avoid detection, including application of numbing agents that mask pain during inspection, but wear off by show time; use of harsh and/or painful training methods (stewarding) at practice inspections to teach the horse that flinching or reaction will cause worse pain; application of something painful in a location other than the hoof (distraction device) just before inspection; and providing a substitute horse for inspection (horse switching).  
Soring may be detected by visual inspection of the horse’s posture and legs and by palpation of the horse’s lower leg. Signs of pain include excessive time spent lying down, unwillingness to move, and an abnormal posture while standing or in motion. Inspection and palpation of the leg may reveal swelling, pain, abraded skin, or other signs of inflammation. The hair of the horse’s lower leg may be wavy, rippled or curly, and there may be cording scars. Sore horses may also move forward very slowly with short, choppy strides. Technology used to detect soring includes gas chromatography to identify chemical agents applied to the leg; thermographic images, which can identify excessively warm (inflamed/painful) and excessively cool areas (numb); blood
tests to detect drugs used to mask pain; iris scanning for horse identification; hoof testers to determine if laminitis or other hoof pain is present; and radiographic images to determine if there are pathologic changes to the third phalanx or if nails, screws, or other objects have been placed between the shoe pads and hoof to cause pain.

The Prevent All Soring Tactics (PAST) Act, H.R. 1518/S. 1406, seeks to eliminate the soring of horses by improving USDA’s enforcement capabilities and strengthening penalties against violators.

Specifically, H.R. 1518/S. 1406:

- Makes the actual act of soring, or directing another person to cause a horse to become sore, illegal, whereas the original HPA only bans showing, transporting or auctioning/selling a horse that is sore, not the actual practice;
- Prohibits the use of ‘action devices’ (e.g., boots, collars, chains, rollers, or other devices that encircle or are placed on the lower extremity of the leg of a horse) on any leg of Tennessee Walking Horses, Spotted Saddle Horses, or Racking Horses at horse shows, exhibitions, sales or auctions and bans weighted shoes, pads, wedges, hoof bands, or other devices (often referred to as ‘performance packages’) that are not used for protective or therapeutic purposes. These devices may facilitate soring (action devices) or may assist in avoiding its detection (performance packages). The American Association of Equine Practitioners and the American Veterinary Medical Association jointly called for a ban on the use of action devices and performance packages in the training and showing of Tennessee Walking Horses in 2012.\(^1\)
- Increases civil and criminal penalties for violations, and creates a penalty structure that requires a horse to be disqualified for increasing periods of time based on the number of violations.
- Allows for permanent disqualification from the show ring after three or more violations.
- Requires the USDA (rather than the current structure of horse industry self-regulation that has proven unsuccessful for more than 40 years) to license, train, assign and oversee inspectors to enforce the HPA.

Amendments to the HPA proposed in the PAST Act are consistent with recommendations made by the AAEP in its 2008 white paper, “Putting the Horse First: Veterinary Recommendations for Ending the Soring of Tennessee Walking Horses,”\(^2\) and are supported by the AAEP, the AVMA, and the American Horse Council, as well as numerous other horse industry, veterinary, and animal protection organizations, and horse industry professionals. As of October 16, 2013, the House bill had more than 200 cosponsors and the Senate version had 18.


RESOLUTION:
The United States Animal Health Association (USAHA) supports passage of The Prevent All Soring Tactics (PAST) Act, H.R. 1518/S. 1406.

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RESOLUTION NUMBER: 34 – NOT APPROVED
SOURCE: COMMITTEE ON ANIMAL WELFARE
SUBJECT MATTER: HORSE TRIPPING AS A RODEO OR CHARRO RODEO EVENT

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The Committee met on October 23, 2012 at the Town and Country Hotel, from 8:00 a.m. – 12:00 p.m. There were 17 members and 29 guests present. The Committee reviewed the charge of the Committee and the USDA response to last year’s resolutions.

**Ascaris Suis Case in Maine**

Don Hoenig

Dr. Hoenig reported on a paper he coauthored in the Morbidity-Mortality Weekly Report which was published on May 24, 2013.

During April 2010–March 2013, the Maine Department of Health and Human Services investigated multiple cases of ascariasis in humans that had been reported by health-care providers, veterinarians, and patients. All of the cases were in persons who had lived or worked on Maine farms and had frequent exposure to pigs. Ascariasis, a parasitic roundworm infection caused by *Ascaris* species, is the most common human intestinal worm infection globally. However, because ascariasis is not a reportable disease, limited data exist regarding the incidence of this infection in the United States (1), and the number of annual cases in Maine is unknown. After investigation, 14 persons on seven farms in Maine were identified with *Ascaris* infection.

**Niche Pork Production Outreach**

Jennifer Koeman, National Pork Board

The emergence of “niche” pork production with different biosecurity parameters, such as outside access, presents potential public health/food safety risks. For example, pigs raised in outdoor production settings, or with outdoor access, in close contact with rodents, cats and wildlife have increased risk of acquiring Trichinella and Toxoplasma infections. Pork Checkoff has initiated an effort to better understand the information needs and information network within the niche pork production community and increase awareness of good production practices to help minimize these risks.
SCWDS Arthropod Surveillance
Joe Corn, Southeastern Cooperative Wildlife Disease Study (SCWDS)

Dr. Joseph Corn and Ms. Stacey Vigil, Southeastern Cooperative Wildlife Disease Study (SCWDS), University of Georgia, Athens, Georgia; and Dr. James Mertins, USDA-APHIS-National Veterinary Services Laboratories (NVSL), Ames, Iowa, gave a report on SCWDS Arthropod Surveillance. The SCWDS, in collaboration with the USDA-APHIS- VS, conducts surveys for exotic arthropods on free-ranging wildlife in the southeastern United States. The current objectives of SCWDS surveys are to determine the wildlife host range of *Amblyomma cajennense* and other possible equine piroplasmosis vectors in South Texas; to determine if wildlife currently serve as hosts for *Rhipicephalus (Boophilus) annulatus* and *R. (B.) microplus* in South Texas; and to conduct surveys for *Culicoides* vectors of bluetongue virus and epizootic hemorrhagic disease virus in the Southeast. Preliminary results from the initial tick collections in Texas and results from *Culicoides* surveys were discussed. Over 25,000 arthropods representing 20 species of ticks and 77 species of other ectoparasites have been collected from wildlife at eight sites in South Texas. The surveillance program for endemic and exotic species of *Culicoides* has identified new state records for nine species of *Culicoides* in 13 states and surveillance is ongoing.

U.S.-Panama Screwworm Commission (COPEG): The Year in Review and Research Directions
John Shaw, USDA-ARS

The U.S.-Panama Screwworm Commission completed the eradication of Panama by 2002 and was declared screwworm-free in 2006, with a permanent sterile insect barrier established. The sterile insect production plant began producing sterile flies in early 2009 for the barrier on the Panamanian Isthmus. Now with a stable barrier protocol in place, attention is being paid to cost effectiveness in field operations, risk management, efficient sterile insect dispersal, production, and the physical sterile insect production plant. A review will also be made on the progress by researchers at COPEG in their work which has great promise of increasing cost effectiveness of maintaining the barrier in the future. Cost effectiveness is ever more important as funding becomes more and more scarce.

USDA-ARS, Knipling-Bushland U.S. Livestock Insects Research Laboratory (KBUSLIRL) Research Activities
Bob Miller and Beto Perez DeLeon, USDA-ARS

Tick and biting fly research continues at the Knipling-Bushland U.S. Livestock Insects Research Laboratory (KBUSLIRL) at a brisk pace. This presentation consists of a summary of but a few of the current agricultural problems our laboratory scientists and staff are currently working to solve. The threat of African Swine Fever (ASF) introduction into the U.S. through Mexico by feral pigs and associated vector competent *Ornithodoros* ticks has been a recent research thrust for the laboratory. A discussion on this topic will consist
PARASITIC DISEASES

of recent visits by Ukrainian scientists to the KBUSLIRL and reciprocal visits by ARS scientists to Russia and the Ukraine along with a discussion of future research needs. Next, an update on multi-pesticide resistance in the cattle fever tick, *Rhipicephalus microplus* will be discussed and how this threatens the success of the Cattle Fever Tick Eradication Program. Finally, novel treatment strategies of the control of horn flies will be discussed along with how they can be integrated with other technologies on the market.

**The Screwworm Eradication Program: From an unlikely dream to an outstanding success**

John Skoda, USDA-ARS

Screwworm myiasis is devastating to warm blooded animals. Eradication of the screwworm from mainland North America using the sterile insect technique (SIT) is an unprecedented achievement; reinvasion is prevented by maintenance of a barrier at the Panama – Colombia border. Throughout the 55 plus years of the Program, innovative research and its application has benefited the successful application of SIT. Here we give a brief history of the program and an update on recent research progress by the Screwworm Research Unit (SRU) at the 117th Annual Meeting of the U.S. Animal Health Association. Molecular genetic techniques are providing an understanding of the genetic diversity of screwworms sampled from across their current range. Transgenic techniques are being used to develop a males-only, genetic sexing strain of screwworms. Potassium permanganate has been shown useful in reducing ammonia production from larval developmental media and to be a viable replacement for formaldehyde as an antimicrobial in the larval diet. SRU recommended updates to navigation and dispersal equipment have been installed on the aircraft that disperse sterile screwworms in the barrier zone; more efficient placement of flies will result. Volatiles that attract female screwworms have been identified from wounds of animals. A new strain of screwworms has been developed from material collected in Colombia. Mating studies between screwworms from central Brazil, Jamaica, and Panama showed no mating barriers, indicating that the current strain in mass production would be effective if used in an eradication effort in South America. Research has been initiated to develop a chemically defined diet for screwworm larvae; this will allow for economical substitutes to be identified for use in mass rearing screwworms. The SRU has consistently reached research milestones established in the interest of providing updated or novel answers to critical questions posed by the Panama – U.S. Commission for Eradication of Screwworms.

**Puerto Rico Tick Vaccine Trial**

Bob Miller, USDA-ARS

Puerto Rico Project Report:

The USDA has recently received a verbal agreement from the Puerto Rican Department of Agriculture (PRDA) to develop an integrated cattle fever
tick (CFT), *Rhipicephalus microplus*, control program. The objective is to create science-based knowledge to integrate technologies for sustainable control of the CFT infesting dairy farms and cattle in Puerto Rico. The project will consist of five phases and will integrate current chemical, biological, cultural, and immunological controls based on sound epidemiological knowledge of the CFT problem on the island.

**Cattle Fever Tick National Update**
Matt Messenger, USDA-APHIS-VS

The Cattle Fever Tick Eradication Program (CFTEP) was allocated approximately $9 M during fiscal year (FY) 2013. The CFTEP is now included in the Cattle Health line item along with other national programs, such as bovine tuberculosis and brucellosis. The FY 2014 appropriation for the Cattle Health line item is estimated to be $92 M. The FY 2014 allocation for the CFTEP may be similar to FY 2013 funding levels; however, it may possibly decrease.

Four technical updates were completed for the Code of Federal Regulations Part 72. The title of the Part was changed from “Texas (Splenetic) Fever in Cattle” to “Bovine Babesiosis”. Other updates included adding additional common names for bovine babesiosis, adding *Rhipicephalus* as the new genus instead of *Boophilus*, deleting the tick species *Rhipicephalus evertsi evertsi*, and deleting all expired acaricides leaving coumaphos as the only permitted acaricide remaining.

APHIS is engaged in Endangered Species Act consultation with the U.S. Fish and Wildlife Service (FWS) on several on-going projects. The first project involves consultation on how APHIS maintains the river trails that are used by the Mounted Patrol Inspectors along the Rio Grande for surveillance and the apprehension and inspection of stray livestock. APHIS uses various hand tools, mowers, bulldozers, and other equipment to periodically keep these trails clear and safe for surveillance activities on horseback. APHIS has received a draft Biological Opinion from the FWS and a response is pending from APHIS. On a different consultation, APHIS received a final Biological Opinion from the FWS to allow the University of Georgia’s Southeastern Cooperative Wildlife Disease Study to continue conducting tick surveys in south Texas. Consultation is on-going for two additional projects: the Tick Control Barrier Environmental Impact Statement and the nilgai harvest in the Boca Chica refuge area.

APHIS continues to work with Mexico regarding cattle fever tick issues. A draft proposed rule recognizing the States of Sonora and Baja California (Norte) as being free of cattle fever ticks is currently under departmental clearance. The State of Chihuahua has also requested to be recognized as fever tick-free, and APHIS has initiated the process of completing a risk assessment as well as following up with the State on addressing recommendations from the APHIS review team visit during 2012. Mexico’s new National Tick Agreement was officially published September 10, 2012. APHIS is closely monitoring the implementation of this Agreement to ensure
that there will be no significant impacts on the three Mexican states we are currently considering as being fever tick-free.

National Piroplasmosis Update/ Thioredoxin Protocol
Angela Pelzel, USDA-APHIS-VS

Since November 2009, more than 231,664 domestic U.S. horses have been tested for equine piroplasmosis (EP) through active surveillance and movement testing with 122,760 horses tested at approved National Animal Health Laboratory Network (NAHLN) laboratories and 108,904 horses tested at National Veterinary Services Laboratories (NVSL). To date, 215 EP-positive horses (205 *Theileria equi*-positive, 10 *Babesia caballi*-positive) have been identified through this surveillance. These positive horses are unrelated to the 2009-2010 *T.equi* outbreak on a Texas ranch where 413 positive horses were identified in connection with the outbreak and natural tick-borne transmission on the ranch was documented to have occurred over at least 20 years. Of the 215 positive horses identified through active surveillance, 172 were Quarter Horse racehorses, 13 were Thoroughbred racehorses, one was a Quarter Horse roping horse and 29 were horses previously imported to the United States before August 2005 when the complement fixation test was being used as the sole import test type for EP. The epidemiology investigations conducted in all of these cases have indicated no evidence of tick-borne transmission and the cases in racehorses specifically have involved iatrogenic transmission as the method of spread.

All EP-positive horses are placed under State quarantine and the horse owners are offered four options for long-term management under state/federal regulatory oversight: 1) life-time quarantine, 2) euthanasia, 3) export from the country, or 4) long-term quarantine with enrollment in the APHIS-VS and ARS treatment research program. Of the 215 positive horses identified, 120 have either died or been euthanized, 14 have been legally exported, and 32 have been enrolled in the treatment research program. From the Texas ranch outbreak, 163 horses were enrolled in the treatment research program and have completed treatment. Successful results from the treatment research program have been recently reported by Ueti et al. in “Re-emergence of the Apicomplexan *Theileria equi* in the U.S.: Elimination of Persistent Infection and Transmission Risk” published in *PLoS One*, September 2012.

In response to Resolution 21 from the 2011 USAHA meeting, an internal APHIS-VS working group was formed to evaluate data from the VS/ARS research treatment program and consider development of a policy to release treated, cleared, test-negative horses from quarantine. The working group recommended that VS establish a policy for quarantine release of previously *T. equi*-infected horses that meet all the following criteria:

- Enrolled in the VS/ARS treatment research program as per VS Memo 555.20; and
- Treated using the ARS published high-dose imidocarb dipropionate treatment protocol under State or Federal supervision; and
Permanently identified using an ISO-compliant microchip with the identification number held in a data repository accessible by State and Federal animal health officials; and

Nested or real-time PCR negative on a series of at least three post-treatment samples collected a minimum of 30 days apart; and

Negative by transfusion to a splenectomized horse or negative by the ARS Western Blot clearance test; and

cELISA and CFT negative at NVSL

Additionally, the working group recommended that the State establish a compliance agreement with the horse owner to conduct the cELISA test annually for three years post-treatment as added assurance of continued disease freedom. These recommendations were accepted by VS Management and became policy in February 2013.

**USDA Screwworm Response Plan Overview**

John Zak, USDA-APHIS-VS

Dr. Zak gave a brief overview of the new USDA FAD Prep plan for screwworm response in North America.

**Texas Equine Piro Update**

Andy Schwartz, Texas Animal Health Commission (TAHC)

Equine piroplasmosis was first diagnosed in south Texas in October 2009, as part of the diagnostic work-up on a clinically ill horse. Testing of equine on adjacent premises ensued during the following year and disclosed no additional cases. In January 2012, a positive horse, unrelated to the original premises, was disclosed in Kenedy County. Subsequent epidemiological investigation led to the testing of all of the equine in the county, disclosing 17 horses on three separate premises as positive for *Theileria equi*.

Based on the high level presence of competent tick vectors and common equine movement practices of equine in both counties, the TAHC designated Kleberg County as a high risk county for equine piroplasmosis in March 2013. A county-wide test of all equine in Kleberg County was conducted during the spring and summer of 2013. A total of 987 equine on 358 premises were tested for both *Theileria equi* and *Babesia caballi*. The county-wide testing disclosed 19 horses (1.9% prevalence) on six premises as positive for *T. equi*.

**Texas Cattle Fever Eradication Program Report**

October 2013

Kevin Varner, USDA-APHIS-VS

In October 2013, the Texas Cattle Fever Tick Eradication Program (CFTEP) reports a total of 24 infested premises (17 in the Permanent Quarantine Zone and 7 in the Free Zone) under quarantine. This continues a three year decline in the number of infested premises: 09/10 – 77 infested premises, 09/11 – 65 infested premises, 09/12 – 48 infested premises, 09/13 - 24 infested premises. In addition to the downward trend in the number of
infested premises, the infestations that the CFTEP is detecting are located closer to the Rio Grande River.

The USDA and the Texas Animal Health Commission (TAHC) have pushed two new program initiatives during FY 2013. First, is the adoption of the Ivermectin Tub technology in the field. Under the INAD authority of the FDA the CFTEP has begun to use this technology to treat infested neighborhoods. To date, 66 premises with a total of 2,337 head of cattle have been treated using this technology. The tub technology allows the cattle in infested neighborhoods to self-treat and minimizes the need to gather cattle. The increased costs of maintaining cattle on infested pastures are due to the required gathering of the cattle every 2 to 4 weeks during the quarantine period. Cattle being treated using tubs are gathered less than half as often as those under previous treatment protocols.

Secondly, the TAHC and the USDA have worked with a major pharmaceutical company to produce a vaccine for cattle in the permanent quarantine zone. The vaccine has completed successful ARS pen trials. In early December 2013, TAHC and USDA will conduct a field safety trial using the final formulation of the vaccine. This safety trial is part of the APHIS-CVB approval process. By early 2014 the CFTEP plans on vaccinating all cattle in the permanent Quarantine Zone. The CFTEP plans on maintaining a mandatory vaccination program in the permanent quarantine zone.

This program dovetails with new animal ID requirements that the TAHC passed in 2013. Under these requirements all cattle in the permanent quarantine zone are required to be officially identified with an RFID tag.
USDA and TAHC staff will apply the required ID and vaccinate the cattle at the same time.

Committee Business:
There were two resolutions passed by the Committee, one related to encouraging Genetic Strain Typing of EP by USDA-VS and the second related to asking Congress to fund the construction of new facilities in Kerrville, Texas where cattle fever tick and screwworm research would be performed by USDA-ARS.
The Committee met on October 22, 2013 at the Town and Country, San Diego, California, from 8:00 a.m. to 12:00 p.m. There were 13 members and 2 guests present. The following presentations and reports were given.

Legislation on Antibiotics for Food Animals
Gail Hansen
Pew Human Health and Industrial Farming

Summary – The problem of antibiotic overuse was defined, with a focus on the concept of antibiotics being a societal resource and the concerns associated with microbial resistance development and spread, particularly the potential effects on public health. Historical information as well as current information on antibiotic legislation was shared. Specifically, the verbiage of S.1256 Preventing Antibiotic Resistance Act (PARA) and H.R. 1150 Preservation of Antibiotics for Medical Treatment Act (PAMTA) in the 113th Congress were discussed. The complete presentation is included with this report.

Antiparasitic Resistance Management Strategy (ARMS)
Anna O'Brien
FDA CVM, Office of New Animal Drug Evaluation

Summary – An overview of current FDA-CVM activity related to antiparasitic resistance in livestock in the U.S. (ARMS initiative) was provided. The FDA has recognized increasing resistance to antiparasiticide in livestock and horses in the U.S. The agency believes that there needs to be a paradigm shift in the use of management practices and appropriate use of anthelminthics. The importance of preserving refugia was underscored as mechanism to slow the replication of resistant parasites and increase the population of susceptible parasites. Center for Veterinary Medicine (CVM) has invited multiple professional organizations (including USAHA) to engage in dialogue on antiparasitic resistance, outreach, and identification of potential areas of collaboration. The complete presentation is included with this report.

Committee Business:
There were no resolutions brought before the Committee for consideration at this meeting. Review of prior resolutions elicited no action from the Committee. Following conscientious review of its mission, the Committee determined that the mission was current and continued to serve the needs of
the general USAHA membership. The Committee discussed the limited attendance at the Committee meeting and potential options to improve attendance, including a change in meeting time and merging with another committee. After weighing the merits of various options, the Committee agreed that issues germane to the Committee required a separate (stand-alone) meeting to ensure that those issues were given due consideration. The Committee further concluded that having the meeting at a different time would likely meet the same obstacle of competing with other committees and topic prioritization by the members. Lastly, the Committee identified improvements in agenda setting to be implemented, such as a standing invitation to FDA-CVM and USDA-Food Safety and Inspection Service (FSIS) for updates at every meeting.
REPORT OF THE COMMITTEE ON PROGRAM
Chair: Stephen Crawford, NH

Lisa Becton, IA; Bonnie Buntain, AB; Stephen Crawford, NH; William Edmiston, TX; Dee Ellis, TX; Mark Engle, TN; James Evermann, WA; John Fischer, GA; Tony Forshey, OH; W. Kent Fowler, CA; Paul Gibbs, FL; Michael Gilsdorf, MD; Gail Golab, IL; Julie Helm, SC; Christine Hoang, IL; Donald Hoenig, ME; Annette Jones, CA; Bruce King, UT; Jim Logan, WY; N James Maclachlan, CA; David Marshall, NC; David Meeker, VA; Sandra Norman, IN; Dustin Oedekoven, SD; Charles Palmer, CA; Boyd Parr, SC; Elisabeth Patton, WI; Barbara Powers, CO; David Schmitt, IA; Kevin Snekvik, WA; Harry Snelson, NC; Nick Striegel, CO; Larry Thompson, MO; Doug Waltman, GA; Peregrine Wolff, NV; James Wolfram, FL.

The Committee on Program met on Saturday, October 19, 2013 at 6:00 p.m. at the Town and Country Hotel in San Diego, California. There were 31 members and two staff in attendance. Stephen Crawford called the meeting to order, thanking the chairs for their work in preparing for the meeting.

Crawford reviewed the following procedural items for the committee in preparation for their respective committee meetings:

- Manual of Operating Procedures for Committee Chairs and Committees
- Robert’s Rules of Order
- Quorum for Committee Meetings
  - 10 members or 30%, whichever is less
- Voting and use of proxies
- Mission Statements

Crawford also noted that OIE Terrestrial Code Chapters would soon be sent out for comment, and USAHA would seek input on any relevant issues from chairs through the Committee on International Standards.

Ben Richey was called upon to review the process for submitting committee reports. Templates were provided electronically, and are due within 24 hours of the meeting. Richey also discussed meeting security procedures if any issues were to arise. He also discussed use of technology options for remote presentations for federal employee speakers that were not able to attend this year.

David Marshall, chair of Committee on Nominations and Resolutions, led discussion about resolutions and recommendations. He reminded chairs that resolutions should be succinct, direct and actionable. He also noted that recommendations could be used for less formal requests.
David Schmitt asked chairs to be thinking of issues for the 2014 Committee on Government Relations. He encouraged chairs to continue thinking of issues during their committee meetings, and leading up to the spring meeting.

David Meeker presented the following chairs with a plaque recognizing them for their service for five years, or as they step down:

- William Edmiston, Jr., Committee on Sheep & Goats, 2009-2013
- James Evermann, Committee on Infectious Diseases of Cattle, Bison and Camelids, 2009-2013
- Tony Forshey, Committee on Livestock Identification, 2009-2013
- W. Kent Fowler, Committee on Infectious Diseases of Horses, 2009-2013
- Paul Gibbs, Committee on Foreign and Emerging Diseases, 2009-2013
- Julie Helm, Committee on Transmissible Diseases of Poultry and Other Avian Species, 2009-2013
- N. James Maclachlan, Committee on Bluetongue and Related Orbiviruses, 2009-2013
- Charles Palmer, Committee on Scrapie, 2009-2013
- John Fischer, Committee on Wildlife Diseases, 2012-2013

There was time for a few questions from chairs.
With no further business the meeting was adjourned.
The Committee met on October 22, 2013 at the Town and Country Hotel, San Diego, California, from 1:00-5:00 p.m. There were 28 members and 24 guests present. The purpose of the committee was reviewed. Resolution 27 from 2012 was reviewed. This Resolution was accepted by USAHA. The USDA response was that funding for oral rabies vaccination programs is expected to remain the same for FY 2014.

Presentations and Reports

What’s New in the National Veterinary Stockpile?
Lee M. Myers
USDA-APHIS-Veterinary Services (VS)

The mission of the USDA-APHIS-VS, National Veterinary Stockpile (NVS) program is to provide veterinary countermeasures – supplies, equipment, vaccines, and response support services – that States, Tribes, and Territories need to respond to damaging animal disease outbreaks. The NVS program’s two goals are to (1) within 24 hours, deploy countermeasures against the most damaging animal diseases, and (2) assist States, Tribes, and Territories with their planning, training, and exercises for the rapid acquisition, receipt, processing, and distribution of NVS countermeasures during an event.

Dr. Myers first emphasized that the NVS program is not expected to change significantly as a result of the APHISVS reorganization, which becomes effective in early November, 2013. The NVS program will become a part of the VS Surveillance, Preparedness, and Response Services’ Logistics Center and remain under the direction of the current NVS Director.
APHIS-VS issued a fact sheet in July 2013 for high-consequence foreign animal diseases and pests. The list divides diseases and pests into tiers according to risk level and identifies biological threats that need to be considered in program priorities and countermeasure stockpile requirements. Tier 1 diseases are those of national concern that pose the most significant threat to animal agriculture in the United States, as they have the highest risks and consequences. The Tier 1 diseases important to the NVS include African swine fever (ASF), classical swine fever (CSF), foot-and-mouth disease (FMD), avian influenza (AI) (any strain that is highly pathogenic or has zoonotic significance), and virulent Newcastle disease (ND). Tier 2 diseases are transmitted primarily by pests. The Tier 2 diseases important to the NVS include Rift Valley fever (RVF) and Venezuelan equine encephalitis (VEE). Tier 3 diseases and pests pose less risk and fewer consequences than those in Tiers 1 and 2, but still rise to the level of inclusion because of their potential negative impact on animal or human health. Tier 3 diseases important to the NVS include henipaviruses (hendra and nipah), rinderpest, and peste des petits ruminants.

Dr. Myers then discussed and illustrated photographs of recently acquired countermeasures within the NVS. New countermeasures support cold chain management, animal handling, and emergency transport. Dr. Myers also emphasized that NVS contractors are receiving hands-on, field training to enhance capabilities for response support services. She highlighted the future NVS exercise partners and reviewed the status of State, Tribe, and Territory NVS planning. NVS preparedness is a continuous cycle of planning, organizing, equipping, training, exercising, and evaluating. NVS planners are encouraged to use the NVS website www.nvs.aphis.usda.gov and the password-protected pages to download examples of state NVS plans, planning tools, questions and answers, and exercise after action reports.

H3N2 Update: 2013 vs. 2012
Bret D. Marsh
Indiana State Veterinarian, Indiana State Board of Animal Health

During 2012, Indiana saw the highest rates of H3N2v virus infection in humans. An epidemiologic investigation of the 138 human cases found a strong correlation with contact with exhibition swine, primarily at county fairs.

To address this public health issue, the Indiana State Board of Animal Health (BOAH) worked closely with federal, state and county health officials, Purdue Extension and 4-H, and private veterinary practitioners, as well as the swine industry. Ultimately, the Indiana Swine Health Advisory Committee established a set of four recommendations for the 2013 to reduce the risk of another influenza event.

The four key recommendations were:
1. Vaccinate swine, whenever possible.
2. Shorten the amount of time swine are congregated at show sites (with a goal of less than 72 hours).
3. Monitor swine for signs of flu-like illness before and during the exhibition.
4. Change human behaviors in the barns, such as banning eating and cooking in animal areas and advising visitors to wash their hands.

As a follow-up to this initiative, BOAH hosted a national working group to develop guidelines for swine exhibitions nationwide. Those may be found online at: http://nasphv.org/Documents/NASAHO-NASPHV-InfluenzaTransmissionAtSwineExhibitions2013.pdf

Remarkably, 2013 proved to be a very different year from 2012. By the end of the show season, the number of human cases was 14. This came as a surprise, considering the first 2013 human case was identified on June 21, during the state's first county fair—much earlier than the initial 2012 case in mid-July. While this early case provided an expectation for a year with many cases, the summer did not pan out that way.

What factors played into dramatically fewer cases? Were the exhibition recommendations effective? Did advisories/warnings to the public work? Was it extensive media coverage? Or did the weather play a role? (The 2012 season was very hot and dry, compared to 2013.)

BOAH partnered with The Ohio State University (OSU) to test swine at the Indiana State Fair, as well as nearly 40 county fairs. Once those tests are processed, OSU researchers hope to provide a better picture of how widespread influenza viruses are in the exhibition sector.

West Nile Virus (WNV) Outbreak Texas – 2012
Tom J. Sidwa
Texas State Public Health Veterinarian

West Nile virus (WNV) is a single-stranded, positive sense RNA virus in the genus Flavivirus. It is a member of the Japanese encephalitis serogroup. This serogroup is the leading cause of arbovirus encephalitis in vertebrates. The virus was first isolated in the West Nile District of Uganda in 1937. Epizootics occurred in horses with significant mortality, but in humans the disease was generally asymptomatic or manifested as a self-limiting childhood disease. West Nile neuroinvasive disease (WNND) has been recognized since 1957, but remained infrequent until 1996 during an outbreak in Romania. Subsequent outbreaks were also marked by higher rates of central nervous system (CNS) disease and mortality. Virus that entered the U.S. in 1999 is thought to have been a strain from Israel. The Israeli and U.S. strains share the feature of high avian mortality and showed the greatest homology among strains compared at the time.

WNV is maintained in a sylvatic mosquito-bird-mosquito cycle. The virus can also infect a wide variety of incidental hosts, most notably humans and equines in which the spectrum of disease ranges from asymptomatic to fatal. Mosquito control and mosquito bite avoidance strategies are the only methods currently available for protecting human populations from infection. There are no known specific treatments or cures for the diseases caused by WNV, and vaccines for humans are not available.
REPORT OF THE COMMITTEE

The primary WNV vector mosquito in Texas is *Culex quinquefasciatus* (Southern House Mosquito). It ranges from the tropics to the lower latitudes of temperate regions (36N to 36S latitude). It is nighttime-active and an opportunistic feeder. St. Louis encephalitis virus, another Flavivirus that is reported in Texas, is also vectored by *Culex quinquefasciatus*. *Culex tarsalis* (Western Encephalitis Mosquito) is an important vector in the western portions of the state.

A wide variety of passerine birds develops viremia at levels necessary to serve as a virus source for biting vector mosquitoes. The duration of viremia in birds is short and imparts lifetime immunity. The predominant species of birds that serve as a virus source for feeding mosquitoes varies geographically. Members of the family *Corvidae*, e.g. crows, ravens, and blue jays experience high mortality from WNV infection. These mortality events may suggest that transmission of WNV is occurring in the area. Both humans and equines are considered “dead end host” due to low level viremia. However, transmission may occur from person to person, e.g. transplacentally and through organ transplantation.

WNV entered the U.S. in 1999 as evidenced by reports of human and avian cases. Approximately 80 percent of infected humans are asymptomatic. Approximately 20 percent develop West Nile fever (WNF), and <1 percent develop the more severe form of the disease, WNND. Sixty to 75 percent of WNND cases have encephalitis or meningoencephalitis. The remainder present with meningitis. The mortality rate for WNND is approximately 10 percent. Approximately 33% of clinically ill equines either die of the disease or are euthanatized because of it.

WNV reached Texas in 2002. Prior to the epidemic in 2012, case counts peaked in 2003 at 736 with 40 deaths. In 2012, there were 1,868 cases and 89 deaths affecting 134 of the state’s 254 counties. Texas reported 29 percent of the WNND cases in the U.S. that year. This was in stark contrast to 2011 in which there were 27 cases and two deaths. Reported equine cases peaked in 2002 with 1,699. Equine vaccine was licensed in 2003. The equine case count in 2012 was 120.

During the spring and early summer of 2012, the Texas Department of State Health Services (DSHS), along with local health department partners, performed routine surveillance and epidemiologic activities related to WNV. Vector control is the responsibility of local jurisdictions. However, local jurisdictions can request state support and assets if local capacity is exhausted.

Historically, WNV case onsets peak in mid-August. DSHS executive staff was notified of increased cases of human infection of West Nile Virus in July 2012. As a result, consultation and planning activities were initiated with DSHS Health Service Region (HSR) leadership, local health department leadership, emergency management, and local elected officials. DSHS activated the State Medical Operations Center and its public health emergency preparedness functions on August 9, 2012. Requests were received from local jurisdictions for state support of outbreak response. This signaled that the outbreak had
reached a critical milestone and that normal control and abatement measures at the local level were inadequate to prevent an increasing incidence of disease or avert increasing numbers of death related to the neuroinvasive form of the disease. The response to this outbreak was rare in the state’s history. It was the first time in over 40 years that some mitigation activities, such as aerial spraying, had been considered or used at the state level as a vector control activity to prevent disease.

To support the response to this outbreak, DSHS staff in Austin and the HSRs began a multi-faceted approach to support local health departments and elected officials to prevent, mitigate, and respond to the outbreak. DSHS expended approximately $3.4M in support of local disease control efforts. Approximately $2.7M of that total was spent on aerial distribution of mosquito adulticide nearly all of which took place in Dallas and Denton Counties. The use of this intervention was controversial and required an extraordinary level of communication and coordination. The Commissioner of Health was thoroughly engaged. He participated in national press conferences hosted by CDC, conference calls with state and local stakeholders, and represented the agency in audio and video public service announcements. DSHS created information outreach materials for distribution by local jurisdictions. Web-based information was created or modified at all levels of government. The State’s air services contractor’s public information team was key to managing risk messages through Metroplex media outlets regarding the pesticides used. An example of the divergent level of acceptance of aerial distribution of pesticides by communities is the fact that only 18 of the 32 jurisdiction within Dallas County opted to have aerial spraying performed.

DSHS does not have a medical entomologist. DSHS and severely impacted local jurisdictions received information and guidance on mosquito control from CDC. Additional assistance on this issue came from Texas A&M University, Texas AgriLife Extension Service, and the State’s vector control contractor. In addition, CDC deployed two teams of subject matter experts in response to DSHS requests for Epi-Aids. One team assessed the validity of using volume of WNV testing as a leading indicator of case count trends. This was determined to be a valid tool in assessing the direction of the epidemiologic curve within the following one to two weeks. The other team assessed mosquito control practices in north-central Texas. The task was made difficult by marked variability in local mosquito control practices and the late point in the cycle at which aerial operations began. The Epi-Aid team concluded that use of aerial distribution of adulticide resulted on a significantly fewer human cases as compared to untreated areas.

An in-depth process of after action review of the 2012 response led to revised surveillance and response plans at all levels of government in Texas.
Human *Brucella canis* Infection Acquired from a Puppy, NYC, 2012

This topic was presented by Dave Smith, State Veterinarian, New York. Catherine Dentinger from CDC was available on the telephone.

**Background:** A three-year-old child presenting with fever and dyspnea was hospitalized for 48 hours for bronchiolitis and discharged without antibiotics. Her admission blood culture grew *Brucella canis*.

**Methods:** Clinical and public health agencies investigated.

**Results:** The child, who received antibiotics for 45 days, remained asymptomatic; 19 laboratory workers received post-exposure prophylaxis. Blood from the child’s eight-week-old puppy grew *B. canis*, the puppy was euthanized. Isolates from the puppy and the child were genetically similar. The puppy and its littermate, which was sold to a Pennsylvania (PA) family, originated from an Iowa breeder. The breeding facility was subsequently quarantined. The PA puppy tested positive for *B. canis* by serology; the owners were not tested.

**Conclusion:** This first confirmed report of *B. canis* transmission from a canine to a child in the U.S. highlighted the need for coordinated disease control efforts of animal and human health agencies.

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Oral Rabies Vaccination Program Cost Analysis
Brody Hatch¹, Stephanie Shwiff¹, Karen Moxey¹
¹National Wildlife Research Center, USDA-APHIS, Wildlife Services (WS)

*Stephanie Shwiff presented via teleconference.*

In the U.S., rabies prevention focuses on vaccinating the main reservoir, wildlife, through the use of large scale oral rabies vaccination (ORV) programs. These programs typically include aerial operations in which small vaccine-laden baits are dropped from aircraft over large portions of specific wildlife habitat. An examination of the costs associated with these programs indicate that typical ORV program costs include salaries, baits, aircraft operations, enhanced surveillance and public communication costs, however, baits comprise the most significant portion of costs. Given the important role of baits in the total cost structure we performed a sensitivity analysis examining different bait prices and associated levels of efficacy, measured by the accepted level of seroconversion. We ran 10,000 Monte Carlo, and Bernoulli simulations to estimate the respective efficiency cost of low, medium, and high efficacy baits. We further analyzed the relative cost effectiveness using a simple binomial mass probability function. Our results examine the tradeoff between prices and efficacy. Using the binomial mass probability analysis, results indicate that the increased price and efficacy have implications for economic efficiency.
Texas Gray Fox Rabies Contingency Study
Ernest “Skip” Oertli
Texas Department of State Health Services, Director of Oral Rabies Vaccination Program (retired August 2013)

Beginning in 1996, the Texas Department of State Health Services, in conjunction with its’ partners Texas Wildlife Services, Texas Military Forces and Merial, have had a rabies control plan utilizing oral rabies vaccine for the Texas gray fox rabies variant. The epizootic zone involving the Texas gray fox variant was encircled at first, and then the baited barrier zone was constricted annually until the entire area could be blanketed with oral rabies vaccine packets. Extremely successful, Texas gray fox variant was thought to have been eliminated. The last case of this variant was identified by passive and active surveillance in May 2009. In May 2013, a three year old, home grown, replacement heifer was diagnosed with the Texas gray fox variant. This presentation reviewed the actions taken in response to the case and future management considerations.

Emily W. Lankau
LandCow Consulting

Oral rabies vaccine (ORV) baits have been successfully applied to reducing rabies virus transmission in U.S. wildlife populations, including coyotes and raccoons. Critical review of raccoon ORV campaigns is instructive for better understanding how different program structures and bait application methods can benefit reduction in virus circulation, or even lead to elimination of raccoon rabies in focal geographic regions. A diversity of raccoon rabies control programs – including ORV campaigns in Cape May, New Jersey; Cape Cod, Massachusetts; Long Island, New York; and the eastern border of Ohio – were reviewed to better understand practices contributing to successful and cost-effective ORV campaigns. These programs demonstrate that successful mitigation of human health risks from raccoon rabies can be accomplished in a time- and cost-effective manner using Raboral V-RG®, especially if doses are distributed at sufficient target density using a multi-modal, biannual approach to effectively reach both juvenile and adult raccoons in heterogeneous urban landscapes. Finally, sustained risk mitigation may be highly dependent on local geography, with increased chances of sustained elimination of raccoon rabies virus variant from areas with clear geographic boundaries to raccoon migration (e.g., peninsula or islands) that enhance ORV barriers and prevent reintroduction of the virus.

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Zoonotic Diseases and Pet Stores – Alaska
Robert Gerlach
State Veterinarian, Alaska

Dr. Gerlach presented the results of a study, Assessing Awareness of Zoonoses and Biosecurity among Alaskan Pet and Feed Stores. The study was undertaken by an MPH student, Amanda Reiff. The purpose of the study was to evaluate pet store and feed store owners’ understanding of zoonoses and biosecurity. Multiple gaps in understanding and knowledge were found. Education and outreach efforts are underway.

A Field Evaluation of Raboral V-RG® as an Oral Rabies Vaccine in Striped Skunk (Mephitis mephitis)
Joanne Maki
Merial Limited

Skunk rabies is an emerging public health concern nationally. In Texas, wildlife oral rabies vaccine (ORV) programs targeting coyotes and foxes have successfully controlled previous rabies outbreaks. Due to these zoonotic disease management programs, the striped skunk (Mephitis mephitis) is now the leading rabid terrestrial wildlife species in Texas with hundreds of rabid skunks reported from suburban and metropolitan areas. The Texas Department of State Health Services (TDSHS) has used targeted distribution of Raboral VR-G® to control wildlife rabies since 1995, resulting in elimination of the canine rabies virus variant from coyote populations in 2004 and a substantial reduction in the incidence of fox rabies in West-Central Texas. While skunk biology makes this species a challenging ORV target, field data collected in Texas suggest that Raboral VR-G® can effectively immunize skunks against rabies virus infection in a field setting. This presentation will discuss the challenges of effectively vaccinating skunk populations against rabies as well as report preliminary results of a field trial currently underway in East Texas evaluating field parameters for ORV bait distribution addressing skunk rabies in Texas.

Human Rabies Investigation Texas – 2013
Tom J. Sidwa
Texas State Public Health Veterinarian

The case of human rabies that is described in this presentation is the first in Texas since 2009. The patient in 2009 survived. Unfortunately, the patient for whom this investigation was conducted succumbed to his disease.

A 28 year-old man, a farmer from Guatemala, had previously entered the U.S. illegally and had worked as a painter in Boston, Massachusetts. He returned to Guatemala in 2011 to visit family. There was a failed attempt to enter the U.S. in 2011. On April 20, 2013 he once more embarked on a trip with the intent of entering the U.S. On April 24th or 25th, he called family in Guatemala from Chiapas, Mexico, a Mexican state bordering Guatemala. On May 8 he once again called home, this time from Reynosa, Mexico which is across the border from Hidalgo, Texas. During both conversations, his family
heard nothing suggesting he was ill. On May 9, he entered Texas and was apprehended by U.S. Border Patrol (BP) in Hidalgo County and transferred to the McAllen Station. He remained in McAllen until May 11 when he was transferred to Weslaco Station, also in Hidalgo County. On May 12, he was transferred to Harlingen Station in Cameron County. Later that day, Immigration and Customs Enforcement (ICE) assumed custody. He was briefly at the Port Isabel ICE facility en route to the Brooks County Detention Center (under contract with ICE).

Onset of illness was May 16 with a complaint of insomnia. On May 17, he was anxious with dysphagia and dyspnea. On May 18, he was spitting excessively apparently associated with dysphagia. He had the sensation of choking. He was transferred to the Medical Unit of the facility. Given the identified complaints and observation of tachycardia, the patient was transferred by ambulance to an Emergency Department (ED) in Kleberg County.

At the ED, tachycardia persisted. The patient had to be restrained due to thrashing. Extensive bilateral subcutaneous and intramuscular emphysema of the neck and lower face and pneumomediastinum were diagnosed through CT scan. The patient was then transferred to a hospital in Nueces County. The patient was intubated and anesthetized only to discover that the pneumomediastinum had resolved spontaneously. However, the patient was not able to be extubated successfully and exhibited altered mental status.

On June 5, the Centers for Disease Control and Prevention (CDC) and the Texas Department of State Health Services (DSHS) were contacted by the attending physician to discuss rule-out of rabies. Appropriate specimens were submitted to CDC. On June 7, rabies was confirmed. The variant was identified as a canine variant known to circulate in Mexico, Honduras, and El Salvador (CDC had no exemplars from Guatemala for comparison). On June 8, CDC arranged for consultation between providers and Dr. Willoughby who developed the Milwaukee Protocol. The Milwaukee Protocol has been used to guide treatment of human rabies with varying levels of success. On June 11, further treatment was deemed to be futile. With family permission, support was withdrawn and the patient died. On June 14, an autopsy was performed in Houston. Rabies was confirmed.

The period of concern for the contact trace-back is 14 days prior to illness onset until death. In this case it is May 2 through June 11, 2013. Many of the potential contacts traveled with or were detained with the patient. Many of these people were already remanded to family in the U.S., transported to ICE facilities in the U.S., or had already been deported to their countries of origin. Other categories of contacts are healthcare workers, medical transport personnel, BP personnel, and ICE personnel. The investigations fell to domestic, federal, and international jurisdictions. The domestic investigation involved identifying and conducting risk assessment for Texas residents. It was carried out by Local Health Departments (LHD) where a LHD existed. DSHS Health Service Region -11 Zoonosis Control staff conducted the domestic investigation where no LHD exists and supported the involved LHDs.
as needed. CDC coordinated with other federal partners on the federal investigation which entailed international communication/notification and identifying and conducting risk assessment for detainees still residing in the U.S. Deportees who should be assessed were identified, and the information was shared with the appropriate ministries of health. The international investigation was the responsibility of the health authorities in the countries to which potentially exposed detainees had been deported. A CDC Epi-Aid was requested by DSHS to gather information on the identity of potentially exposed detainees. Assessment tools were developed with weighted criteria to allow gradation of exposure risk.

Conference calls and emails were heavily utilized to accomplish the required level of communication. On June 12, CDC posted case information to EpiX and ICE did a press release describing the case, in compliance with law mandating the action when a detainee in their custody dies.

**Domestic Investigation Outcome**

Non-Healthcare Workers (BP and contract detention center staff)
- 179 assessments were completed
- 3 persons received post-exposure prophylaxis (PEP)
  - Had close physical contact with the patient
  - May have been exposed through contact with the patient’s saliva on a fresh, open cut or wound

Healthcare Workers (Detention Center Medical Unit staff, EMS from two ambulances, and staff from two hospitals)
- 38 assessments were completed
- 7 persons received PEP
  - 5 may have been exposed through contact with the patient’s saliva on a fresh, open cut or wound
  - 2 requested PEP as a precaution

**Federal Investigation Outcome**
- 549 detainees moved through the same facilities as the patient with overlapping times
  - 378 were considered to be at increased risk of rabies exposure
    - 10 countries of origin represented (primarily Guatemala and Mexico)
  - 49 of the 378 were considered to be at moderate risk
    - 5 countries represented
  - 19 of 378 were considered to be at highest risk
    - All from Guatemala
    - 5 individuals crossed into the US with the patient and remained in ICE custody
    - CDC notified the involved states
- All domestic detainees identified, risk classified, and notified
- All international ministries of health notified by PAHO
- ICE facilities (1 high risk/16 moderate risk)
International Investigation Outcome

- Guatemala
  - Case patient was bitten by a dog on April 2
- Guatemala (18 high risk / 13 moderate risk)
  - 4 received PEP due to risk assessment
  - 2 received PEP based upon request
- El Salvador (3 moderate risk)
  - 1 received PEP for BP dog bite (not associated with case)
- Honduras (4 moderate risk)
  - No PEP administered
- Mexico (13 moderate risk)
  - No information

This investigation is indicative of the ability of a multijurisdictional, multidisciplinary team to work cooperatively to achieve a shared public health goal.

Committee Business:

The Committee voted to support a resolution presented by the Committee on Infectious Diseases of Cattle, Bison, and Camelids. The resolution encourages state regulatory agencies in states that allow the sale of raw milk to include *Coxiella burnetti* surveillance in their raw milk program.

The Committee passed a resolution requesting an increase in funding for the USDA-APHISWS oral rabies vaccination program.

Topics for a One Health Symposium next year were discussed.
REPORT OF THE COMMITTEE ON SALMONELLA

Chair: Doug Waltman, GA
Vice Chair: Richard Sellers, VA

Deanna Baldwin, MD; Marilyn Balmer, MD; Stacey Bosch, GA; Richard Breitmeyer, CA; Paul Brennan, IN; Jones Bryan, SC; Evelyn Crish, PA; Kevin Custer, IA; Sherrill Davison, PA; Brandon Doss, AR; Tracy DuVernoyn, MD; James Foppoli, HI; Tony Frazier, AL; Richard Gast, GA; Eric Gingerich, IN; Eric Gonder, NC; Jean Guard, GA; Rudolf Hein, DE; Julie Helm, SC; Bill Hewat, AR; Danny Hughes, AR; Eric Jensen, AL; Annette Jones, CA; Barry Kelly, CA; Spangler Klopp, DE; Jennifer Koeman, IA; Michael Kopp, IN; Elizabeth Krushinskie, DE; Dale Lauer, MN; Elizabeth Lautner, IA; Tsang Long Lin, IN; Edward Mallinson, MD; Beth Mamer, ID; Sarah Mason, NC; Patrick McDonough, NY; James McKean, IA; David Meeker, VA; Alfred Montgomery, MD; Thomas Myers, MD; Kakambi Nagaraja, MN; Steve Olson, MN; Kristy Pabilonia, CO; Lynn Post, TX; G. Donald Ritter, DE; Charles S Roney, GA; John Sanders, WV; Joni Schefftel, MN; Tom Sidwa, TX; John Smith, GA; Bruce Stewart-Brown, MD; Belinda Thompson, NY; Alberto Torres, AR; Bob Tully, KS; Liz Wagstrom, DC; Don Waldrip, TN; Scott Wells, MN; Nora Wineland, MO; Ching Ching Wu, IN.

The Committee met on October 22, 2013 at the Town and Country Hotel, San Diego, California, from 8:00 a.m. – 12:00 p.m. There were 22 members and 22 guests present. After the Chair opened the meeting and welcomed the attendees, he reminded those present to sign the attendance sheets and if a member to check to see that their contact information was correct and if they were not members to indicate if they would like to become a member of the committee. The Chair briefly overviewed the requirements of becoming a member and that only members could propose resolutions, recommendations and vote. However, everyone was encouraged to participate in the discussion.

Update: Outbreaks of Human Salmonella Infections Linked to Live Poultry from Mail-Order Hatcheries

Tara Creel Anderson
EIS Officer, Outbreak Response and Prevention Branch, CDC

Outbreaks of Salmonella in live poultry linked to mail order hatcheries is a growing, but preventable public health issue. Backyard flocks are small scale poultry operations that typically consist of less than 50 birds. Poultry flocks may include chickens, ducks, turkeys, geese, or other avian species or combinations of all.

USDA sponsored an Urban Chicken Ownership study termed Poultry 2010, which surveyed four major cities. The study found that one percent of all households owned chickens. Four percent of households without chickens planned to have chickens within the next five years. Of the homeowners with chickens, the majority had been raising chickens less than five years. They cited the following reasons to own chickens: fun/hobby, better quality food,
Salmonella eggs and/or meat, animal welfare concerns, learning experience for kids, environmental concerns, and family traditions.

The mail-order hatchery industry in the United States consists of about 20 core hatcheries that sell more than 50,000,000 chicks annually. They distribute chicks nationwide typically through the U.S. Postal service and deliver directly to customers or to feed stores. The number of birds in a box varies by the size/type of bird. One box may contain multiple species, which provides a potential means of cross contamination. Because of the minimum purchase requirements for ordering chicks, most of these chicks are purchased at feed stores.

Eleven percent of human salmonellosis cases are due to animal contact or zoonotic sources. Recent (2006-2012) live poultry-associated outbreaks have included:

- Caterer contaminated food
- Chicken contact led to outbreak associated with infected delicatessen workers
- Poultry flock in daycare caused outbreak
- Death in nursing home resident, chicks had been brought into home
- Feed store employees became outbreak cases
- One sick postal worker who handled chicks in the mail

From 1990 to 2012 there have been 45 live poultry outbreaks involving 1,563 laboratory-confirmed cases, 221 hospitalizations and five deaths. The number of outbreaks and resulting cases has dramatically increased the last two years. For example, already this year there have been four outbreaks:

- Montevideo 12 cases 9 states
- Braenderup 50 21
- Multiple serotypes 145 28
- Typhimurium 328 37

The recent Typhimurium outbreak has involved the most cases and the largest area. PulseNet identified the outbreak in April 2013. Fourteen cases in nine states made up the initial report. The outbreak strain was a Typhimurium with a rare PFGE pattern. The characteristics of the persons infected showed the median age to be six, with 58% of the infected less than ten years old. Epidemiologic investigation included using foodborne disease questionnaires. The surveys pointed to exposure to live poultry. Ninety-seven percent of persons purchased poultry from feed stores.

The investigation highlighted some complex mail-order hatchery supply practices referred to as multiplying, trans-shipping, and drop shipping. These practices complicate the issue of tracing the sources of specific flocks involved in outbreaks.

The particular Typhimurium outbreak, found 97% of the poultry were purchased from 113 feed stores representing 33 companies. There were 18 sources of baby poultry. Mail-order hatchery A located in New Mexico was primarily the hatchery implicated in the outbreak.
Update on USDA, Agricultural Research Service (ARS) and Food and Drug Administration (FDA), National Antimicrobial Resistance Monitoring System (NARMS) Studies
Eileen Thacker
Food Safety, USDA-ARS

The presentation covered the new changes – some already implemented and some proposed in NARMS sampling by the USDA and FDA. NARMS is a national public health surveillance system that tracks antibiotic resistance in foodborne bacteria. The NARMS program is a partnership between FDA, CDC and USDA and monitors antimicrobial susceptibility among enteric bacteria from humans, retail meats and food animals.

New procedures implemented by FDA include monitoring animals in slaughter houses in a more random fashion than the current system which is heavily skewed towards problem farms. In addition, FDA is proposing the use of cecal (intestinal samples) as a measure of on-farm antibiotic resistance patterns. In addition to the use of cecal samples, an on-farm pilot project encompassing sampling feces from animals on the farm and following the same animals to slaughter. Species included in the study include beef and dairy cattle, swine and broilers and turkeys. This project is finishing the sample collection phase and it is anticipated there will be results in early 2014. In addition, a study by Dr. Paula Cray involving testing swine for Salmonella was briefly described.

Salmonella in Agricultural Exhibitions and Feed Stores in Colorado
Kristy Pabilonia
Colorado State University

The Centers for Disease Control and Prevention reported eight Salmonella outbreaks linked to contact with live backyard poultry in 2012. With the number of backyard flocks increasing in the United States, evaluating the epidemiology of Salmonella in these flocks is important to understanding measures that can be utilized to prevent transmission of the bacteria between flocks and prevent zoonotic transmission to humans. Colorado State University and collaborators recently conducted two studies in an effort to further understand this issue.

The aim of the first study was to measure the frequency of isolation of Salmonella from the environment of poultry exhibits at agricultural fairs. The results are published in Zoonoses and Public Health (KL Pabilonia, KJ Cadmus, et al. Environmental Salmonella in agricultural fair poultry exhibits in Colorado. Zoonoses and Public Health, epub ahead of print 2013). Poultry cage litter; feed and environmental samples (floors and tables) were collected from 11 agricultural fairs. Salmonella was detected in 91% of fairs and 50.9% of all samples detected. Eleven Salmonella serotypes were detected, including Enteritidis, Infantis, Kentucky, and Braenderup (see table below). Results demonstrate that environmental surfaces of agricultural fairs can be
contaminated with Salmonella and could potentially serve as a route of transmission to bird owners and the general public.

<table>
<thead>
<tr>
<th>Serotype</th>
<th>No. isolates</th>
<th>Serotype</th>
<th>No. isolates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kentucky</td>
<td>13</td>
<td>Cubana</td>
<td>1</td>
</tr>
<tr>
<td>Meleagridis</td>
<td>4</td>
<td>Derby</td>
<td>1</td>
</tr>
<tr>
<td>Bredeney</td>
<td>3</td>
<td>Enteritidis</td>
<td>1</td>
</tr>
<tr>
<td>Infantis</td>
<td>2</td>
<td>Montevideo</td>
<td>1</td>
</tr>
<tr>
<td>O8,20:-:z6</td>
<td>2</td>
<td>Thompson</td>
<td>1</td>
</tr>
<tr>
<td>Braenderup</td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The aim of the second study was to assess the prevalence of Salmonella in baby poultry enclosures at feed stores. Cage litter and drag swabs were collected from 30 feed stores. Salmonella was detected in 63% of the stores and 40% of the samples. All total 13 serotypes were identified (see table below). Feed stores sourced baby poultry from ten different hatcheries in seven states. Results of this study are currently being submitted for publication.

<table>
<thead>
<tr>
<th>Serotype</th>
<th>No. Stores</th>
<th>No. Samples</th>
<th>Serotype</th>
<th>No. Stores</th>
<th>No. Samples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anatum</td>
<td>1</td>
<td>1</td>
<td>Montevideo</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Anatum var 15+</td>
<td>3</td>
<td>7</td>
<td>Rough O:e,h:1,6</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Braenderup</td>
<td>2</td>
<td>4</td>
<td>Senftenberg</td>
<td>3</td>
<td>14</td>
</tr>
<tr>
<td>Enteritidis</td>
<td>2</td>
<td>3</td>
<td>Typhimurium</td>
<td>6</td>
<td>24</td>
</tr>
<tr>
<td>Hadar</td>
<td>1</td>
<td>4</td>
<td>4,12:i:-</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Infantis</td>
<td>2</td>
<td>3</td>
<td>3,19:NM</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Kentucky</td>
<td>2</td>
<td>7</td>
<td>Montevideo</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

National Veterinary Services Laboratories (NVSL) Salmonella Update
Brenda Morningstar-Shaw
Diagnostic Bacteriology Laboratory, NVSL, USDA-APHIS-VS

The number of isolates submitted over the last five years as they are generally categorized is shown in the table below. The number of isolates submitted to the laboratory over the last 4 years has remained fairly consistent.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>20,735</td>
<td>9328</td>
<td>7640</td>
<td>3117</td>
<td>650</td>
<td>298</td>
</tr>
</tbody>
</table>
The top five serotypes from all sources is shown below. For clinical isolates there has been an increase (or moving up in rank) for 4,[5],12:i:-, Agona and Derby. For the Non-clinical isolates Heidelberg, Senftenberg, and Typhimurium have increased.

### Most Common Serotypes – All Sources 2012

<table>
<thead>
<tr>
<th>Rank</th>
<th>Clinical</th>
<th>Non-Clinical</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Typhimurium</td>
<td>Kentucky</td>
</tr>
<tr>
<td>2</td>
<td>4,[5],12:i:-</td>
<td>Enteritidis</td>
</tr>
<tr>
<td>3</td>
<td>Dublin</td>
<td>Heidelberg</td>
</tr>
<tr>
<td>4</td>
<td>Agona</td>
<td>Senftenberg</td>
</tr>
<tr>
<td>5</td>
<td>Derby</td>
<td>Typhimurium</td>
</tr>
</tbody>
</table>

With respect to the most common isolates in chickens, Muenchen has increased in the clinical isolate category and Heidelberg, Enteritidis, Senftenberg, and Mbandaka have all increased in the non-clinical area. For turkeys, Typhimurium and Saintpaul increased clinically, and Senftenberg, Muenster, Kentucky, and London increased in the non-clinical category while Hadar decreased.

### Most Common Serotypes – Chickens 2012

<table>
<thead>
<tr>
<th>Rank</th>
<th>Clinical</th>
<th>Non-Clinical</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Enteritidis</td>
<td>Heidelberg</td>
</tr>
<tr>
<td>2</td>
<td>Kentucky</td>
<td>Kentucky</td>
</tr>
<tr>
<td>3</td>
<td>Typhimurium</td>
<td>Enteritidis</td>
</tr>
<tr>
<td>4</td>
<td>Rough O:g,m:-</td>
<td>Senftenberg</td>
</tr>
<tr>
<td>5</td>
<td>Muenchen</td>
<td>Mbandaka</td>
</tr>
</tbody>
</table>

### Most Common Serotypes – Turkeys 2012

<table>
<thead>
<tr>
<th>Rank</th>
<th>Clinical</th>
<th>Non-Clinical</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Senftenberg</td>
<td>Senftenberg</td>
</tr>
</tbody>
</table>
With respect to the other species, isolates were not separated into clinical and non-clinical because there were very few non-clinical isolates. Therefore they were combined into one category. The ranking of isolates did not change with the cattle and swine isolates. For horses, Typhimurium, Anatum, and 4,[5],12:i:- increased while Newport decreased. With dogs and cats, Newport, Infantis, Agona, and 4,[5],12:i:- increased while Typhimurium decreased.

<table>
<thead>
<tr>
<th>Rank</th>
<th>Cattle All Sources</th>
<th>Horses All Sources</th>
<th>Swine All Sources</th>
<th>Dogs/Cats All Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Dublin</td>
<td>Typhimurium</td>
<td>Typhimurium</td>
<td>Newport</td>
</tr>
<tr>
<td>2</td>
<td>Typhimurium</td>
<td>Newport</td>
<td>Derby</td>
<td>Infantis</td>
</tr>
<tr>
<td>3</td>
<td>Cerro</td>
<td>Anatum</td>
<td>Agona</td>
<td>Typhimurium</td>
</tr>
<tr>
<td>4</td>
<td>Montevideo</td>
<td>Norwich</td>
<td>4,[5],12:i:-</td>
<td>Agona</td>
</tr>
<tr>
<td>5</td>
<td>Newport</td>
<td>4,[5],12:i:-</td>
<td>Infantis</td>
<td>4,[5],12:i:-</td>
</tr>
</tbody>
</table>

Frequently isolates that are known to be group D are submitted to determine if they are Enteritidis. Of 589 group D isolates, 566 (96%) were serotype Enteritidis. The remainders were Javiana, Berta, Ouakam, Alabama, and Miami. This is significant because there are some rapid tests that are only group D specific. Therefore they must be confirmed to be Enteritidis.

NVSL has implemented the xMAP Molecular Salmonella serotyping assay that was developed by CDC. The xMAP assay will not serotype all isolates so NVSL will maintain the ability to perform the gold standard of antisera-based conventional serotyping. Currently they are testing some isolates with the xMAP assay, with the goal to initially screen all isolates with the xMAP assay and then complete serotyping with antisera.

The molecular assay is faster and less cumbersome than conventional serotyping. In addition, it has high throughput, eliminates some sera QC issues and subjective interpretation. It also gives a genotype of the isolate, so the specific antigen can be detected even if it is not expressed. Lastly, it is less labor intensive. The negatives include the expense of the equipment and variable reagent cost.

The molecular typing assay is used for the SE rule out testing for the FDA Egg Rule testing. The assay provides a rapid turnaround, can type rough, weakly motile and even non-motile isolates. Additionally, the molecular assay detects the sdf gene which is specific to Enteritidis.

The NPIP Group D proficiency test and serotyping proficiency panel results have not been completed, but should be released in a few weeks.
Salmonella: What are others doing on-farm? What is the prevalence in the U.S.?
Annette O’Connor
Iowa State University

The presentation consisted of two parts: first to describe mandated Salmonella specific pre-harvest control approaches in major pork exporting countries and second to collate estimates of the prevalence of Salmonella pre-harvest in the United States.

A survey of Salmonella programs of various countries generally concludes that on-farm interventions have either not been effective in lowering Salmonella contamination or if it was somewhat effective it was shown to not be cost effective. The processing plant has been shown to be highly effective in controlling Salmonella contamination.

Salmonella Contamination in Beef Production
Dayna Harhay
Meat Safety and Quality Research Unit, USDA, ARS

A summary of 152 Salmonella outbreaks representing 12,181 illnesses from 1998-2011 showed that only 4% of the confirmed cases were attributed to contaminated beef. On the other hand, 28% were due to Tomatoes/lettuce, 12% nuts, and 9% sprouts, herbs and spices. One study looking at the prevalence of Salmonella in ground beef found a level of 4.2%. The most commonly identified serotypes were Montevideo, Anatum, Muenster, and Mbandaka. The peculiar aspect of those findings was although Montevideo is the most commonly isolated serotype in ground beef there has only been one outbreak due to Montevideo, whereas there have been six outbreaks of Typhimurium and Newport.

Apparently there are two sources of Salmonella contamination of beef, external and internal. External contamination is due to contaminated trim or some intervention failure. A study of over 3,000 carcasses found that at the beginning of processing the contamination level was 90%, after the hide was removed the level was 50%, but at the end of processing the level was less than 1% showing the effectiveness of the interventions in the plant.

Internal contamination may originate from fat trim containing lymph nodes that harbor Salmonella. Several studies have provided evidence to this route of contamination. A survey of the serotypes found in lymph nodes showed the top two serotypes were Montevideo (44%) and Anatum (25%), whereas Newport and Typhimurium were in only 1% and 0.4%, respectively. The serotypes in ground beef were Montevideo (21%) and Anatum (15%), whereas Typhimurium and Newport were 4.5% and 1.7%, respectively.

There is evidence that the internal contamination of the lymph nodes may originate from wound infections, whether from trauma or from biting insects. Salmonella infects the site of injury and then migrates to the regional lymph node.
Dr. Harhay described the variation in the virulence of *Salmonella* serotypes and strains to show that "not all *Salmonella* are created equal" or at least have equal ability to contaminate and cause infection. Her group is involved in a large project looking at the genetic basis for the virulence of *Salmonella* and the differences they are seeing between what is found in ground beef and in human cases. They are going to do whole genome sequence analysis on dozens of isolates.

**National Poultry Improvement Plan (NPIP) Status Report**

Dr. Denise Brinsen  
NPIP, USDA-APHIS-VS

*(Dr. Brinsen was unable to attend and sent this report in to be included in our report.)*

**Pullorum-Typhoid Status:**

There were no isolations of Salmonella pullorum in commercial poultry in FY 2011 or FY 2012. There were two isolations of Salmonella pullorum in backyard birds in FY 2011. There were no isolations of Salmonella pullorum in any type of poultry in FY 2013. There have been no isolations of Salmonella gallinarum since 1987 in any type poultry in the U.S.

### Hatchery Participation in the National Poultry Improvement Plan  
Testing Year FY2013

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Egg and Meat-Type Chickens: Participating</td>
<td>250</td>
</tr>
<tr>
<td>Turkeys: Participating</td>
<td>33</td>
</tr>
<tr>
<td><strong>Waterfowl, Exhibition Poultry and Game Birds: Participating</strong></td>
<td><strong>788</strong></td>
</tr>
</tbody>
</table>

### Egg-Type Chicken Breeding Flocks in the National Poultry Improvement Plan Participation and Testing Summary  
Testing Year FY2013

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. Pullorum-Typhoid Clean Flocks</td>
<td>262</td>
</tr>
<tr>
<td>Birds in Flocks</td>
<td>8,287,331</td>
</tr>
<tr>
<td>Birds Tested</td>
<td>42,889</td>
</tr>
</tbody>
</table>

### Meat-Type Chicken Breeding Flocks in the National Poultry Improvement Plan Participation and Testing Summary  
Testing Year FY2013

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. Pullorum-Typhoid Clean Flocks</td>
<td>6,286</td>
</tr>
<tr>
<td>Birds in Flocks</td>
<td>100,100,705</td>
</tr>
<tr>
<td>Birds Tested</td>
<td>239,726</td>
</tr>
</tbody>
</table>
### Turkey Breeding Flocks in the National Poultry Improvement Plan Participation and Testing Summary
**Testing Year FY2013**

<table>
<thead>
<tr>
<th>U.S. Pullorum-Typhoid Clean Flocks:</th>
<th>503</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birds in Flocks</td>
<td>4,754,650</td>
</tr>
<tr>
<td>Birds Tested</td>
<td>18,356</td>
</tr>
</tbody>
</table>

### Waterfowl, Exhibition Poultry, and Game Birds Breeding Flocks in the National Poultry Improvement Plan Participation and Testing Summary
**Testing Year FY2013**

<table>
<thead>
<tr>
<th>U. S. Pullorum-Typhoid Clean Flocks</th>
<th>6,001</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birds in Flocks</td>
<td>1,764,432</td>
</tr>
<tr>
<td>Birds Tested</td>
<td>147,980</td>
</tr>
</tbody>
</table>

---

**U.S. <i>Salmonella enteritidis</i> Clean Egg-Type Breeding Chickens**

No. of flocks and birds in flocks by State with <i>Salmonella enteritidis</i> isolates, 1990-2013

<table>
<thead>
<tr>
<th>State</th>
<th>Environmental</th>
<th>Dead Germ</th>
<th>Birds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arkansas</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flocks</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Birds in Flocks</td>
<td>6,000</td>
<td>15,000</td>
<td></td>
</tr>
<tr>
<td>Georgia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flocks</td>
<td>3</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Birds in Flocks</td>
<td>30,400</td>
<td>46000</td>
<td></td>
</tr>
<tr>
<td>Illinois</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flocks</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Birds in Flocks</td>
<td>3,900</td>
<td>3700</td>
<td>1200</td>
</tr>
<tr>
<td>Indiana</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flocks</td>
<td>15</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Birds in Flocks</td>
<td>158,345</td>
<td>27,479</td>
<td>15,092</td>
</tr>
<tr>
<td>Kentucky</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flocks</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Birds in Flocks</td>
<td>6,625</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ohio</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flocks</td>
<td>17</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Birds in Flocks</td>
<td>192,700</td>
<td>91,600</td>
<td></td>
</tr>
</tbody>
</table>
### Oregon

<table>
<thead>
<tr>
<th>Flocks</th>
<th>Birds in Flocks</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>19,516</td>
</tr>
</tbody>
</table>

### Pennsylvania

<table>
<thead>
<tr>
<th>Flocks</th>
<th>Birds in Flocks</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>166,385</td>
</tr>
<tr>
<td>6</td>
<td>78,450</td>
</tr>
</tbody>
</table>

### Texas

<table>
<thead>
<tr>
<th>Flocks</th>
<th>Birds in Flocks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10,000</td>
</tr>
</tbody>
</table>

### Phage Types

<table>
<thead>
<tr>
<th>Phage Type</th>
<th>Environmental</th>
<th>Dead Germ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phage type 13</td>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td>Flocks</td>
<td>Birds in Flocks</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>152,000</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>3,700</td>
<td></td>
</tr>
<tr>
<td>Phage type 13A</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Flocks</td>
<td>Birds in Flocks</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>54,321</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>27,479</td>
<td></td>
</tr>
<tr>
<td>Phage type 2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Flocks</td>
<td>Birds in Flocks</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>28,900</td>
<td></td>
</tr>
<tr>
<td>Phage type 23</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>Flocks</td>
<td>Birds in Flocks</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>16,000</td>
<td></td>
</tr>
<tr>
<td>Phage type 28</td>
<td>2</td>
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</tr>
<tr>
<td>Flocks</td>
<td>Birds in Flocks</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>15,000</td>
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</tr>
<tr>
<td>2</td>
<td>46,000</td>
<td></td>
</tr>
<tr>
<td>Phage type 34</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Flocks</td>
<td>Birds in Flocks</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>15,000</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>46,000</td>
<td></td>
</tr>
<tr>
<td>Phage type RNDC</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Flocks</td>
<td>Birds in Flocks</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>7,000</td>
<td></td>
</tr>
<tr>
<td>Phage type Untypable</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Flocks</td>
<td>Birds in Flocks</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>24,000</td>
<td></td>
</tr>
<tr>
<td>Phage type 8</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>Flocks</td>
<td>Birds in Flocks</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>237,701</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 1989-2013

<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>
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**Committee Business:**

There was no old business, but a Resolution was brought before the Committee by Dr. Elizabeth Krushinsknie. The title or subject matter of the Resolution was “Objection to Salmonella Linked to Human Illnesses Being Declared Adulterants.” Following a brief discussion the Resolution was approved unanimously.
REPORT OF THE COMMITTEE ON SCRAPIE
Chair: Charles Palmer, CA
Vice Chair: Kristine Petrini, MN

Deborah Brennan, GA; Beth Carlson, ND; John Clifford, DC; Thomas Conner, OH; Walter Cook, WY; Stephen Crawford, NH; Linda Detwiler, NJ; Nancy East, CA; William Edmiston, TX; Anita Edmondson, CA; Dee Ellis, TX; Keith Forbes, NV; Michael Gilsdorf, MD; William Hartmann, MN; Carl Heckendorf, CO; Susan Keller, ND; James Leafstedt, SD; Mary Lis, CT; Jim Logan, WY; Michael Marshall, UT; Shirley McKenzie, NC; Cheryl Miller, IN; Ronald Miller, PA; Elisabeth Patton, WI; Jewell Plumley, WV; Justin Roach, OK; Suelee Robbe-Austerman, IA; Paul Rodgers, WV; Joan Dean Rowe, NC; Ben Smith, WA; Scott Stuart, CO; Diane Sutton, MD; Manoel Tamassia, NJ; Stephen White, WA; Nora Wineland, MO; David Winters, TX; Cindy Wolf, MN.

The Committee met on October 22, 2013 at the Town and Country Hotel, San Diego, California, from 9:00 to 11:46 a.m. There were 12 members and 9 guests present. The meeting began with a review of the purpose of the Committee. Attendees did not elect to make any changes to the current language. The following presentations and reports were given.

USDA-APHIS Scrapie Program Update and Scrapie Surveillance Projects
Alan Huddleston, Associate National Scrapie Program Director
United States Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services (USDA-APHIS-VS) (Presented by TJ Myers Associate Deputy Administrator, USDA-APHIS-VS)

Scrapie Eradication Program Results
- There has been a 90 percent decrease in the percent positive sheep sampled at slaughter adjusted for face color, from 0.15 to 0.015 percent, since the start of Regulatory Scrapie Slaughter Surveillance (RSSS) in FY 2003 thru September 30, 2013.
- There were 11 new infected or source flocks reported in FY 2013 as of September 30, 2013. FY 2013 is the first year since FY 2005 when a reduction in the number of new scrapie infected and source flocks was not observed. Now that the program is in the tail end of the eradication effort it is likely that the numbers will go up and down from year to year due to the difficulty in accurately measuring the frequency of uncommon events.

Slaughter Surveillance
- The number of animals sampled through slaughter surveillance in FY 2013, through September 30, 2013 was 42,888 compared to 40,776 in FY 2012; this represents an increase of 5 percent. The increase was due to increased sampling of goats.

Scrapie Surveillance Plan
- Implementation
  - States with regulatory scrapie slaughter surveillance (RSSS) collection sites will continue to sample all targeted sheep and goats.
States have State-of-origin sampling minimums for sheep.

- VS plans to require annual State-of-origin sampling minimum for goats to be met once the proposed rule revising title 9, *Code of Federal Regulations* (9 CFR) parts 54 and 79 is finalized. Proposed sampling minimums were provided for FY 2013 and FY 2014.

- The annual State-of-origin sampling minimum for sheep is 20 percent of the number required to detect a scrapie prevalence of 0.1 percent with 95 percent confidence or 1 percent of the breeding flock in the State, whichever is less. The objective is to sample sufficient sheep in a 5-year period to detect a scrapie prevalence of 0.1 percent with 95 percent confidence or 5 percent of the breeding flock in the State, whichever is less.

- The annual State-of-origin sampling minimum for goats is determined based on the States’ goat scrapie case incidence.
  - If a State has not had a goat scrapie case in the previous ten years, its annual goat sampling minimum is its prorated share of 3,000 samples, based on its proportion of the U.S. goat population as determined by the National Agricultural Statistics Survey (NASS) Sheep and Goat annual report.
  - If a State has had a goat scrapie case in the previous ten years, its annual goat sampling minimum is determined using the same method as is used for determining its annual sheep sampling minimum.

- Beginning in FY 2013, sheep and goat sampling minimums were calculated separately. As a result, a higher percentage of States will not achieve their sheep sampling minimums in FY 2013 compared with FY 2012. Approximately 40% will not achieve the sheep sampling minimums this fiscal year, compared to approximately 20% in FY 2012. States that did not meet their sheep sampling minimum in FY 2013 through RSSS but will be expected to find other sampling sources to meet the minimum in FY 2014.

*Note:* These are minimums. Plans are to continue to collect samples from the maximum number of targeted animals given the available budget.

**FY 2014 Priorities**

- VS priorities for scrapie are to focus on improving the effectiveness and cost efficiency of surveillance and to increase animal identification compliance. This will be accomplished in part by publishing a proposed rule that would address gaps in identification and require States to meet reasonable surveillance targets to remain consistent States. States must meet these targets for VS to demonstrate geographically appropriate surveillance to meet the criteria for freedom and have confidence that all of the remaining cases have been found.

- The rule would propose to:
SCRAPIE

- Give the APHIS Administrator authority to relieve requirements for sheep and goats exposed to scrapie types, such as Nor98-like, that do not pose a significant risk of transmission;
- Increase flexibility in how investigations can be conducted and allow the epidemiology in a specific flock to be given more consideration in determining flock and animal status;
- Add a genetic-based approach to regulation;
- Make goat identification requirements similar to those for sheep to support ongoing slaughter surveillance in goats (no changes will be made in the consistent State requirements regarding identification of goats in intrastate commerce);
- Tighten the definition of slaughter channels;
- Expand the individual identification requirement to all sexually intact animals unless moving as a group/lot (allows mixed-source groups moving in slaughter channels under 18 months);
- Limit the use of tattoos and implants to animals not moving through markets and not in slaughter channels; and
- Reduce recordkeeping requirements by making them similar to the current uniform methods and rules compliance guidance.

APHIS is also revising its scrapie import regulations to bring them more in line with the World Animal Health Organization (OIE) scrapie chapter. This will ensure that we meet OIE criteria for free status and prevent the reintroduction of scrapie after free status is achieved.

Scrapie Flock Certification Program (SFCP) Standards

On May 3, 2013 APHIS announced its intention to revise the SFCP. The comment period closed June 3, and the revised program has gone into effect. The SFCP standards were revised to increase the program’s ability to identify infected flocks quicker and to prevent infected flocks from becoming certified, to reduce costs associated with the program, and to increase SFCP contribution to scrapie surveillance. Scrapie program staff collected input from SFCP enrolled producers, industry representatives, and State and federal stakeholders. The public had a final opportunity to comment on the revised standards through a Federal Register notice.

In the revised SFCP the Complete category is eliminated. Additionally, the Select category is revised, and the Export category is slightly modified.

- **Select category**: APHIS has redirected monitoring from inspections to sampling. Select category flocks do not become certified. Specifics for this category include:
  - There are no annual inspections.
  - Owners must report clinical signs of scrapie.
  - Herd owners follow 9 CFR 79 requirements for recordkeeping and animal ID for their flocks.
  - Flock owners can acquire animals from any other flock, whether or not
that flock is enrolled in the SFCP.

- The sampling and testing requirements include:
  - Sheep or goats displaying clinical signs over 12 months of age;
  - Animals of any age that either test suspect, inconclusive or positive on a live animal scrapie test or have been determined to be a scrapie suspect by a State, Federal or accredited veterinarian; and
    - A minimum of one animal per 1-3 years, depending on flock size.

- **Export Category:** APHIS continues a high level of monitoring including inspections and sampling. Flocks can become Export Certified. Specifics for this category include:
  - Annual inspections are required.
  - Owners must report clinical signs of scrapie.
  - Animals must be identified with official SFCP ID.
  - Flock owners must meet rigorous recordkeeping requirements including maintaining records on every animal that leaves the flock for seven years.
  - Flock owners must have all cull animals inspected, including home slaughtered animals, for clinical signs of scrapie at least 30 days before culling.
  - Flock owners can acquire female animals and embryos only from other Export category flocks of equal or higher status.
  - Flock owners can use sheep and goat milk and colostrum and sheep and goat milk- and colostrum-derived products only from within their own flock or from other Export category flocks of equal or higher status.
  - The sampling and testing requirements include:
    - Sheep or goats displaying clinical signs over 12 months of age;
    - Animals of any age that either test suspect, inconclusive or positive on a live animal scrapie test or have been determined to be a scrapie suspect by a State, Federal or accredited veterinarian;
    - All found dead mature animals, including euthanized animals;
    - An annual sampling minimum of one test eligible animal tested for each year of status held (A flock will be removed from the program if the flock owner fails to submit at least one test eligible animal for two consecutive years.);
    - To gain six years in status, 15 test eligible animals must be sampled; and
    - The requirements for Export Certified status include:
      - seven years in status; and
      - Meet one of three sampling protocols
        - Standard: 30 test eligible animals
        - Alternative 1: test all genetically susceptible animals sold
Participants in the Complete category had the following options: (1) join the Export category with up to 5 years of status; (2) join the revised Select category; or (3) withdraw from the program.

For participants who held “Certified” status in the Complete category who convert to the Export category, APHIS will continue to publish their “Certified” status on its website for 3 years following the start date of the revised program, in addition to their new “Export Monitored” status, to allow them sufficient time to become Export Certified; and

If instead they convert to the Select category or withdraw from the program, APHIS will not continue to publish their “Certified” status on its website.

Scrapie Surveillance Projects:

- Since the start of slaughter surveillance in 2003 the prevalence of scrapie in sheep has declined 85 percent from 0.2 percent to less than 0.03 percent. The prevalence in goats is estimated to be less than 0.02 percent.
- APHIS continues to find new approaches to increase flock level surveillance.
- In FY 2013 APHIS initiated an effort to provide information on sample collection and to encourage producer and accredited veterinarian submission of samples.
- Instructions for producers and veterinarians to submit samples are now available on the APHIS Scrapie Web Page.
- In FY 2014 APHIS will conduct pilot projects in New Jersey and Arkansas to evaluate the efficiency of working with accredited veterinarians to collect samples for scrapie testing.

Update from Agriculture Research Service
David Schneider
USDA, Agriculture Research Service (ARS), Animal Disease Research Unit (ADRU)

The USDA-ARS unit in Pullman, Washington, conducts an integrated research program involving studies on scrapie transmission, diagnosis and susceptibility genetics in domestic sheep and goats. Accumulation of disease-associated prion protein (PrP\textsuperscript{Sc}) in the placenta of sheep is a recognized source for natural transmission of classical scrapie disease and environmental contamination. Much less is known about prion accumulation in the placenta of goats but our recent study demonstrated much less PrP\textsuperscript{Sc} accumulates in the placenta in goats, which calls into question its role in natural transmission. In a recent follow-up study, we now demonstrate that the placenta of goats does harbor prions infectious to other goats and sheep when exposed by the oral route. A study on Nor98-like scrapie in breeding ewes is now in its 6\textsuperscript{th} year.
Ewes were experimentally inoculated with brain homogenate obtained from a U.S. sheep with clinical Nor98-like scrapie. Recipient ewes are bred annually to examine the placenta for evidence of a transmissible agent. Placentas shed 2009-2013 were negative. In 2013, one recipient ewe developed an unrelated disease. At postmortem examination, abundant accumulation of PrP$\text{Sc}$ was observed only in the cerebellum of this ewe with much less accumulation in the hindbrain obex. This confirms that initial inoculation of these ewes has been successful. Monitoring continues in the remaining ewes of this study.

Improvements in tissue-based (rectal biopsy) live animal testing for scrapie with focus on application to goats continue. In addition, efforts toward developing a live-animal blood test have demonstrated the presence of prions (infectivity) in the blood of sheep and goats, even those with preclinical disease and within blood sample volumes routinely used in veterinary diagnostic work. A recent study also demonstrates PrP$\text{Sc}$ accumulation in lymphoid tissues of hemal nodes, small lymphoid organs that filter blood but not lymph. Collectively, these findings confirm that blood is a relevant target for continued assay development. We continue to develop methods for enriching the relevant blood fractions for assay and are now making efforts to adapt novel in vitro assays for detecting infectivity and prion-associated misfolding activity. A long term study examining the effect of prion genotype on susceptibility to goat scrapie and the effect of genetic changes on accuracy of live animal testing continue. Following oral infection at birth with placenta and brain-derived scrapie, goats with the highly susceptible genotype all developed clinical disease around 24 months. Goats with the less susceptible or long incubation genetics today remain clinically normal. Monitoring continues.

**Prion Transmission Through Milk**

Christina Sigurdson
University of California, San Diego School of Medicine, Department of Pathology

Prion disorders are caused by misfolded proteins that are naturally transmitted, causing a fatal neurological disease in animals. In sheep with classical scrapie, prions accumulate in the follicles of lymphoid tissues in addition to the brain and spinal cord. Follicular dendritic cells (FDCs) form a network within the follicles and accumulate high levels of prions during disease. Previous work in mice has revealed that follicular inflammation in non-lymphoid organs, such as kidney, results in prion accumulation and can lead to prion shedding, such as into the urine. We have found sheep with follicular mastitis and scrapie that have accumulated prions within the follicles of the mammary gland.

In follow-up studies, we found that sheep with scrapie and lentiviral mastitis secrete prions into the milk and infect nearly 90% of naïve suckling lambs. Taken together, lentiviruses may enhance prion transmission and conceivably sustain prion infections in flocks for generations. Work by other groups has also shown prion infectivity in all three milk fractions, cells, casein whey, and
Prion infectivity has also been detected in milk from sheep having the VRQ/VRQ genotype with no evidence of mastitis.

References

Committee Business:
The final response from the Committee’s 2012 Resolution (26, 9 and 30 Combined) relating to the export of sheep and goats was reviewed. In this response the USDA-APHIS-VS agreed to ask the World Organization for Animal Health (OIE) to modify the Scrapie Chapter to consider options such as genotyping to qualify animals for export. USDA-APHIS-VS agreed to make this request by Spring 2014, and would expect to see the Scrapie Chapter amended in Spring 2015 or 2016 if their revisions were to be accepted by OIE.

One of the Committee members updated the group on progress related to a 2010 Resolution #48. This resolution requested USDA, Food Safety Inspection Service (FSIS) to work with USDA-APHIS-VS and industry to identify and approve appropriate sites for radio frequency identification implants for goats and sheep. As a result, both the underside of the tail and the base of the ear are now approved sites for these implants.

No new resolutions or recommendations were introduced.

The Committee briefly discussed the challenges of obtaining scrapie surveillance samples from certain flocks and herds. Several members mentioned that one barrier to sample collection is the problem that the producers have with carcass disposal after the head has been removed. Members agreed that offering options to producers to help them properly dispose of these carcasses could significantly increase voluntary participation in surveillance. Options include to transporting carcasses to diagnostic laboratories or providing payment to the producers to offset the cost of carcass disposal.
Scott Bender, AZ; Deborah Brennan, GA; John Clifford, DC; Thomas Conner, OH; Walter Cook, WY; Stephen Crawford, NH; Linda Detwiler, NJ; Nancy East, CA; Effingham Embree, Jr., IL; Chester Gipson, MD; Joseph Huff, CO; Paul Jones, AL; Eileen Kuhlmann, MN; James Leafstedt, SD; Howard Lehmkuhl, IA; Mary Lis, CT; Jim Logan, WY; Linda Logan, TX; Francine Lord, CAN; David Marshall, NC; Michael Marshall, UT; Chuck Massengill, MO; Cheryl Miller, IN; Ronald Miller, PA; Jeffrey Nelson, IA; Charles Palmer, CA; Kris Petrini, MN; Suelee Robbe-Austerman, IA; Paul Rodgers, WV; Joan Dean Rowe, NC; Mo Salman, CO; A. David Scarfe, IL; William Shulaw, OH; Diane Sutton, MD; Peter Timm, CA; Stephen White, WA; Margaret Wild, CO; Ellen Mary Wilson, CA; William Wilson, KS; Nora Wineland, MO; David Winters, TX; Cindy Wolf, MN.

The Committee met on October 22, 2013 at the Town and Country, San Diego, California, from 1:00 to 4:30 p.m. There were 9 members and 12 guests present. The meeting proceeded with the following presentations and reports.

**Overview of Schmallenburg Virus: Lessons from a European Outbreak**
Rob Cordery-Cotter, Dept. of Animal Science, University of Wyoming

Dr. Cordery-Cotter presented the history of Schmallenberg Virus (SBV) incursion into Europe and the United Kingdom (U.K.), with excellent photos and case histories of clinical signs and symptoms. A complete power point of this presentation is available on the Committee web page, at www.usaha.org.

**Regulatory Updates for Sheep and Goat Importations**
Joyce Bowling-Heyward, NCIE, USDA-APHIS

Discussion initiated with discussion of bovine spongiform encephalopathy (BSE), Scrapie and other Transmissible spongiform encephalopathies (TSEs) in Ruminants, and impact on regulations concerning these. Schmallenberg Virus and potential for incursion was discussed, and need for surveillance and vigilance. A complete copy of this presentation is included at the end of this report.

**Amyloidosis in the Uterus of Goats**
Christina Sigurdson, University of California-San Diego

Dr. Sigurdson reported on cases of ten goats of three breeds in two counties of Northern California with unusual accumulation of Amyloid if the cotyledons of the uterus. Clinical signs of this condition are abortion in mid-to-late term pregnancy and a clear uterine discharge, failure to kid beyond due date with agalactia and clinical diagnosis of fetal death, and live kids and mummified fetuses, often occurring repeatedly over multiple years. Cause of this unusual site of Amyloid accumulation is unknown. Necropsy as a means
of diagnosis of cause of abortion was discussed. A complete copy of this presentation is included at the end of this report.

A Sheep Genetic Test Based on Zinc Finger Genes for Control of Ovine Progressive Pneumonia Virus Replication and Other Discoveries

Stephen N. White, USDA-ARS Animal Disease Research Unit, Dept. Veterinary Microbiology and Pathology, Washington State University (WSU)

Summary: Ovine progressive pneumonia virus (OPPV) is a small ruminant lentivirus present in one fourth of U.S. sheep. It can cause interstitial pneumonia, cachexia, mastitis, and arthritis in sheep. There is no preventive vaccine and no cure, but host genetics has been known to play a role in both susceptibility to and control of OPPV. Variants in the TMEM154 gene have been consistently associated with odds of infection, but no genetic test has been validated for control of OPPV post-infection. A recent genome-wide association study found strong association between a zinc finger gene region and control of OPPV, as measured by proviral concentration. We examined additional markers in this same region and identified a small insertion-deletion variant near the ZNF389 gene that was associated with OPPV proviral concentration in multiple flocks containing over 1,300 OPPV-positive sheep. Specifically, the insertion homozygotes at this locus had approximately half the OPPV proviral concentration compared to other genotypes. This association was observed in every individual flock with at least 35 insertion homozygote, OPPV-positive sheep. This included a severely affected crossbred flock with very high prevalence (over 90% of sheep at least two years of age) and very high proviral concentrations (4-5 fold higher than any other flock tested). This validates the insertion-deletion variant for OPPV proviral concentration, which is related to severity of disease. Especially since OPPV is an RNA virus with a much higher mutation rate than the sheep host, combining multiple genetic tests that operate by separate mechanisms may be helpful in providing multiple hurdles for the virus to overcome. Future work will examine additional potential phenotypic associations with production and other disease traits.

A second project addressed the open question of highly selected genetic regions in domestic sheep. The sheep HapMap project identified approximately 30 such regions, including those containing horned/polled and coat color-related genes, but the majority of responsible genes have not been identified. Michael Gonzalez recently found strong associations with both red blood cell traits and lifetime weight of lamb weaned for one of these highly selected regions. Further, he identified a divergent artiodactyl repeat containing a MYADM-like gene that may explain these results. Additional characterization of this divergent repeat is ongoing.

Coxiella infected goat farms

Tahnee Szymanski, DVM, National Association of State Public Health Officials

Dr. Szymanski presented a case overview of Coxiella infected goat farms, and then presented the position paper produced by the Q Fever Committee. The paper is available at http://www.nasphv.org/Documents/Q_Fever_2013.pdf
The paper includes excellent resources for Coxiella diagnosis and control. A complete copy of the presentation is included at the end of this report.

Committee Business:

Three resolutions from past years were reviewed and adopted with further requests:

2012 RESOLUTION NUMBER: 29 APPROVED
SOURCE: COMMITTEE ON SHEEP AND GOATS
SUBJECT MATTER: MINOR USE ANIMAL DRUG PROGRAM
 Moved, seconded and passed that Committee on Sheep and Goats 2012 Resolution #29 SUBJECT MATTER: MINOR USE ANIMAL DRUG PROGRAM (MUAD) remains of strong interest to the Committee. Committee recommends that this resolution is still important and ask that the Government Relations Committee take this resolution forward. It was further noted that the MUMS program which is referenced In the interim response relates only to projects with protocol concurrence, and that the MUAD Program is critical in providing information essential to food safety and animal care and welfare of sheep, goats and other minor species.

2011 RESOLUTION NUMBER: 34 and 32 Combined APPROVED
SOURCE: COMMITTEE ON PUBLIC HEALTH AND RABIES
COMMITTEE ON SHEEP AND GOATS
SUBJECT MATTER: Q-FEVER (COXIELLA BURNETTI) VACCINE FOR SHEEP AND GOATS AND FOR HUMANS IN THE UNITED STATES
 Moved, seconded and passed that Committee on Sheep and Goats 2011 Resolution #34 and 32 Combined SUBJECT MATTER: Q-FEVER (COXIELLA BURNETTI) VACCINE FOR SHEEP AND GOATS AND FOR HUMANS IN THE UNITED STATES remains of strong interest to the Committee. Committee recommends that this resolution is still important and be carried forward. Interim response provided some promise of progress; final response with updates would be appreciated.

2011 RESOLUTION NUMBER: 28 APPROVED AS AMENDED
SOURCE: COMMITTEE ON SCRAPIE
SUBJECT MATTER: SEPARATE SHEEP AND GOAT COMMODITY HEALTH LINE ITEM
 Moved, seconded and passed that Committee on Scrapie 2011 Resolution #28 SUBJECT MATTER: SEPARATE SHEEP AND GOAT COMMODITY HEALTH LINE ITEM is still important to the Committee on Sheep and Goats. Committee recommends that this resolution is still important and ask that the Government Relations Committee take this resolution forward.

A new resolution was adopted to address diary health requirements; State or Regional Brucellosis and Tuberculosis Classification for Sheep and Goats.
REPORT OF THE COMMITTEE ON TRANSMISSIBLE DISEASES OF POULTRY AND OTHER AVIAN SPECIES
Chair: Julie Helm, SC
Vice Chair: Vacant

Bruce Akey, NY; John Atwell, NC; Lyndon Badcoe, WA; George Badley, AR; Deanna Baldwin, MD; Marilyn Balmer, MD; Richard Breitmeyer, CA; Deborah Brennan, GA; Paul Brennan, IN; Denise Brinson, GA; Nancy Chapman, MD; Bruce Charlton, CA; Steven Clark, NC; Stephen Crawford, NH; Sherrill Davison, PA; Thomas DeLiberto, CO; Brandon Doss, AR; Aly Fadly, MI; Naola Ferguson-Noel, GA; Tony Forshey, OH; Patricia Fox, NC; Tony Frazier, AL; Marion Garcia, WV; Samantha Gibbs, VA; Isabel Gimeno, NC; Eric Gingerich, IN; Eric Gonder, NC; Tanya Graham, SD; James Grimm, TX; Scott Gustin, AR; William Hartmann, MN; Rudolf Hein, DE; Michael Herrin, OK; Bill Hewat, AR; Linda Hickam, MO; Dee Hilliard, OK; Heather Hirst, DE; Donald Hoenig, ME; Guy Hohenhaus, MD; Floyd Horn, MD; Danny Hughes, AR; Dennis Hughes, NE; John Huntley, WA; Mark Jackwood, GA; Jarra Jagne, NY; Eric Jensen, AL; Annette Jones, CA; Donna Kelly, PA; Gary Kinder, WV; Bruce King, UT; Patrice Klein, MD; Spangler Klopp, DE; Michael Kopp, IN; Elizabeth Krushinskie, DE; Dale Lauer, MN; Randall Levings, IA; Anne Lichtenwalner, ME; Tsang Long Lin, IN; Mary Lis, CT; Edward Mallinson, MD; David Marshall, NC; Sarah Mason, NC; Todd McAloon, MN; Gay Miller, IL; Patti Miller, GA; Kristi Moore Dorsey, KS; Lee Myers, GA; Thomas Myers, MD; Kakambi Nagaraja, MN; Steve Olson, MN; Claudia Osorio, MD; Kristy Pabilonia, CO; Mary Pantin-Jackwood, GA; Boyd Parr, SC; James Pearson, IA; Angela Pelzel-McCluskey, CO; Jewell Plumley, WV; Willie Reed, IN; G. Donald Ritter, DE; Lisa Rodin, IN; Keith Roehr, CO; Charles S Roney, GA; A. Gregorio Rosales, AL; Michael Rybolt, DC; Mo Saif, OH; John Sanders, WV; Yuko Sato, IN; David Schmitt, IA; Andy Schwartz, TX; Jack Shere, NC; Marilyn Simunich, ID; Terry Slaten, AL; John Smith, GA; Philip Stayer, MS; Bruce Stewart-Brown, MD; Patricia Stonger, WI; Darrel Styles, MD; David Swayne, GA; Manoel Tamassia, NJ; Alberto Torres, AR; H. Wesley Towers, DE; Deoki Tripathy, IL; Susan Trock, GA; Arnaldo Vaquer, VA; Jesse Vollmer, ND; Shauna Voss, MN; Patricia Wakenell, IN; Don Waldrip, TN; Doug Waltman, GA; James Watson, MS; Steve Weber, CO; Richard Wilkes, VA; Ching Ching Wu, IN; Ernest Zirkle, NJ.

The Committee met on October 21, 2013 from 1:00 to 5:50 p.m. and October 22, 2013 from 1:00 to 3:15 p.m. at the Town and Country, San Diego, California. There were 43 Committee members and 41 guests in attendance, for a total of 84 participants. Chair Julie Helm presided. The Chair welcomed the Committee, summarized the 2012 meeting, and reported on the responses to the 2012 Resolution:


No response from DHS has been received by USAHA.
Dr. Maurice Pitesky, University of California, Davis, CA, presented the Spatial and temporal Epidemiology of very virulent Infectious Bursal Diseases Virus in California and is included in these proceedings.

Dr. David Suarez, USDA-ARS-SEPRL, Athens, GA, in lieu of Dr. David Swayne, Chair of the Avian Influenza and Newcastle Disease Subcommittee, gave the Subcommittee report. The report was approved by the Committee and is included in these proceedings.

Dr. David Suarez, USDA-ARS-SEPRL, Athens, GA, gave the Southeastern Poultry Research Laboratory Research (SEPRL) Update. The report is included in these proceedings.

Dr. Jane Rooney, USDA-APHIS-VS, Riverdale, MD, in lieu of Dr. Fidel Hegngi, USDA-APHIS-VS, presented the Live Bird Marketing Systems (LBMS) Update. The report is included in these proceedings.

Dr. Thomas Myers, USDA-APHIS-VS, in lieu of Dr. Denise Brinson, USDA-APHIS-VS, National Poultry Improvement Plan (NPIP), Conyers, GA, presented the annual status report for the NPIP and is included in these proceedings.

Dr. John Smith, Fieldale Farms, Baldwin, GA, in lieu of Dr. John Glisson, US Poultry & Egg Association, Tucker, GA, presented the U.S. Poultry & Egg Association Research Report and is included in these proceedings.

Dr. Jamie Slingluff, University of MN, St. Paul, MN, presented the risk assessment associated with live poultry movement in a control area during a HPAI outbreak and is included in these proceedings.

Dr. John Smith, Fieldale Farms, Baldwin, GA, in lieu of Dr. David Shapiro, Perdue Farms, Salisbury, MD, presented the annual industry report for the broiler industry and is included in these proceedings.

Dr. Eric N. Gingerich, Diamond V, Zionsville, IN, delivered the annual industry report for the table egg industry and included in these proceedings.

Dr. Steven Clark, Zoetis, West Jefferson, NC, gave the annual industry report for the turkey industry and is included in these proceedings.

Dr. Michelle Walsh, Augusta, ME, presented the annual report for backyard/small commercial flock report and is included in these proceedings.

The Monday session adjourned at approximately 5:50 p.m.. The meeting reconvened at 1:00 p.m. on Tuesday, October 22, 2012.

Dr. Sarah Tomlinson, USDA-APHIS-VS-NVSL, Fort Collins, CO, gave an overview of the National Animal Health Laboratory Network (NAHLN) concept paper and is included in these proceedings.

Dr. Mia Torchetti, USDA-APHIS-VS-NVSL, Ames, IA, delivered the annual status report for NVSL Avian Import Activities and Avian Influenza and Newcastle Disease Diagnostics and is included in these proceedings.

Ms. Brenda Morningstar, USDA-APHIS-VS-NVSL, Ames, IA, delivered the annual NVSL Diagnostic Bacteriology report and is included in these proceedings.
Dr. Kristy Pabilonia, Colorado State University, Fort Collins, CO, presented salmonella in poultry at fair, shows and in feed stores and is included in these proceedings.

Dr. Doug Waltman, GA Poultry Laboratory Network, presented an overview of the USAHA Committee on Salmonella meeting. His report is included in these proceedings.

Dr. Michael David, Director of Sanitary International Standards, National Center for Import and Export, USDA-APHIS-VS, Riverdale, MD, was unable to attend the meeting due to the recent Federal Government shutdown, but had sent a report on the update on the World Organization for Animal Health (OIE) poultry activities and is included in these proceedings.

The Avian Diseases & Oncology Laboratory, Lansing, MI, update on current research activities at the laboratory was unable to be presented due to the recent Federal Government shutdown.

Committee Business

Committee Old Business: There was no old business.

Committee New Business: Dr. Dale Lauer, MN Board of Animal Health, Willmar, MN was nominated as the new Chair and Dr. Sarah Mason, NC Department of Agriculture & Consumer Services, Raleigh, NC was nominated as Vice Chair.

The Committee approved a Resolution entitled “Objection to Salmonella linked to human illnesses being declared adulterants” urging USDA to refrain from declaring any serotype of Salmonella an adulterant of raw poultry meat products, intact or ground, because this action is scientifically unwarranted and unlikely to result in measurable reductions in the national salmonellosis burden.
Newcastle Disease. Between July 2013 and June 2013, 75 countries had Newcastle disease in poultry or poultry and wild birds, either as suspect cases, infections without clinical disease, infections with clinical disease or limited infections of poultry. An additional five countries had Newcastle disease in wild birds only. Many developing countries are endemic. Few actual outbreaks were reported except in NDV-free countries that reported outbreaks.

High Pathogenicity Avian Influenza. Since 1959, there have been 33 HPAI epizootics. For 2012-2013, H5N1 HPAI was enzootic in six countries: 1) self-declared enzootic (Egypt and Indonesia), 2) continue to report occurrences of outbreaks over multiple years (Vietnam and Bangladesh), or 3) have published data in the literature of continuous reports of infection and molecular evidence of virus continual presence in country (China and east India).

For July 2012- September 2013, 17 countries have reported outbreaks of H5N1 domestic poultry: 12 with H5N1 (Bangladesh, Bhutan, Cambodia, China, Egypt, Hong Kong, India, Indonesia, North Korea, Myanmar, Nepal and Vietnam), two with H5N2 (South Africa and Chinese Taipei), one with H7N3 (Mexico), and two with H7N7 (Australia and Italy).

There were five epicenters of H5N1 HPAI: 1) Egypt; 2) Ganges Delta (India, Bhutan, Nepal and Bangladesh), 3) Mekong Delta (south Vietnam and Cambodia), 4) Indonesia, and 5) east to southeast Asia (China, Hong Kong, North Korea, northern to central Vietnam and Myanmar). For July 2012 – September 2013, six subclades of H5N1 HPAI virus have been reported in poultry and wild birds: 1) subclade 2.3.2.1, most frequently reported with wide geographic dispersion including northern and central Vietnam, India, Bangladesh, China, Hong Kong, India, Nepal, and Bhutan); 2) subclade 2.2.1 viruses in Egypt; 3) subclade 7.2 in northern China and Vietnam; 4) subclade 2.1.3.2 and 2.3.2.1 in Indonesia; and 5) subclade 1.1 in southern Vietnam and Cambodia. Human infections were reported with clades 2.3.4.2 (China), 2.2.1 (Egypt), 2.1.3.2 (Indonesia) and 1.1 (Vietnam and Cambodia).

Five HPAI outbreaks have involved subtypes other than H5N1. An outbreak of H5N2 HPAI began in 2011 in South Africa, affecting only ostriches, and continued until resolution in mid-2013. In total, 50 outbreaks have occurred, affecting 57,569 ostriches resulting in 16,402 cases with 4930 birds being destroyed and 47,677 handled via controlled slaughtered. The outbreak was resolved 3 July 2013.

An unrelated outbreak of H5N2 HPAI occurred in Chinese Taipei, being the second such outbreak in Chinese Taipei with first report on 27 February 2012 and resolved 7 August 2012. This involved native chickens on Penchu Islands with 200 deaths and 631 culled chickens. Chinese Taipei has ongoing outbreaks of North American lineage of H5N2 low pathogenicity avian
influenza LPAI) virus with first report on 21 October 2008 and most recent 9 September 2013. The H5N2 HPAI virus was derived from the H5N2 LPAI.

The H7N3 HPAI epizootic in central Mexico has re-emerged. Initial cases were reported in Jalisco 21 June 2012 with last cases on 12 September 2012, and declaration of freedom 12 December 2012. The epizootic reemerged in Aguascalientes 3 January 2013, with 64 total outbreaks in the states of Jalisco, Aguascalientes, Guanajuato and Puebla. In the resurgence, layers, broiler breeders, backyard poultry and broiler farms were affected with 550,322 deaths, 6,230,022 culled and 284,015 slaughtered birds. The most recent case was 19 August 2013.

Two unrelated H7N7 HPAI epizootics have occurred in Italy and Australia. The Australian outbreak began 11 November 2012 in a free-range egg layer farm in New South Wales. The farm experienced 5000 deaths and the remaining 45,000 chickens were culled. The source of the virus was unknown, but farm had a pond with wild ducks. The Italian outbreak occurred in Emilia-Romagna province of Northern Italy, a geographic location of previous HPAI and LPAI outbreaks. The outbreak began on 15 August with the last cases on 4 September 2013. In total, six outbreaks occurred: four in commercial layers, one in turkey flock and one in a backyard free-range layer flock. Deaths numbered 5676 and 946,982 poultry were culled.
During the winter of 2008, researchers at California Animal Health and Food Safety (CAHFS) identified a more virulent type of Infectious Bursal Disease (IBD) called very virulent IBD (vvIBD) not previously seen in North America in a commercial laying flock in northern California. Since then, several other commercial and backyard facilities mainly northern California have had flocks affected by the same strain and other unique (previously unseen) strains/subtypes of IBD.

The vvIBD-working group, which includes researchers and veterinarians from a wide range of departments and universities including the California Department of Food and Agriculture (CDFA), UC Davis, UC Cooperative Extension, Ohio State University, USDA and the California Department of Fish and Game, has been studying the molecular biology, ecology, and epidemiology of these strains in order to better understand how to manage the disease. Since 2008, these combined efforts have led to: Gross pathology and PCR assays for endemic IBD and vvIBD of over 1,500 bird samples (representing over 200 backyard (BY) and commercial farms throughout California); the development and validation of a PCR assay for historical bursal samples in order to assess if the different versions of IBD (including vvIBD) were present prior to 2008; identification of 4 new subtypes of vvIBDV unique to CA; testing of the various types of the virus in pathogen free birds in order to assess the pathogenicity of the different types of IBD; testing for IBD in wildlife geographically associated with the affected farms; GIS mapping and spatial and temporal statistics of disease spread; advanced decision based modeling which takes data and stakeholder opinions into account; outreach efforts (4-H talks, scientific presentations, peer reviewed articles) with commercial, backyard, regulatory, and the scientific community; and selected paper publications, including Pitesky, ME. Cataline, K. Crossley, B. Poulos, M. Ramos, G. Willoughby, D. Woolcock, P. Cutler, G. Bland, M. Tran, J. Jackwood, D. Allen, L. Breitmeyer, R. Jones, A. Forsythe, K. Senties, G. & Charlton B. Historical, Spatial, and Time-Space Epidemiology of very virulent Infectious Bursal Disease (vvIBD) in California: A Retrospective Study 2008-2011, Avian Diseases 2013 (in press); Jackwood, D.J, B. M. Crossley, S. T. Stoute, S. Sommer-Wagner, P. R. Woolcock and B. R. Charlton. Diversity of genome segment B from infectious bursal disease viruses in the United States. Avian Dis. 56:165-172, 2012; and Jackwood, D. J., S. E. Sommer-Wagner, B. M. Crossley, S. T. Stoute, P. R. Woolcock and B. R. Charlton. Identification and pathogenicity of a natural reassortant between a very virulent serotype 1 infectious bursal disease virus (IBDV) and a serotype 2 IBDV. Virology 420:98-105, 2011.

Conclusions: Based on our surveillance and the molecular epidemiology of the virus we believe the virus was most likely introduced via legal trading of specialty birds between the European Union and one farm in the U.S. that
specializes in procuring specialty breeds. That farm then sold infected birds to BY enthusiasts in California where the virus then spread further primarily within the BY specialty bird community. This route of spread is particularly worrisome because of the persistence of the virus in the environment coupled with the general lack of biosecurity that most BY facilities have. California is currently considering multiple approaches toward controlling the spread of vvIBDV. To our knowledge, California is currently the only state with a robust, on-going surveillance program for variant forms of IBD including vvIBD. Due to our current understanding of how BY birds are being ‘web-traded’ via websites such as Craig’s List, we believe IBD surveillance for virulent strains in other states would improve the scientific understanding of this disease.
Avian influenza:

The recent outbreaks of H7N9 influenza in China has resulted in many human cases with a high fatality rate. Poultry have been suspected as the source of infection based on sequence analysis and virus isolations from live bird markets, but it’s not clear which species of birds are most likely to be infected and shedding sufficient levels of virus to infect humans. Experimental studies with intranasal inoculation of chickens, Japanese quail, pigeons, pekin ducks, mallard ducks, muscovy ducks, and embden geese with A/Anhui/1/2013 virus resulted in infection but no clinical signs. Virus shedding in quail, chickens, and Muscovy ducks was much higher and prolonged than in the rest of the species. Quail effectively transmitted the virus to direct contacts but pigeons and pekin ducks did not. In all species, virus was detected at much higher titers from oropharyngeal swabs than cloacal swabs. The high levels of viral replication in the upper respiratory tract are characteristic of poultry-adapted influenza viruses.

Studies were also conducted looking at co-infection studies with avian influenza and other viral pathogens. Studies with infectious bursal disease demonstrated the expected decrease in the immune response to avian influenza vaccines after early infection with infectious bursal disease. An increase in severe clinical disease was also observed and is likely related to the decreased immune response.

Studies were also conducted looking at avian influenza vaccines with different challenge strains from Indonesia. Indonesia has clade 2.1 viruses, but the virus has considerably drifted since the introduction in 2003. This has resulted in some viruses that were not adequately protected by any of the existing commercially available vaccines. This supports the need to combine surveillance studies to understand what is circulating in a country with targeted vaccine selection criteria to provide adequate protection for avian influenza through vaccination.

Pathogenesis studies were performed with swine influenza viruses in poultry. Many new variants of H3N2 viruses are circulating in swine in the U.S. and present a historical risk of spreading to turkeys. Studies showed the three variant viruses could infect adult turkeys and quail, but not young turkeys showing an age tropism.

Newcastle Disease Virus:

Research on Newcastle disease virus (NDV) continues with two different areas being highlighted. The first study examined whether virulent NDV, when infecting laying hens, would result in virus being present inside the egg or on the surface of the egg. Naïve and vaccinated birds were studied. The naïve birds did shed virus in and on the egg, and the vaccinated birds had much less
virus detected with virus only detected on the egg shell. Studies were also
done looking at the variability of NDV around the world and the impact on
vaccination programs. It is still correct to believe that NDV is a single serotype,
such that a vaccine with any NDV seed strain will be protective against any
other NDV virus. However, the closer the match of vaccine to the challenge
strain results in better protection as measured by virus shedding, which
contributes to disease control and potentially eradication. One approach to
make homologous vaccines involves substituting the HN and modified F genes
from a virulent strain into a vaccine backbone using a reverse genetics
approach. The vaccines strains in laboratory studies performed well in
protecting chickens and reducing viral shed.

**Enteric Diseases of Poultry:**

We continued to analyze the large amount of data accumulated during a
comparative analysis of the ribonucleic acid (RNA) virus communities present
in selected chicken and turkey gastrointestinal tracts. Specifically, we
compared the RNA virus metagenome of a healthy turkey flock and a turkey
flock experiencing enteric disease signs. This comparison revealed the
presence of a large number of small RNA virus sequences in the affected
turkey flock that were not present in the healthy turkey flock. Specifically, a
large amount of picornavirus sequence was discovered in turkey flocks
experiencing enteric disease signs. Based upon the success of the turkey gut
viral metagenome from a flock affected by enteric disease, a comparative
metagenome comparing the ribonucleic acid (RNA) viral metagenomes from a
healthy flock and a “sister flock” affected by enteric disease was further
analyzed. This analysis revealed numerous picornaviruses that were
determined to be homologous to the avian turdiviruses and the turkey and duck
hepatitis viruses. Further, molecular diagnostic assays targeting the
picornavirus capsid protein gene were designed and tested using archived and
field enteric samples. We also developed a molecular diagnostic test targeting
the novel enteric picobirnaviruses discovered in the turkey gut. This assay was
fully validated in our laboratory and targets the novel turkey picobirnavirus
ribonucleic acid (RNA)- dependent RNA polymerase (RdRp) gene.

Avian metapneumovirus (aMPV) and Newcastle disease virus (NDV) are
threatening avian pathogens that cause sporadic but serious respiratory
diseases in poultry worldwide. In our studies, reverse genetics technology was
used to construct NDV LaSota vaccine strain-based recombinant viruses that
express the glycoprotein (G) of aMPV, subtype A or B, as bivalent, next-
generation vaccines. These recombinant viruses, rLS/aMPV-A G and
rLS/aMPV-B G, showed slight attenuation in vivo, yet maintained similar
growth dynamics, cytopathic effects, and virus titers in vitro when compared to
the parental LaSota virus. Vaccination of turkeys with rLS/aMPV-A G or
rLS/aMPV-B G conferred complete protection against velogenic NDV, CA02
challenge strains and partial protection against homologous pathogenic aMPV
challenge. These results suggest that the LaSota recombinant virus and other
low pathogenic NDV vaccines, including enterotropic strains may be safe and
effective vaccine vectors against respiratory and enteric pathogen induced poultry viral diseases.

Avian Herpesviruses (Marek’s Disease and Infectious Laryngotracheitis):

To construct cell-free Marek’s disease vaccine candidates three herpesvirus of turkey (HVT) recombinants were generated in order to create an HVT helper virus. The first recombinant contained a single deletion in the packaging site. The second recombinant contained deletions in both packaging sites. The third recombinant containing double deletions in the packaging sites also contained a packaging site flanked by lox P sequences. The viability of this third recombinant was assessed on CEFs expressing the Cre recombinase and its complete genomic sequence was determined. Previously using a three step recombination scheme it was believed that this construct was successfully created; however, the complete nucleotide sequence of this recombinant indicated that the construct contained a deletion in a critical cis-acting site needed for packaging. In 2013 this construct was successfully repaired to be packaging competent.

The genomic ILTV program involved comparative analysis of virulent and vaccine strains of gallid herpesvirus type 1. In collaboration with the University of Georgia the nucleotide sequences of six vaccine strains [derivative of chicken embryo origin (CEO) and tissue culture origin (TCO)] was determined using hybrid next generation sequencing technology. The sequences of these strains have been instrumental in the identification of genes associated with virulence and will provide the blueprints for the generation of new vaccine containing deletion in these genes. Comparative sequence analysis between the vaccine strains and virulent strains indicated surprising conservation at the amino acid lengths of the majority of open reading frames. However, numerous single nucleotide polymorphisms were identified and it is largely suspected that virulent isolates were the result of reversion of the vaccines to generate virulent progeny. Furthermore we have identified a gene within the TCO genome that contains a premature stop codon which results in a truncation protein for the ORF-C gene. By deleting this gene in a genome of a virulent virus, we could generate a potential vaccine strain that is safe and can protect poultry against virulent challenge.
In October 2004, the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS) Veterinary Services (VS) published Uniform Standards for NAI Prevention and Control in the LBMS to establish a more consistent approach by participating States in the control of NAI in the LBMS. In August 2012, VS published an updated edition of the Uniform Standards, which includes: adding of the definition of cleaning and disinfection and dealers. The definition of poultry was changed to reflect the OIE standard definition. Significant changes were made to the Bird Testing and Recordkeeping section. The use of rRT-PCR for testing domestic duck cloacal samples was added to the Official Testing of Specimens section.

State participation is voluntary. Participating States will enact regulations for compliance of their live bird markets (LBMs), producers, and distributors. All LBMs, producers, and distributors that supply the retail markets must be registered or licensed with the State and allow Federal and State inspectors access to their facilities, birds, and records. These facilities must also have written biosecurity protocols in place. APHIS coordinates and administers the program. APHIS provides field and laboratory personnel and resources to assist States with implementation and compliance with program requirements.

In February 2013, the annual LBM Working Group business meeting was held in Seattle, Washington, to address the LBMS NAI Prevention and Control program concerns. More than 55 participants representing 32 States attended the meeting including APHIS field, regional, and headquarters staff; State Department of Agriculture representatives; and LBMS industry stakeholders. Participants discussed the program’s progress, shared ideas for continued program development, and agreed on further implementation of the program.

In addition, the working group discussed: (1) FY2013 Avian Health umbrella cooperative agreement work plans; (2) VS guidance document on response, communications, and investigation of NAI in domestic poultry; (3) trans-border communication for foreign animal disease preparedness; (4) laboratory diagnostic support for foreign animal disease preparedness and response; (5) update on H7N3 HPAI outbreak in Mexico; (6) VS guidance document on procedures for flock plans, compliance agreements and indemnity claims in cases of H5/H7 LPAI in poultry; (7) methods for collection of specimens for AIV and NDV; (8) the National Veterinary Services laboratories (NVSL) 10-4 submission form and reporting of results. Special presentations were given on: risks of avian influenza and Newcastle disease from wild water birds in Washington State; human Salmonella infections associated with live bird markets; the National Animal Health Monitoring System (NAHMS) urban chicken study and plans for 2013 layer study. Further, the Agricultural Research Service and NVSL discussed avian influenza research and diagnostic updates. The working group also learned about the
Poultry Handling and Transportation Quality Assurance (PHTQA) training program. This project is a collaborative effort between personnel from Pennsylvania State University, Diamond V and USDA-APHIS-VS. The program involves certification training for poultry transporters and catch crews. The training covers biosecurity, disease recognition, the American Veterinary Medical Association (AVMA) approved methods of euthanasia, transportation, safety, emergency response and media relations. Training materials are available in English and Spanish. The website address for this program is www.poultryhandling.org.

The annual Live Bird Marketing System Continuing Education (LBMS-CE) Training Course was held at the Western University of Health Sciences, College of Veterinary Medicine, Pomona, California, in August 2013. A total of 57 participant attended from 15 States. The LBMS-CE Training Course is designed to provide veterinary medical officers (VMOs), animal health technicians (AHTs), and other regulatory personnel who are involved with the live bird marketing system program with the basic information and skills they need to successfully carry out their job responsibilities. The goals and objectives of the course are to provide participants with the ability to: (1) evaluate and define LBMS stakeholder activities and ensure compliance with applicable state laws, program standards, and licensing/registration requirements through consistent audit and evaluation of paper records within the LBMS; (2) identify and evaluate biosecurity and disease risks in auction markets, swap meets, small sales, fairs, shows, and flea market segments of the LBMS; (3) provide education and outreach information to bird marketers on appropriate mitigation techniques (e.g., cleaning, disinfection, best biosecurity principles and practices, and transport to retail market); (4) communicate knowledge regarding biosecurity issues and best practices to various stakeholder groups via pre-prepared presentations; (5) define the different components of the LBMS; (6) understand the essential symptoms of poultry respiratory diseases; (7) learn the basic information and skills required for LBMS NAI surveillance activities; (8) identify where the U.S. LBMS NAI surveillance program fits within the context of a State’s avian influenza response and containment plan; (9) identify the roles of VMOs and AHTs in supporting the implementation of activities and standards proposed by the LBMS Working Group subcommittees; (10) develop evaluation tools for risk assessment and risk communication, and determine what type of biosecurity certification system is appropriate for extending training to LBMS stakeholders; (11) define poultry-related issues involving social cultures within the various LBMS; and (12) perform proper techniques of bird restraint, swabbing, blood collection, necropsy, rapid field diagnostic tests (Zoetis Flu Detect and Abaxis VetScan Avian Influenza Rapid Test), and euthanasia techniques.

The training also included field trips to evaluate biosecurity and records auditing at several retail live bird markets in China town, Los Angeles, California. Participants also visited a spent hen and brown pullet supplier for the California live bird markets to conduct an emergency scenario exercise.
In fiscal year (FY) 2013, surveillance in the LBMS remains a high priority. Approximately 149,232 tests have been conducted for AI surveillance in the LBMS for the first three quarters. Tests included agar gel immunodiffusion, real-time reverse-transcriptase polymerase chain reaction (rRT-PCR), antigen capture immunoassay, and virus isolation. For virus isolation and rRT-PCR, each sample may represent five or eleven individual swabs pooled for a composite single sample/test.

Since the H5/H7 LPAI LBMS program was initiated in 2004, the number of LBMS positive premises has decreased steadily. FY2007 marked the successful eradication of the low pathogenicity H7N2 AI virus that had been circulating in the LBMS in the Northeast United States since 1994. The H7N2 virus has not been detected since April 2006. In FY 2013, there was one detection of H5N2 LPNAI virus in the LBMS. In addition, there were four detections of H5 viral RNA with no virus isolated. Detection was from multiple ducks and red fowl.
Pullorum-Typhoid Status: There were no isolations of Salmonella pullorum in commercial poultry in FY 2011 or FY 2012. There were 2 isolations of Salmonella pullorum in backyard birds in FY 2011. There were no isolations of Salmonella pullorum in any type of poultry in FY 2013. There have been no isolations of Salmonella gallinarum since 1987 in any type poultry in the U.S.

| Hatchery Participation in the National Poultry Improvement Plan Testing Year FY2013 |
|---------------------------------|-----------------|
| Egg and Meat-Type Chickens:     |                 |
| Participating                   | 250             |
| Turkeys:                        |                 |
| Participating                   | 33              |
| Waterfowl, Exhibition Poultry   |                 |
| and Game Birds:                 |                 |
| Participating                   | 788             |

<table>
<thead>
<tr>
<th>Egg-Type Chicken Breeding Flocks in the National Poultry Improvement Plan Participation and Testing Summary Testing Year FY2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. Pullorum-Typhoid Clean Flocks:</td>
</tr>
<tr>
<td>Birds in Flocks:</td>
</tr>
<tr>
<td>Birds Tested:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Meat-Type Chicken Breeding Flocks in the National Poultry Improvement Plan Participation and Testing Summary Testing Year FY2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. Pullorum-Typhoid Clean Flocks:</td>
</tr>
<tr>
<td>Birds in Flocks:</td>
</tr>
<tr>
<td>Birds Tested:</td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th>Turkey Breeding Flocks in the National Poultry Improvement Plan Participation and Testing Summary Testing Year FY2013</th>
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<tbody>
<tr>
<td>U.S. Pullorum-Typhoid Clean Flocks:</td>
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<tr>
<td>Birds in Flocks:</td>
</tr>
<tr>
<td>Birds Tested:</td>
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</tbody>
</table>
### Waterfowl, Exhibition Poultry, and Game Birds Breeding Flocks in the National Poultry Improvement Plan Participation and Testing Summary Testing Year FY2013

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</tr>
</thead>
<tbody>
<tr>
<td>U. S. Pullorum-Typhoid Clean Flocks</td>
<td>6,001</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Birds in Flocks</td>
<td>1,764,432</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Birds Tested</td>
<td>147,980</td>
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**Mycoplasma gallisepticum, Mycoplasma synoviae, and Mycoplasma meleagridis positive breeding flocks - National Poultry Improvement Plan FY2013**

<table>
<thead>
<tr>
<th></th>
<th>WEGBY</th>
<th>Egg-Type</th>
<th>Meat-Type</th>
<th>Turkeys</th>
</tr>
</thead>
<tbody>
<tr>
<td>M. gallisepticum</td>
<td>38</td>
<td>0</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>M. synoviae</td>
<td>30</td>
<td>0</td>
<td>86</td>
<td>4</td>
</tr>
<tr>
<td>M. meleagridis</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

**U.S. Salmonella enteritidis Clean Egg-Type Breeding Chickens**

No. of flocks and birds in flocks by State with *Salmonella enteritidis* isolates, 1990-2013

<table>
<thead>
<tr>
<th>State</th>
<th>Environmental</th>
<th>Dead Germ</th>
<th>Birds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arkansas</td>
<td>1</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Flocks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Birds in Flocks</td>
<td>6,000</td>
<td></td>
<td>15,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Georgia</td>
<td>3</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Flocks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Birds in Flocks</td>
<td>30,400</td>
<td></td>
<td>46000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illinois</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Flocks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Birds in Flocks</td>
<td>3,900</td>
<td></td>
<td>3700</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1200</td>
</tr>
<tr>
<td>Indiana</td>
<td>15</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Flocks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Birds in Flocks</td>
<td>158,345</td>
<td></td>
<td>27,479</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>15,092</td>
</tr>
<tr>
<td>Kentucky</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flocks</td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### U.S. *Salmonella enteritidis* Clean Egg-Type Breeding Chickens

No. of flocks and birds in flocks by State with *Salmonella enteritidis* isolates, 1990-2013

<table>
<thead>
<tr>
<th>State</th>
<th>Flocks</th>
<th>Birds in Flocks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ohio</td>
<td>17</td>
<td>192,700</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>91,600</td>
</tr>
<tr>
<td>Oregon</td>
<td>2</td>
<td>19,516</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>16</td>
<td>166,385</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>78,450</td>
</tr>
<tr>
<td>Texas</td>
<td>1</td>
<td>10,000</td>
</tr>
</tbody>
</table>

### *Salmonella enteritidis* Phage Types for U.S. *Salmonella enteritidis* Clean Egg-Type Breeding Chickens

<table>
<thead>
<tr>
<th>Phage Type</th>
<th>Environmental</th>
<th>Dead Germ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phage Type 13</td>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td>Flocks</td>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td>Birds in Flocks</td>
<td>152,000</td>
<td>3,700</td>
</tr>
<tr>
<td>Phage type 13A</td>
<td>5</td>
<td>2</td>
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<tr>
<td>Flocks</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Birds in Flocks</td>
<td>54,321</td>
<td>27,479</td>
</tr>
<tr>
<td>Phage type 2</td>
<td>2</td>
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<tr>
<td>Flocks</td>
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<tr>
<td>Birds in Flocks</td>
<td>28,900</td>
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</tr>
<tr>
<td>----------------</td>
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<td></td>
</tr>
<tr>
<td>Phage type 23</td>
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<table>
<thead>
<tr>
<th>Flocks</th>
<th>21</th>
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<tbody>
<tr>
<td>Birds in Flocks</td>
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</tr>
<tr>
<td>Phage type 28</td>
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<table>
<thead>
<tr>
<th>Flocks</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Birds in Flocks</td>
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</table>

<table>
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<tr>
<th>Phage type 34</th>
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<table>
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<tr>
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<tr>
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<table>
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<table>
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</thead>
<tbody>
<tr>
<td>Birds in Flocks</td>
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<table>
<thead>
<tr>
<th>Phage type-Untypable</th>
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<table>
<thead>
<tr>
<th>Flocks</th>
<th>2</th>
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</thead>
<tbody>
<tr>
<td>Birds in Flocks</td>
<td>24,000</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Phage type 8</th>
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</thead>
</table>

<table>
<thead>
<tr>
<th>Flocks</th>
<th>21</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birds in Flocks</td>
<td>237,701</td>
</tr>
</tbody>
</table>
Egg-type Chicken breeding flocks with isolates of *Salmonella enteritidis* by phage type and by year 1989-2013

<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>
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<td>1993</td>
<td>5</td>
<td>Untypable, 8, 2</td>
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<td>1994</td>
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<td>13A, 8</td>
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<td>1997</td>
<td>2</td>
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<td>2002</td>
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<td>2009</td>
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<td>2010</td>
<td>3</td>
<td>8(2), 13</td>
</tr>
<tr>
<td>2011</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>
The current research program at USPOULTRY has a long and productive history. The program was started over 50 years ago by the Southeastern Poultry & Egg Association (SEPEA) in response to the need of the poultry industry for research directed toward solving the most important problems facing the industry. Over these five decades the program has advanced in size, scope, and organization to become an indispensable asset of the US poultry industry and has helped the industry overcome many of the hurdles which impaired its development and success.

During the early years of the development and organization of the United States poultry industry, one of the most limiting factors to success was the widespread incidence of disease in broiler, breeder, layer, and turkey flocks. As farms grew larger and production intensified, new diseases appeared for which control measures did not exist. The poultry industry desperately needed research to be conducted which could find solutions to some of these disease problems. In 1962, in response to this urgent need the SEPEA created a research program. The first two grants were awarded in 1963. Dr. Allen Edgar at Auburn University received $5,000 to study control measures for infectious bursal disease (Gumboro disease). Dr. Frank Craig, North Carolina State University, received $2,500 to also study infectious bursal disease. In 1964, a third grant of $5,000 was received by Dr. Sam Schmittle, University of Georgia, to study the control of Marek’s disease. Although the program’s beginning was modest, the concept proved to be very successful. The interests and needs of the poultry industry fueled the continued expansion and development of the research program.

<table>
<thead>
<tr>
<th>U.S. <em>Salmonella</em> enteritidis Clean Egg-Type Breeding Chickens</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of flocks and birds in the flocks with <em>Salmonella</em> enteritidis isolates, 1990-2013</td>
</tr>
<tr>
<td>Flocks</td>
</tr>
<tr>
<td>--------</td>
</tr>
<tr>
<td>71</td>
</tr>
<tr>
<td>Birds in Flocks</td>
</tr>
</tbody>
</table>

In the early years, researchers would simply submit research proposals to the Board of the Southeastern Poultry & Egg Association for consideration. The Board had a Grants Committee that would review all proposals and recommend to the Board which proposals to fund. In 1982 the Board created the Technical Advisory Committee (TAC) which was made up of technical experts from various companies in the poultry industry. This committee
REPORT OF THE COMMITTEE

established a list of research topics which were considered to be the priority topics of interest for the research program. In addition, the committee established an annual deadline for submission of research proposals. The TAC reviewed all research proposals and recommended proposals for funding to the Board. The creation of the TAC and the implementation of research priorities and an annual funding timeline provided much of the structure we see in the program today.

As the program grew in the 1980's, the administrative activities required to operate the program also grew. In 1985, Dr. Morris Cover joined the staff of SEPEA as the first Director of Research Programs. During Dr. Cover's tenure the research priorities were expanded beyond the traditional topics of poultry production to include product quality, food safety and food technology. In 1993, Dr. Charles Beard joined SEPEA as the Vice President of Research and Technology and served the organization until 2010. During those years the research program expanded greatly in terms of the number of research projects funded, the scope of topics funded, and total dollars awarded. The program expanded to two proposal submission deadlines per year, one in the spring and one in the fall. The TAC was renamed the Research Advisory Committee (RAC). The submission of research proposals was greatly improved by the addition of a one-page pre-proposal which the researchers could submit to determine whether the RAC was interested in receiving a full research proposal on the topic. This allowed the submission of many diverse research ideas and allowed the RAC to easily determine which pre-proposals should be invited for full research proposals. In 2005, the research program became jointly funded by USPOULTRY and the USPOULTRY Foundation. The RAC was renamed the Foundation Research Advisory Committee (FRAC). When Dr. Beard retired, Dr. Henry Marks joined the organization (renamed the U.S. Poultry & Egg Association in 1997) as Research Coordinator and administered the program until 2011. In 2011, Dr. John Glisson joined USPOULTRY as the Director of Research Programs.

The good idea that the SEPEA Board had in 1962 to form a research program has grown to become a very big and important idea today. Since that first $5,000 grant in 1963 the USPOULTRY research program has funded over $25,000,000 in research grants. This investment in research and innovation by the USPOULTRY research program has been a vital component in the impressive growth and success of the U.S. poultry industry. Today the USPOULTRY research program funds research in 19 topic areas at research institutions all over the country. USPOULTRY and the USPOULTRY Foundation are committed to growing the research program and continuing to support the needs of the poultry industry through research.
Risk managerial decisions involving live bird movements from premises located in a HPAI Control Area are highly consequential and have a considerable impact on business continuity. Past outbreak experiences indicate that live bird movements without adequate mitigation measures can contribute to spread of AI infections, while not moving live birds results in animal welfare issues and direct losses to producers as a result of depopulation. Assessing the risk of movement of live birds involves additional complexities as some of the simplifying assumptions and mitigation strategies used in other the poultry commodity assessments are not applicable. In the case of live bird movement risks assessments, the likelihood of a flock being infected as well as the likelihood of the infected flock being undetected by the time of movement have to assessed.

In the broiler and turkey sector working groups, we have made progress in discussion and evaluation of risk pathways, strategies and mitigation measures. One of the strategies being considered in these groups is to have a pre-movement isolation period ahead of the scheduled live bird movement date. In essence, this isolation period involves implementing enhanced biosecurity for some days prior to the movement date. The strategy is beneficial in minimizing the likelihood of the flock becoming exposed close to the scheduled movement date in which case the detection likelihood may be lower. Exposure and infection of the flock much before the scheduled movement day (e.g., more than 5 days) is likely detected by movement day and is unlikely to represent movement associated risks. Some critical operational contacts such as feed delivery would continue to occur during the pre-movement isolation period with strict biosecurity.

There may still be a residual likelihood of the premises becoming infected after implementing heightened biosecurity due to components of local spread such as aerosols and flies. In the baseline scenario, our approach is to determine a distance beyond which such local spread components would represent a low risk for disease transmission. A combination of information sources including modeling, literature review and expert opinion are being utilized to evaluate the transmission likelihood for these pathways.

We have also evaluated various active surveillance options proposed by the working group members using quantitative simulation models. The primary surveillance protocol in both the broiler and turkey groups involved the testing of two pooled samples of swabs from dead birds via RRT-PCR (matrix gene) before movement of live poultry. Supplementary antigen capture testing by
industry was also evaluated and the analysis thus far suggests some potential benefit under specific scenarios. However given the uncertainty regarding the test characteristics, further research on their performance for different HPAI strains and sample types is required.

In summary, objective science based risk assessments developed through an inclusive process with the participation of various stakeholders are critical to inform risk management decisions associated with live bird movements.

2013 Activities - Broiler Sector Working Group (Conference Calls every 2-3 weeks)

- Broiler Hatching Egg RA
  - Completed (June 2012)
- Broiler Day Old Chick RA Review Process
  - CEA H review complete (Sept 2013)
  - NCAHEM review pending (Oct 2013)
- Broilers to Slaughter RA Writing
  - RA writing process started (March 2013)
- Secure Broiler Supply
  - Initial draft started (Sept 2012)
- Secure Broiler Supply Website
  - Started Secure Broiler Supply website development (March 2013)

2013 Activities - Turkey Sector Working Group (Conference Calls every 2-3 weeks)

- Turkey Hatching Egg RA, Review Process
  - RA draft in review, CEAH (Oct 2013)
- Turkey Day Old Poult Risk RA, Review Process
  - Finalizing Draft (Sept 2013)
- Turkeys to Slaughter RA Writing
  - Discussions for framing RA, Scope, Risk Pathways and Information gathering (Fall 2013)
**Broiler Production:** Production thus far in 2013 is ahead of the same period in 2012 and is projected to be 2.1% higher for the year. Average broiler weight has increased slightly. Production costs, especially feed costs continue to put tremendous economic pressure on broiler production.

**Mortality:** First week mortality over the first half of 2013 is slightly higher than the same period in 2012. A relative shortage of hatching eggs may be contributing (increased usage of hatching eggs from very young and very old breeder flocks). Chick quality was also identified by broiler veterinarians as a current key issue. Total mortality during the first half of 2013 was more than 0.25% higher than the same period in 2012. This was reflected in most weight classes but was more pronounced in the heavier broiler classes.

**Condemnations:** Whole Body Farm Condemnations + Parts
Condemnations increase from 0.470% in the first half of 2012 to 0.536% in the first half of 2013. All of the major condemnation categories strongly related to infectious disease (Septox, Airsac, IP, and Leukosis) increased. The greatest increase (both in percentage and absolute terms) was in the Airsac category, which strongly supports the concerns expressed by broiler veterinarians regarding new strains of Infectious Bronchitis.

**Key Broiler Health Issues:** Coccidiosis was listed more than any other disease as a major issue by broiler veterinarians. This reflects not only the actual frequency of diagnosis or treatment of coccidiosis but also a decrease in the efficacy of some coccidiostat programs as roxarsone usage stopped. It may also be the result of the challenges associated with chemical coccidiostat and coccidiosis vaccine programs. E. maxima was the species most often mentioned by broiler veterinarians. Necrotic Enteritis also ranked high as a disease issue and would be often associated with inadequate control of E. maxima. Novel strains of reoviruses continue to cause tenosynovitis in many broiler operations. Use of autogenous vaccines in the parent stock is most common intervention. Infectious Bronchitis, primarily emerging strains such as the GA-08, seriously degraded broiler respiratory health. Affected birds often showed only modest clinical signs and lesions during growout but high airsac condemnations due to a partially ‘silent’ abdominal, E. coli complicated airsacculitis. Existing IB vaccines have been ineffective. Locally produced vaccines have showed some protection and USDA licensed vaccines are expected before year’s end. Kinkyback or Vertebral Osteoarthritis continues to be a commonly mentioned problem. Treatment (antibiotics) and management interventions (layout) have been moderately effective. IP, Gangrenous Dermatitis, and Chick Quality/Cull Chicks were listed by 18% of responding broiler veterinarians as key issues. Other conditions listed as important by 12% or less of the responding veterinarians include: conditions related to E. coli, Mycoplasma synoviae, non-infectious leg problems, RSS, Marek’s, DOAs, and Newcastle disease.
Key Non-Disease Broiler Issues: Loss of use of effective drugs was listed by the most broiler veterinarians as a key issue. This could include loss of a drug (e.g. roxarsone) or restriction of use of drugs due to market requirements or public opinion. It should be noted that the decreased usage of some drugs is more a result of marketing imperatives (e.g. “antibiotic-free”, “organic”), pressure from consumer groups, or indirect regulatory actions; than rational veterinary decisions or credible threats to public health. Increased regulation is also a major issue. This can come from multiple sources. The USDA/FSIS has increased monitoring and oversight of Salmonella and other food pathogens in the plant and such food safety regulation is slowly being extended to farms. Testing results and notices of nonconformances which were previously confidential are now posted on the internet by the USDA. The FDA has dramatically increased inspection of farm and hatchery sites with regard to both the shell egg rule and hatchery antibiotic usage. More stringent environmental regulations at both the federal and state levels have made litter management and manure disposal more challenging, in some cases, restricting the frequency at which houses can be cleaned out (or new housing constructed). Poultry welfare is now a major aspect of any broiler veterinarian’s job, occupying up to 20% of his/her time in some cases. Its importance can take the form of writing welfare programs, coordinating audits, balancing scientifically supportable welfare stances with what the public thinks chicken like, and formulating corrective actions for non-conformances. Food safety issues, such as Salmonella spp. and Campylobacter spp. continue to pose critical challenges, not only in the form of regulatory requirements but also as a serious matter in dealings with customers and the public. Export restrictions due to some country’s MRLs (restricting use of some drugs) or AI-related trade bans (often excessively broad or lengthy were noted as business hampering situations. Wooden breast (hard muscle, plank breast), a non-infectious condition where the superficial breast muscle is unusually turgid was listed as a problem by multiple companies. Other non-disease topics listed as important problems include white striping, effective utilization of alternative feed ingredients, future status of the NPIP, grain prices, need for more efficient vaccine licensing, inaccurate condemnation dispositions, and economic pressures on contract growers. While some issues, both disease and non-disease, were only mentioned by a small number of respondents, given the large number of birds for which any broiler veterinarian is responsible, any topic mentioned by any broiler veterinarian is likely of significant importance industry-wide; just prioritized differently.
Overall health of the national table egg layer flock continues to be very good. There are no major clinical disease problems occurring at this time. This is due to the several resources and practices available to the industry:

- Continued availability of high quality vaccines
- Flock supervision from professional, well-trained flock service technicians
- Readily available veterinary technical assistance from primary breeder, vaccine company, diagnostic laboratory, feed additive suppliers, and consulting veterinarians
- High quality nutrition provided by professional nutritionists
- Housing of a majority of layers in environmentally controlled facilities in cages without exposure to litter
- Use of sound biosecurity practices.
- Continual surveillance for foreign animal diseases or potentially highly pathogenic agents such as Newcastle and avian influenza by our state and federal laboratory system

A poll of the Association of Veterinarians in Egg Production (AVEP) was conducted within the last month. The members were asked to rate a list of common diseases of caged and cage-free pullets (23 and 24 conditions listed respectively) and caged and cage-free layers (32 and 33 conditions listed respectively) as to their prevalence and their importance in their area of service on a scale of 0 to 3 with 0 = not seen, 1 = seen but not common, 2 = commonly seen, and 3 = seen in a majority of flocks. For the importance question, they were asked to give a value of each disease to a company in their area of service on a scale of 0 to 3 with 0 = not important issue for flock health or economics to 3 = very important issue for flock health and economics. Approximately 20 members answered the survey.

To follow are the results of prevalence and importance of chick issues:

<table>
<thead>
<tr>
<th></th>
<th>Caged Pullets</th>
<th>Cage-Free Pullets</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prevalence</td>
<td>Importance</td>
</tr>
<tr>
<td>Yolk Infections</td>
<td>1.32</td>
<td>1.26</td>
</tr>
<tr>
<td>Starveouts</td>
<td>1.14</td>
<td>1.05</td>
</tr>
</tbody>
</table>

Chick mortality problems are normally associated with small chicks, poor sanitation in the hatchery, or a lack of proper brooding management on the grow farm. As this problem continues high on the prevalence list, the emphasis on solving this issue is apparently not being addressed successfully.
The survey revealed the following top five diseases of concern occurring in U.S. for growing pullets excluding chick yolk infections and starveouts:

<table>
<thead>
<tr>
<th>Top 5 Caged Pullet Diseases</th>
<th>Top 5 Cage-Free Pullet Diseases</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Prevalence</strong></td>
<td><strong>Importance</strong></td>
</tr>
<tr>
<td>1 – Coccidiosis (1.18)</td>
<td>1 – Coccidiosis (1.68)</td>
</tr>
<tr>
<td>2 – Necrotic enteritis (0.86)</td>
<td>2 – Marek’s (1.63)</td>
</tr>
<tr>
<td>2 – E. coli (0.86)</td>
<td>2 – E. coli (1.00)</td>
</tr>
<tr>
<td>3 – Piling (0.94)</td>
<td>3 – Piling (0.94)</td>
</tr>
<tr>
<td>4 – Marek’s (0.82)</td>
<td>4 – Marek’s (0.89)</td>
</tr>
<tr>
<td>5 – Post SE bacterin hepatitis (0.80)</td>
<td>5 – Mycoplasma synoviae (0.84)</td>
</tr>
<tr>
<td></td>
<td>5 – ILT (1.18)</td>
</tr>
</tbody>
</table>

The rearing of flocks on litter and exposure to feces complicates coccidiosis in cage-free situations. Coccidiosis is an increasing problem in caged pullets as well with vaccine usage as an intervention on the rise. Marek’s Disease in caged pullets is due to early exposure to Marek’s virus laden dust from the prior flock in the house or neighboring pullets in a multi-age unit. Marek’s vaccine requires 5 to 7 days to provide full immunity. Marek’s in cage-free flocks is also an issue due to the reduced ability to sanitize cage-free facilities between flocks compared to cage houses. SE bacterin induced hepatitis is a new item this year and apparently is being seen somewhat frequently. This syndrome can result in up to 7 percent mortality starting 2 weeks after the administration of SE bacterin. The cause of this problem continues to be unknown at this time.

Infectious bursal disease (IBD) is its subclinical form may lead to immunosuppression after the maternal antibody has subsided. The use of the recombinant HVT-vectored IBD vaccine has greatly aided those sites with problems.

To follow are the top five diseases for caged and cage-free layers from the survey:
**Top 5 Caged Layer Diseases**

<table>
<thead>
<tr>
<th>Prevalence</th>
<th>Importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ms (1.81)</td>
<td>1 – E. coli (1.89)</td>
</tr>
<tr>
<td>E. coli (1.62)</td>
<td>Tie 2 – Calcium depletion (1.78)</td>
</tr>
<tr>
<td>Calcium depletion (1.57)</td>
<td>Tie 2 – Infectious bronchitis, IB (1.78)</td>
</tr>
<tr>
<td>Mg gallisepticum, Mg (1.48)</td>
<td>Tie 2 – Mg (1.78)</td>
</tr>
<tr>
<td>Mites (1.33)</td>
<td>5 – Focal Duodenal Necrosis, FDN (1.56)</td>
</tr>
</tbody>
</table>

**Top 5 Cage-Free Layer Diseases**

<table>
<thead>
<tr>
<th>Prevalence</th>
<th>Importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 – Cannibalism (1.81)</td>
<td>1 – Cannibalism (2.00)</td>
</tr>
<tr>
<td>2 – Ms (1.48)</td>
<td>2 – E. coli (1.89)</td>
</tr>
<tr>
<td>3 – E. coli (1.43)</td>
<td>Tie 3 – Calcium depletion (1.61)</td>
</tr>
<tr>
<td>4 – Coccidiosis (1.24)</td>
<td>Tie 3 – Mg (1.61)</td>
</tr>
<tr>
<td>5 – Mites (1.14)</td>
<td>5 – FDN and IB (1.44)</td>
</tr>
</tbody>
</table>

Cannibalism continues to be seen especially in high light intensity situations in cage-free flocks. In these cases, the 10-day or younger rule for beak trimming result 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. As this is a major problem for cage-free flocks, genetics companies are placing more emphasis on reducing this trait. The increasing use of large colony cages may also increase the level of cannibalism.

Colibacillosis is a problem mainly of young flocks with mortality rates of 0.5 to 4% per week starting shortly after housing can occur. 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 colibacillosis was about the same as last year, 1.52. 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. The live *E. coli* vaccine, introduced in mid to late 2006, has been increasingly used successfully as both a preventative and as a treatment in the face of an outbreak in most areas.

Calcium depletion is normally associated with low intake of calcium, phosphorus, and/or vitamin D3 especially early in production with low feed intakes. This condition will be an ongoing issue with increasingly higher egg production rates through improvements in management and genetics.

Infectious bronchitis (IB) has a low prevalence in flocks but crept into the picture due to its importance where found. Variant strains of IB are usually the problem. Incorporating all of the available vaccine strains into the pullet program, making sure the pullet live and killed vaccines are administered properly, and/or utilizing a live booster program in lay are utilized in response to these problems.
An external parasite, the Northern Fowl Mite, has risen to prominence in cage layers in past years’ surveys. The difficulty in treating this condition, in cages and in cage-free flocks, has likely led to this increase. Spray treatment of caged layers is difficult due to the configuration of equipment. Elemental sulfur in dust baths is being used very successfully in cage-free flocks. Feeding of elemental sulfur will aid in reducing numbers of mites on birds as well. Decontamination of pullet moving trucks and equipment may also be lacking especially if the equipment was used previously for mite-infested spent fowl movement.

Focal duodenal necrosis (FDN), felt to be due to *Clostridium colinum*, is an under-diagnosed problem. It is felt to be a widespread subclinical disease with lesions in the duodenum, and results in losses of egg weight gain and/or egg production depending on the severity of the infection. The use either of the antibiotics chlortetracycline or bacitracin is used successfully for treatment and/or prevention. Fermentation metabolite, probiotic, prebiotic, and botanical products are being evaluated for their usefulness in prevention of FDN.

*Mycoplasma synoviae* (Ms) is a very prevalent disease in multi-age complexes but has little significance in most cases due to its low pathogenicity. *Mycoplasma gallisepticum* (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 or where the Ts-11 or 6/85 vaccines are no longer effective. The live pox-vectored recombinant Mg vaccine is being used in a variety of situations and appears to be useful in low challenge situations. Vaccine failures with all vaccines are somewhat common and the unit must resort to medication programs using tylosin or tetracycline antibiotics. Most all operators are now applying the F-strain vaccine by eyedrop rather than spray in an effort to increase its efficacy.

Diseases under control and of low incidence are as follows: Marek’s, vaccinal infectious laryngotracheitis (vILT), fowl coryza, and urolithiasis/gout. These diseases tend to be localized to a region or a farm. The pox-vectored recombinant ILT vaccine has been determined to not be a replacement for chick embryo origin (CEO) vaccines in high challenge areas. The HVT-vectored ILT vaccine continues to show good results in high challenge regions and should reduce the amount of CEO vaccine used in layer flocks that may spread to broilers. Fowl coryza is a regional disease (Maine, California, Florida, and south Texas) and is controlled well by the use of commercial bacterin. Gout is almost exclusively due to feeding of excess calcium to birds not yet sexually mature or feeding inadequate phosphorus to birds at any stage of life.

Diseases that are very rarely a problem for table egg layers are pox, Newcastle, infectious bursal disease, chick anemia virus, erysipelas, and fowl cholera. The area where the very virulent IBD outbreaks (vIBD) seen in northern California in Dec08 and May09 have not shown a recurrence of the disease in layers but apparently may still be present in broiler flocks.
The AVEP survey also asked about other issues and diseases of concern on a scale of 0 to 3 with 0 = no concern, 1 = some concern, 2 = moderately concerned, and 3 = very high concern. The opinions of the 20 respondents is as follows:

<table>
<thead>
<tr>
<th>Issue (20 respondents)</th>
<th>Average 2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avian Influenza (AI)</td>
<td>1.55</td>
<td>2.00</td>
</tr>
<tr>
<td>Lack of Effective Treatments</td>
<td>2.15</td>
<td>2.43</td>
</tr>
<tr>
<td>SE and FDA Egg Safety Rule</td>
<td>2.55</td>
<td>2.29</td>
</tr>
<tr>
<td>S. heidelberg and Egg Safety Rule</td>
<td>2.45</td>
<td>1.90</td>
</tr>
<tr>
<td>Welfare in General</td>
<td>2.33</td>
<td>2.15</td>
</tr>
<tr>
<td>Beak Trimming</td>
<td>1.70</td>
<td>1.50</td>
</tr>
<tr>
<td>Disposal of male chicks</td>
<td>1.40</td>
<td>1.25</td>
</tr>
<tr>
<td>On-Farm Euthanasia</td>
<td>1.95</td>
<td>1.80</td>
</tr>
<tr>
<td>Molting of Layers</td>
<td>1.60</td>
<td>1.35</td>
</tr>
<tr>
<td>Banning of Cages</td>
<td>2.60</td>
<td>2.35</td>
</tr>
<tr>
<td>Adoption of Enriched Cages</td>
<td>N/A</td>
<td>2.11</td>
</tr>
<tr>
<td>Supply of Useful Vaccines</td>
<td>1.20</td>
<td>1.05</td>
</tr>
</tbody>
</table>

Concern for SE and its consequences continues due to the ongoing possibility of human outbreaks as occurred with the egg recall of 2010 involving two Iowa operations in August 2010. The Egg Safety Rule was implemented on July 9, 2010 for flocks over 50,000 layers. Flocks of between 3,000 and 50,000 joined the program on July 9, 2012. The inspections for these smaller units began in late 2012 and early 2013.

The FDA Egg Safety Program entails obtaining chicks from NPIP SE Clean breeders, rodent and fly monitoring and control programs, biosecurity, cleaning and disinfection of premises, training of persons involved, testing of manure samples at 14-16 weeks, 40 to 45 weeks, and 6 weeks after molt. If any of the manure tests are positive for SE, egg testing must take place. The producer funds all testing and compliance efforts. Laboratories have managed to gear up to handle the increased testing load this requires. Producers with a manure positive swab test are holding eggs from the market until after the test results of eggs are obtained. The use of DNA based tests are now being used that minimize the time of testing from the formerly required 10 days for culture to as low as 27 hours with the new tests. There is no provision in the program for compensating a producer who has an egg-positive flock and does not have a pasteurization or hard-cooking plant that will take their eggs. Producers are greatly ramping up measures to reduce risk of SE infection by increased use of vaccines, intestinal health feed additives, rodent and fly control measures, and biosecurity practices as was intended by the plan.

The possible addition of *Salmonella heidelberg* (SH) to the FDA Egg Safety Plan has the industry questioning why and how this will be initiated. SH in humans has not recently been attributed to eggs and the prevalence of SH in humans has dropped since the late 1990’s to 2011 from 1 per 100,000
population to 0.35 per 100,000 in CDC figures from FoodNet. Also, there is no breeder program as there is for SE and it may take five to 10 years before one can be fully assured of a clean product once a breeder program is started. Also, no specific SH vaccines are available as they are for SE. It is estimated that a much higher contamination rate of flocks with SH is present compared to SE. The SE flock prevalence has been found to be reduced to as low as 2% at present with the pressure of state and federal programs.

Poultry welfare concerns continue to be of high to very high concern due to continued activities by activist groups. A surprising event occurred in 2011 as the United Egg Producers (UEP) and the Humane Society of the United States (HSUS) agreed to work together to establish federal legislation to require an eventual switch from conventional cage systems to enriched cage systems by 2029. This should lead to the use of enriched cages in CA where the issue of which type of system would be approved according to the Prop 2 ballot initiative was undecided. This possibility of an agreement also negated the ballot initiatives that were planned by HSUS in WA and OR. This agreement was attached to the 2012 Farm Bill as an amendment to the Egg Products Inspection Act. The 2012 Farm Bill did not pass. An attempt was made to add the bill to the 2013 Farm Bill but without success. Attempts will be made to pass it on its own or add it to the Farm Bill in 2014.

The lack of effective treatments for diseases such as colibacillosis, necrotic enteritis, ascarids, Capillaria spp., fowl cholera, etc. is a very high concern and a welfare issue for the diseases that can cause much suffering due to illness. The list of antibiotics that can be used in egg layers is quite short – bacitracin, tylosin, and chlorotetracycline. The lack of an anti-parasitic product for used in controlling ascarids during lay, or other nematodes, is especially troublesome as these conditions are becoming increasingly common in cage-free production. Amprolium continues to be available to prevent and treat coccidiosis. Hygromycin is also now approved for use in egg layers in production for roundworms, Capillaria spp., and cecal worms. Also, there is an increase in usage of non-antibiotic, preventative feed and water additives containing probiotics, prebiotics, and fermentation metabolites.

AI rose to moderate concern this year compared to last due to the threat of highly pathogenic (HP) AI, H7N3, in Mexico. The situation in Mexico is being controlled by vaccination without culling of flocks that may be infected with the virus so the threat of virus coming from positive flocks there.

AI active and passive surveillance programs are continue across the US in response to the threat of HPAI H5N1 from Asia or HPAI H7N3 from Mexico. As there is great concern in the layer industry in regard to the amount of time before egg movement can take place once quarantine is placed on a premise in a control zone, the industry and USDA have developed the Secure Egg Supply (SES) Plan that would allow movement of product within 48 hours after quarantine. This is done by assuring that a farm 1) has good biosecurity practices by being pre-approved, and 2) is negative for AI by a) testing five dead birds per house by AI real time PCR, and b) reporting daily mortality and egg production to the authorities. Discussion and research as to the best ways
of bird euthanasia and disposal from large cage layer houses and complexes continues. The threat of H5 or H7 low pathogenic AI (LPAI) for layer flocks on the East coast is much reduced due to the efforts by NY and NJ Departments of Agriculture and USDA to reduce the positivity of the live bird markets from 60% positive markets in 2004 to near 0 since. No significant AI isolations have been made in layer flocks in the US 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.

Vaccine use continues to be the mainstay of disease prevention in the egg layer industry second to biosecurity. The supply of useful vaccines continues to be quite adequate and appears to be keeping up with the layer industry needs. It will be interesting to see if this good supply of vaccines continues with the consolidations now occurring in the poultry vaccine business.

This is the second year that the AVEP members have been asked for their ideas as to research needs for the layer industry. A summary of the responses of the 15 members is as follows:

<table>
<thead>
<tr>
<th>Research Need Area</th>
<th>Number of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 – FDN</td>
<td>9</td>
</tr>
<tr>
<td>2 – Salmonella control</td>
<td>6</td>
</tr>
<tr>
<td>3 – Increased availability of therapeutics</td>
<td>4</td>
</tr>
<tr>
<td>4 – Mg vaccination and dynamics in a complex</td>
<td>3</td>
</tr>
<tr>
<td>5 – Welfare – stress, housing, food safety effects</td>
<td>3</td>
</tr>
<tr>
<td>6 – Coccidiosis in layers and coccidiosis vaccination of cage pullets</td>
<td>2</td>
</tr>
<tr>
<td>7 – Soft bones</td>
<td>2</td>
</tr>
<tr>
<td>8 – Low Atmospheric Pressure (LAPS) Euthanasia</td>
<td>1</td>
</tr>
<tr>
<td>- Longevity of vaccine effectiveness</td>
<td>1</td>
</tr>
<tr>
<td>- Intestinal health and immunity modulation</td>
<td>1</td>
</tr>
<tr>
<td>- Immunomodulators</td>
<td>1</td>
</tr>
<tr>
<td>- Attaining pullet target weights</td>
<td>1</td>
</tr>
<tr>
<td>- Intestinal Dilatation Syndrome</td>
<td>1</td>
</tr>
<tr>
<td>- Disease risk of outdoor access</td>
<td>1</td>
</tr>
<tr>
<td>- Composting of spent fowl</td>
<td>1</td>
</tr>
<tr>
<td>- Pooling of drag swabs for Salmonella detection</td>
<td>1</td>
</tr>
<tr>
<td>- Infectious bronchitis</td>
<td>1</td>
</tr>
<tr>
<td>- Infectious laryngotracheitis and vaccinal immunity</td>
<td>1</td>
</tr>
<tr>
<td>- Peripheral neuropathy</td>
<td>1</td>
</tr>
<tr>
<td>- New Marek’s vaccines</td>
<td>1</td>
</tr>
</tbody>
</table>

The egg industry has experienced higher profits this year compared to last year. Exports of eggs to Mexico due their losses of birds due to AI have buoyed the egg price this year leading to a projected profit of over $1.30 per
bird compared to a breakeven situation in 2012. Feed price decreases in late 2013 will aid in increasing profits. Exports as a percent of total production averaged 3.8% in 2012 and is averaging 4.5% so far in 2013.

Iowa (51.9 million) continues to be the lead state in egg production followed by Ohio (28.2 million), Indiana (25.7 million), Pennsylvania (23.8 million), and California (18.9 million) according to the National Agricultural Statistics Service for August 2013.
In preparation for this report to the USAHA Committee on the Transmissible Diseases of Poultry & Other Avian Species, the subcommittee chair, Dr. Clark, surveyed turkey industry professionals and veterinarians representing a majority (n=26) of the US turkey production regarding the health status of turkeys produced in August 2012 through August 2013. The turkey industry reports several disease challenges for this 12 months varying by geographic regions within a state and across the United States. This report will list, Table 1, the challenges by disease and issues. Of particular interest in 2013 are lack of efficacious drugs and issues with clostridial dermatitis, turkey coronavirus, blackhead and colibacillosis.

The “lack of approved efficacious drugs” continues to be the top disease issue (Table 1). The withdrawal of the NADA (New Animal Drug Application) for enrofloxacin in 2005 for use in poultry leaves the industry with no adequate therapeutic response to colibacillosis (ranked #3, unchanged from prior year), or fowl cholera (ranked #17 from #20). In July 2011 the sale of roxarsone was suspended; September 30, 2013, it was announced that the FDA marketing authorization (New Animal Drug Applications) would be withdrawn. The controversy over the use of antibiotics in animal agriculture remains a major concern for the turkey industry and for all of animal agriculture.

**Clostridial Dermatitis (CD)**, previously referred to as Cellulitis, remains a major disease issue across all geographic regions; as the survey average decreased slightly to a score of 3.6 (from 3.8 in prior year) and ranked #2 (no change), from 3.9 (#2), 4.0 (#2), 3.8 (#2) and 3.3 (#3) in 2011, 2010, 2009 and 2008, respectively. Analysis indicates range of concern; 62% of respondents score CD a 4 or 5 (severe), 27% score it a 2 or 1 (mild), 76% and 20% respectively for the prior year. CD is most commonly seen in, but not limited to, commercial male turkeys nearing market age. 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 (crepitus); serous or serosanguineous 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. The affected flock will have mortality greater than or equal to 0.5 dead per 1,000-birds, fitting the individual bird definition, for two consecutive 24-hour periods. Opinions vary as to risk factors and potential causes of the problem. Some of the key areas to control of CD include: early recognition; removal of mortality 2-3 times per day; medicating affected flocks with appropriate antimicrobials; promptly
managing all water spills and wet litter. There has been limited success with vaccinating at-risk flocks with autogenous bacterins and toxoids.

**Poult enteritis of unknown etiologies** has decreased in importance, to position #9 from #7, with a score of 2.8 (from 2.9). Turkey Coronavirus (TCV), as a defined cause of enteritis, was ranked #27 (Table 1), increasing from #29, with a record 420 reported cases (Table 2); we began reporting in 2008 with 10 cases (2009, 3; 2010, 91; 2011, 70; 2012, 221). We conducted an Enteric Health supplemental survey in April 2012; the survey was not conducted this year.

**Protozoal Enteritis**, attributed to flagellated protozoa, Cochlosoma, Tetrastrichomonas and Hexamita, ranked #22 (score 1.8). Several types of protozoa are associated with enteric disease of turkeys. Protozoal enteritis can present with general signs, including dehydration, loss of appetite (off-feed), loose droppings (diarrhea) and watery intestinal contents. Flagellated protozoa include Cochlosoma, Tetrarichomonas and Hexamita. Eimeria and Cryptosporidia are non-flagellated protozoa. Cochlosoma and Hexamita are associated with enteritis, primarily in young turkeys, especially in the summer months. There are field reports of co-infections with Cochlosoma and Tetrastrichomonas, or Cochlosoma and Hexamita, or flagellated protozoa and Eimeria.

**Single age brooding** has been implemented during the last several years to assist in managing diseases on turkeys farms, especially enteric diseases. Historically, production systems included 2 - 3 different ages on a single farm site reared in separate barns, from day-old to market age. The trend is to isolated, specialized brooding facilities. All production is separate hen and tom rearing. The brooding phase for commercial turkeys is rearing about 0 – 5 weeks of age, then the flock is moved to specialty finisher or grow-out barns. Single age brooding may be termed all-in/all-out or single-age or brooder hub. Single age brooding systems can operate in two ways. One option rears the turkeys to slaughter age at the same farm site, without other ages on the farm. Another system of single age brooding involves farm sites dedicated to brooding, then at 5 weeks of age birds are moved to a separate site for finishing; some systems may move birds 0.25 miles up to 20 miles away. In 2013, 49% of brooding was single age, compared to 39% in 2008. Single age brooding is more common in the Southeastern US than the Midwest states. Conversion to single age brooding started in late 1990 following the emergence of PEMS in North Carolina; advantages became obvious and it has expanded to other areas of the US.

**Late mortality** ranked fifth (#5) health issue and no change from the prior year. Late Mortality may be defined as mortality, in excess of 1.5% per week, in toms (males) 17-weeks and older; mortality is not diagnosed to a specific disease or cause. Excess cumulative mortality of 5 – 10% 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 (#4, prior year was #6) are ranked among the top concerns of the turkey industry. 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 various conditions (refer to Table 1), including, pododermatitis, fractured femurs, fractured tibia, osteomyelitis (OM), tibial dyschondroplasia (TDC), spondylolisthesis, “Shaky Leg”, etc.

Turkey Reovirus Digital Flexor Tendon Rupture (TR-DFTR) was recognized as a newly emerging disease in 2011. A unique reovirus has been isolated and identified as the cause of tenosynovitis and digital flexor tendon rupture in commercial turkeys. Clinical signs in young flocks are reportedly mild to nonexistent, but can develop into lameness and/or abnormal gait in older flocks, starting at about 12 weeks of age. Affected flocks may also report an increased incidence of aortic ruptures and poor flock performance (weight gain, uniformity). Research is on-going into pathogenesis, virus characterization, diagnostics and epidemiology. Research indicates that the turkey arthritis reovirus is distinct from the recently identified novel reovirus causing arthritis in chickens, and most similar to the turkey enteric reovirus. TR-DFTR was added to the survey in 2011 and ranked #11 (Table 1) with 106 “confirmed” cases or flocks (Table 2). In 2013 TR-DFTR ranked #26 with 39 cases (2012, 131). A breeder company has implemented an autogenous reovirus vaccination program to induce the maximum production of antibodies and resulting transfer of maternal antibodies. Results show a significant reduction in associated clinical signs in those pouls placed from vaccinated flocks. A commercial turkey lighting program of 4-8 hours of continuous dark in a 24-hour period has also been recommended. The combined efforts of breeder vaccination, commercial farm biosecurity and flock management appear to be controlling this disease.

Blackhead, also known as Histomoniasis, decreased to position #16 (#14 prior year). It is one disease with no efficacious drug approved for use in turkeys. There were 52 reported cases of blackhead (Table 2) a decrease from 80 the prior year, and a record 108 in 2010. Losses to blackhead have been severe and sporadic cases are occurring in North America. The disease can be devastating in the individual flocks affected. Nitarsone is the only product approved by the FDA for the prevention of histomoniasis, 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. Losses to blackhead have been severe in several areas of Europe, and sporadic cases are occurring in North America. It seems unconscionable that we are unable to prevent the suffering and death in flocks affected by histomoniasis when effective treatments exist.

Heat stress ranked #12 following another hot summer, compared to #4 the prior year. Poult Enteritis Mortality Syndrome (PEMS) ranked #31 versus #30 previously, Ornithobacterium rhinotracheale (ORT) ranked #13 versus #17 previously, and Avian Metapneumovirus (AmPV) ranked #35 versus #34.
Mycoplasma synoviae (MS, infectious synovitis) infections, ranked #24 (#25, prior year), 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 75 cases of MS reported (Table 2) representing an increase from 49 the prior year. The primary breeders have remained free of M. gallisepticum (MG), M. meleagridis (MM) and MS. Sporadic, but increasingly frequent infections with Mycoplasma, both MG and MS, often in association with backyard poultry and broiler breeder flocks is an ongoing concern, having the greatest impact when a breeder flock is infected and has to be destroyed. There were 45 cases of MG reported (Table 2).

Over the past 10 years the US animal agriculture industry has been continually challenged with numerous attempts to ban the use of antibiotics in livestock and poultry. The current attempt at the federal level is with the [113th Congress] Preservation of Antibiotics for Medical Treatment Act of 2013, introduced into both the House and Senate [H.R.1150; S.1256], otherwise known as PAMTA 2013. The Senate version is titled S. 1256 Preventing Antibiotics Resistance Act (PARA) and is “to amend the Federal Food, Drug, and Cosmetic Act to preserve the effectiveness of medically important antimicrobials used in the treatment of human and animal diseases.” The legislation would disallow use of medically important antimicrobials for nontherapeutic uses. The turkey industry opposes PAMTA, a bill that would devastate the ability to protect animal health by unnecessarily and inappropriately removing several classes of important antibiotics from the market. The turkey industry welcomes honest discussion of science-based, pragmatic options allowing producers to farm in the best interests of their animals and customers while providing consumers’ assurance our use of these vital, safe and effective production tools is professional, judicious and does not jeopardize these products’ effectiveness in human medicine.

The industry’s primary focus in 2012 - 2013 continues to be the protection of the drugs approved for use in turkeys, especially in light of increased scrutiny from special interests regarding antibiotic resistance. The first related guidance was introduced in 2003, Final Guidance #152, “Evaluating the Safety of Antimicrobial New Animal Drugs with Regard to their Microbiological Effects on Bacteria of Human Health Concern”. In 2012, the Food and Drug Administration Center for Veterinary Medicine published the draft text of its proposed rule for the Veterinary Feed Directive, the Final Guidance #209, “The Judicious Use of Medically Important Antimicrobial Drugs in Food-Producing Animals”, and the Draft Guidance #213, “New Animal Drugs and New Animal Drug Combination Products Administered in or on Medicated Feed or Drinking Water of Food Producing Animals: Recommendations for Drug Sponsors for Voluntarily Aligning Product Use Conditions with GFI #209”. CVM's Guidance #209 addresses FDA's current thinking regarding the judicious use of medically important antibiotics from human medicine in food producing animals, and Draft Guidance #213 provides recommendations for drug companies to voluntarily eliminate or transition to "production" (growth promotion and feed efficiency) claims to “therapeutic” claims, in order to conform to Guidance #209.
Although voluntary, FDA will be working closely with companies to encourage them to make these changes. FDA is still expected to publish the VFD and Final Guidance #213 in 2013. These programs are still being developed, and the industry continues to play an active role in helping to shape how they ultimately look, both through comments and participation in FDA and APHIS’ public meetings. In 2013, individual reports were published from groups such as the Environmental Working Group (EWG), Center for Science in the Public Interest (CSPI), and Consumer Reports (CR) focusing on antibiotic resistant bacteria in foods. Regardless of the accuracy or influence of any of these reports, the fact remains that there exist many groups committed to eliminating antimicrobial use in food animal production, which could have substantial impacts on the health and well-being of turkey flocks.

A major, growing concern of the turkey industry over the past several years has been the impact of feed prices on feed availability, and on potential animal health impacts of feed alternatives. The Renewable Fuels Standard (RFS) has distorted feed costs for turkey producers, as well as the rest of the livestock and poultry industries. Today, livestock and poultry feed accounted for ~4.4 billion bushels (40.8% of domestic production), while ethanol consumed ~4.6 billion bushels of corn (42.7%). The result has been corn stocks at near-record lows and corn prices at near-record highs, leading turkey producers to search for alternative feed sources, and reduce production overall. The distillers’ grains that are byproducts of ethanol production do not have a major impact on feed availability, as only about 10% of a turkey's feed ration can be comprised of DDGs. The turkey health impacts of such altered-diets are currently a subject of concern and research for turkey producers. Further, with growing attention on antibiotic usage, the Center for Food Safety (CFS) and the Institute for Agriculture and Trade Policy (IATP) submitted a petition to the FDA in April of 2013 encouraging a ban on the use of antibiotics in ethanol production when DDGs are sold as animal feed for food producing animals. This debate further complicates the feed availability and antimicrobial resistance issues.

The industry continued work on developing the Federal and State Transport (FAST) Plan for Movement of Commercial Turkeys in a High Pathogenicity Avian Influenza (HPAI) Control Area, and Turkey Risk Assessment. The goal of this work is to facilitate business continuity and economic survival of participating non-infected turkey operations in a Control Area after an outbreak of HPAI, and to help assure the continuous availability of safe turkey meat to consumers. Recent outbreaks of Low Pathogenicity AI (LPAI) in two states have underscored the need for such programs in responding to a potential AI outbreak. Regarding disease surveillance, the industry has continued to voice strong support for the maintenance of the National Poultry Improvement Plan (NPIP) in the face of increased government spending cuts. NPIP is a vital state-federal-private partnership for the turkey industry, as well as the broiler and egg industries, and APHIS has continued to show strong support for the program, having recently hired a new program coordinator, indicating that it would hire an additional staff person, and...
maintaining their officers in Conyers, Georgia, instead of moving it to the
Washington, D.C. area.

In early 2012 the Food Safety and Inspection Service (FSIS) issued its
proposed rule for the New Poultry Inspection System (NPIS), which would
modernize the inspection of turkeys and other poultry in the United States.
Under this new inspection system, FSIS inspectors would be allowed more
flexibility to patrol the processing plant and provide scientific oversight to
ensure the plant is meeting the required food safety performance standards.
Federal inspectors would be stationed at the end of the production line to verify
every poultry carcass meets the federal regulations, and plant employees
would have an expanded role in inspecting carcasses for quality standards on
the inspection line. The finalization of this rule, and establishing a practical
implementation process is still a major priority.

In 2012, turkey production increased to 7,546.695 from 7,273.60 million
pounds (live weight) in 2011. Overall domestic per capita consumption for
turkey products decreased to 16.00 lbs in 2012 from 16.10 lbs in 2011. The
preliminary number for 2013 is 16.40 lbs turkey consumption per capita, which
is the highest level since 2010. Production in 2012 increased to 253.500 million
head with an average live weight of 29.83 lbs. In 2011, 248.500 million head
were produced with an average live weight of 29.43 lbs. (Reference: National
Turkey Federation Sourcebook, September 2013).

Table 1. Turkey health survey (August 2012 - 2013) of professionals in
U.S. turkey production ranking current disease issues (1= no issue to 5 =
severe problem).

<table>
<thead>
<tr>
<th>Issue</th>
<th>Score Average (1-5)</th>
<th>Score Mode (1-5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of approved, efficacious drugs</td>
<td>4.6</td>
<td>5</td>
</tr>
<tr>
<td>Clostridial Dermatitis (Cellulitis)</td>
<td>3.6</td>
<td>5</td>
</tr>
<tr>
<td>Colibacillosis</td>
<td>3.4</td>
<td>4</td>
</tr>
<tr>
<td>Leg Problems</td>
<td>3.2</td>
<td>3</td>
</tr>
<tr>
<td>Late Mortality</td>
<td>3.0</td>
<td>3</td>
</tr>
<tr>
<td>Salmonella</td>
<td>2.8</td>
<td>2</td>
</tr>
<tr>
<td>Poul Enteritis of unknown etiologies</td>
<td>2.8</td>
<td>3</td>
</tr>
<tr>
<td>Bordetella avium</td>
<td>2.5</td>
<td>3</td>
</tr>
<tr>
<td>Breast Blisters and Breast Buttons</td>
<td>2.5</td>
<td>2</td>
</tr>
<tr>
<td>Osteomyelitis (OM)</td>
<td>2.5</td>
<td>2</td>
</tr>
<tr>
<td>Cannibalism</td>
<td>2.5</td>
<td>2</td>
</tr>
<tr>
<td>Heat stress</td>
<td>2.4</td>
<td>2</td>
</tr>
<tr>
<td>Ornithobacterium rhinotracheale (ORT)</td>
<td>2.3</td>
<td>3</td>
</tr>
<tr>
<td>Coccidiosis</td>
<td>2.3</td>
<td>2</td>
</tr>
<tr>
<td>Tibial Dyschondroplasia (TDC, Osteochondrosis)</td>
<td>2.3</td>
<td>2</td>
</tr>
<tr>
<td>Blackhead (Histomoniasis)</td>
<td>2.2</td>
<td>1</td>
</tr>
<tr>
<td>Disease</td>
<td>Score</td>
<td>Mode</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>-------</td>
<td>------</td>
</tr>
<tr>
<td>Cholera</td>
<td>2.2</td>
<td>1</td>
</tr>
<tr>
<td>Fractures</td>
<td>2.1</td>
<td>2</td>
</tr>
<tr>
<td>Bleeders (aortic, hepatic ruptures)</td>
<td>2.0</td>
<td>2</td>
</tr>
<tr>
<td>Newcastle Disease Virus (NDV)</td>
<td>1.9</td>
<td>1</td>
</tr>
<tr>
<td>Round Worms (Ascaridia dissimilis)</td>
<td>1.9</td>
<td>1</td>
</tr>
<tr>
<td>Protozoal Enteritis (Flagellated)</td>
<td>1.8</td>
<td>1</td>
</tr>
<tr>
<td>Shaky Leg Syndrome</td>
<td>1.8</td>
<td>2</td>
</tr>
<tr>
<td>Mycoplasma synoviae (MS)</td>
<td>1.7</td>
<td>1</td>
</tr>
<tr>
<td>Mycoplasma gallisepticum (MG)</td>
<td>1.7</td>
<td>1</td>
</tr>
<tr>
<td>TR-DFTR (Turkey Reovirus Digital Flexor Tendon Rupture)</td>
<td>1.7</td>
<td>1</td>
</tr>
<tr>
<td>Turkey Coronavirus</td>
<td>1.7</td>
<td>1</td>
</tr>
<tr>
<td>Avian Influenza</td>
<td>1.5</td>
<td>1</td>
</tr>
<tr>
<td>Mycoplasma iowae (MI)</td>
<td>1.4</td>
<td>1</td>
</tr>
<tr>
<td>Necrotic enteritis</td>
<td>1.4</td>
<td>1</td>
</tr>
<tr>
<td>PEMS (Poult Enteritis Mortality Syndrome)</td>
<td>1.4</td>
<td>1</td>
</tr>
<tr>
<td>H3N2 (H1N1) Swine Influenza</td>
<td>1.3</td>
<td>1</td>
</tr>
<tr>
<td>Erysipelas</td>
<td>1.2</td>
<td>1</td>
</tr>
<tr>
<td>Mycoplasma meleagridis (MM)</td>
<td>1.1</td>
<td>1</td>
</tr>
<tr>
<td>Avian Metapneumovirus</td>
<td>1.1</td>
<td>1</td>
</tr>
<tr>
<td>Spondylolisthesis (Kinky-Back)</td>
<td>1.0</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 2. Turkey health survey (August 2012 - 2013) of professionals in US turkey production. * One respondent noted that their operation processed over 300 flocks with varying degrees of severity, but not included in the reporting of confirmed cases; Turkey Reovirus Digital Flexor Tendon Rupture (TR-DFTR).

<table>
<thead>
<tr>
<th>Disease</th>
<th>201</th>
<th>201</th>
<th>201</th>
<th>201</th>
<th>200</th>
<th>200</th>
<th>200</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blackhead (Histomoniasis)</td>
<td>321</td>
<td>80</td>
<td>89</td>
<td>108</td>
<td>67</td>
<td>63</td>
<td>68</td>
</tr>
<tr>
<td>Mycoplasma gallisepticum (MG)</td>
<td>45</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>67</td>
<td>63</td>
<td>68</td>
</tr>
<tr>
<td>Mycoplasma synoviae (MS)</td>
<td>75</td>
<td>49</td>
<td>39</td>
<td>56</td>
<td>38</td>
<td>47</td>
<td>52</td>
</tr>
<tr>
<td>Turkey Coronavirus (TCV)</td>
<td>420</td>
<td>221</td>
<td>70</td>
<td>91</td>
<td>3</td>
<td>10</td>
<td>n/a</td>
</tr>
<tr>
<td>Turkey Reovirus Digital Flexor Tendon Rupture</td>
<td>39</td>
<td>131</td>
<td>106</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
</tbody>
</table>

Table 3. Turkey research priorities (August 2012 - 2013) of industry professionals in turkey production (1= low to 5 = high).

<table>
<thead>
<tr>
<th>Issue</th>
<th>Score Average (1-5)</th>
<th>Score Mode (1-5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disease</td>
<td>4.0</td>
<td>4</td>
</tr>
<tr>
<td>Food Safety</td>
<td>3.9</td>
<td>5</td>
</tr>
<tr>
<td>Welfare</td>
<td>3.5</td>
<td>4</td>
</tr>
</tbody>
</table>
REPORT OF THE COMMITTEE

Poultry Management  3.2  3
Nutrition  2.8  3
Environmental  2.5  2
Processing  2.4  3
Waste Disposal  2.4  3

Table 4. Percentage (%) of brooding (commercial; farm) production is all-in/all-out (single-age; brooder hub); average of respondents (n=24).

<table>
<thead>
<tr>
<th>Year</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>48.6</td>
</tr>
<tr>
<td>2008</td>
<td>39.0</td>
</tr>
</tbody>
</table>

Table 5. Nineteen (19) in-feed FDA approved medications for turkeys listed by label indication categories: subtherapeutic (improved weight gain, feed conversion) versus therapeutic (disease prevention, control, treatment). * Not currently marketed. ** Deemed “Medically Important” per FDA Guidance #209 and #152. (Roxarsone approval was withdrawn September 30, 2013).

<table>
<thead>
<tr>
<th>Subtherapeutic</th>
<th>Therapeutic (Prevention, Control, Treatment)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bacitracin Zinc</td>
<td>Amprolium</td>
</tr>
<tr>
<td>Bacitracin Methylene Disalicylate</td>
<td>Bacitracin Methylene Disalicylate</td>
</tr>
<tr>
<td>Bambermycin</td>
<td>Chlortetracycline **</td>
</tr>
<tr>
<td>Chlortetracycline **</td>
<td>Clopidol</td>
</tr>
<tr>
<td>Neomycin + Oxytetracycline **</td>
<td>Diclazuril</td>
</tr>
<tr>
<td>Oxytetracycline **</td>
<td>Fenbendazole</td>
</tr>
<tr>
<td>Penicillin **</td>
<td>Halofuginone *</td>
</tr>
<tr>
<td>Ractopamine</td>
<td>Lasalocid</td>
</tr>
<tr>
<td>Virginiamycin **</td>
<td>Monensin</td>
</tr>
<tr>
<td>Neomycin + Oxytetracycline **</td>
<td>Nitarsonne</td>
</tr>
<tr>
<td>Sulfadimethoxine + Ormetoprim **</td>
<td>Nitarsone</td>
</tr>
<tr>
<td>Oxytetracycline **</td>
<td>Neomycin + Oxytetracycline **</td>
</tr>
<tr>
<td>Zoalene (DOT) *</td>
<td>Sulfadimethoxine + Ormetoprim **</td>
</tr>
</tbody>
</table>

388
Backyard poultry production continues to increase in many parts of the nation and with it the emergence of diseases that are infrequently seen in commercial poultry production because of the use of vaccines. In the 2013 backyard poultry survey, ten laboratories in nine states responded with the different types of diseases diagnosed from August 2012 to August 2013. Laboratories were from California, Pennsylvania, Arkansas, West Virginia, New York, New Jersey, Maine, Maryland and South Carolina. State submissions are seen in table 1 below. A total of 1,066 submissions were diagnosed. California, Pennsylvania, West Virginia and Maine had the highest submissions.

Table 1.

<table>
<thead>
<tr>
<th>State</th>
<th>Total Submissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>California</td>
<td>447</td>
</tr>
<tr>
<td>Arkansas</td>
<td>55</td>
</tr>
<tr>
<td>West Virginia</td>
<td>108</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>175</td>
</tr>
<tr>
<td>South Carolina</td>
<td>33</td>
</tr>
<tr>
<td>New York</td>
<td>46</td>
</tr>
<tr>
<td>New Jersey</td>
<td>24</td>
</tr>
<tr>
<td>Maine</td>
<td>105</td>
</tr>
<tr>
<td>Maryland</td>
<td>73</td>
</tr>
</tbody>
</table>

Chickens were the most numerous species submitted to the labs (80%) followed by turkeys (7.3%) and game birds (5.3%) as seen in table 2 below. Pigeon submissions were also notable (3.6%).

In the disease categories, the most diagnosed were the bacterial diseases. Colibacillosis and *Mycoplasma gallisepticum* infections were the most diagnosed bacterial infections. Parasitic diseases accounted for over 25% of all the laboratory-confirmed diseases with coccidiosis and nematodiasis being the most numerous. Viral neoplastic diseases followed closely after the parasitic diseases at 23.8% of the total. Almost 70% of all the viral neoplastic diseases were diagnosed as Marek’s disease again reflecting the absence of vaccination programs in backyard and small flock production. Fatty Liver Hemorrhagic syndrome (FLHS) was the most frequently diagnosed metabolic condition. Aspergillosis and Candidiasis had significant numbers in the fungal category. In the “other” category, cannibalism, salpingitis, pecking and lead toxicosis were among the conditions listed.
Bacterial, parasitic and neoplastic diseases (mostly due to Marek’s) are significant problems in backyard poultry. Hatcheries that supply most of the birds going into the backyard system do not routinely vaccinate day-old chicks for Marek’s. At the moment, there are no comprehensive policies either at the state or federal level to monitor the nation’s backyard flocks. Our survey just covered ten labs but it is clear from the results that the disease situation in small flocks is at a high level. More education directed at owners is necessary to control and manage diseases in this population.

<table>
<thead>
<tr>
<th>Disease Categories</th>
<th>Poultry Species Affected</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Chicken</td>
<td>Turkey</td>
</tr>
<tr>
<td>Viral (non-neoplastic)</td>
<td>59</td>
<td>6</td>
</tr>
<tr>
<td>Viral (neoplastic)</td>
<td>251</td>
<td>1</td>
</tr>
<tr>
<td>Bacterial</td>
<td>238</td>
<td>28</td>
</tr>
<tr>
<td>Parasitic</td>
<td>177</td>
<td>40</td>
</tr>
<tr>
<td>Metabolic</td>
<td>57</td>
<td>3</td>
</tr>
<tr>
<td>Fungal</td>
<td>29</td>
<td>0</td>
</tr>
<tr>
<td>Nutritional</td>
<td>19</td>
<td>1</td>
</tr>
<tr>
<td>Other</td>
<td>22</td>
<td>1</td>
</tr>
</tbody>
</table>

**Total**: 852 80 1 60 39 2 1,066

| Total | 852 | 80  | 1 | 60 | 39 | 2 | 1,066 |

1,066
The National Animal Health Laboratory Network is a partnership between the United States Department of Agriculture, State, university and federal diagnostic laboratories across the U.S. Currently, there are 60 NAHLN laboratories that work together to ensure there is adequate diagnostic capacity and capability for early detection of, rapid response to, and recovery from animal health emergencies. NAHLN operates on six key founding principles including: supporting laboratory quality management systems; ensuring competency of laboratory personnel; using standardized protocols, reference materials and equipment; maintaining secure reporting systems; confirming facilities use appropriate biosafety/biosecurity and emphasizing laboratory preparedness. NAHLN laboratories are AAVLD or ISO 17025 accredited or reviewed regularly by the NAHLN program. Along with their state animal health official, NAHLN laboratories submit a checklist for diseases they wish to be approved to test for which is reviewed by relevant VS programs. If accepted, laboratory personnel are provided standardized SOPs and trained and proficiency tested by NVSL reference labs. The NAHLN program works to establish sample targets, test result reporting criteria and funding mechanisms with the labs. In order to ensure the network can maintain adequate capacity and capabilities, a concept paper was developed by the NAHLN Coordinating Council to propose a revised structure for the NAHLN. The concept paper was published for public comment in the Federal Register in April 2013; forty-two comments were received that will be incorporated into efforts to codify the NAHLN, develop program standards and update the NAHLN strategic plan. A number of comments were related to questions regarding the proposed structure and implications regarding the National Poultry Improvement Plan (NPIP). The proposed structure will not affect NPIP testing; it will not be a requirement for NPIP laboratories to become NAHLN laboratories. However, NPIP laboratories will have the opportunity to request to become NAHLN laboratories- fitting into one of the five categories, including private laboratories, as described in the concept paper. The details regarding the number of laboratories in each category, the specific criteria on how that will be determined and the funding at each level are yet to be determined. Stakeholder input is welcome as those decisions are made.
Live Bird Marketing System (LBMS), Backyard Birds and Exhibition Birds

As part of the ongoing LBMS surveillance for presence of avian influenza virus (AIV) and avian paramyxovirus type-1 (APMV-1), the National Veterinary Services Laboratories (NVSL) tested 642 specimens in 266 submissions from 16 states (AL, CT, FL, MA, MD, ME, MO, NH, NJ, NY, OH, OK, OR, PA, RI, SD) by virus isolation in embryonated chicken eggs and, when appropriate, by real-time RT-PCR (rRT-PCR). The surveillance is a collaborative effort between individual States and the United States Department of Agriculture (USDA). Presumptive positive specimens from rRT-PCR testing at State laboratories and specimens requiring virus isolation (environmental and non-duck cloacal swabs) were submitted to the NVSL for testing. All remaining LBMS surveillance specimens were tested at the State level.

In fiscal year (FY) 2013, AIV or APMV was isolated from 14% (37/266) of submissions and 16% (102/623) of specimens tested. AIV subtype H1N1 (VA n=2), H1N2 (SD, PA n=2), H1N8 (PA n=3), H4N6 (PA n=1), H4N9 (PA n=1), H5N2 (PA n=1), H6N2 (AL n=1), H6N8 (NJ n=2), H11N9 (PA, OK n=4) and H12N5 (MA n=1) were found in the LBMS and backyard this year (Table 1). An H5N2 LPAI virus was isolated from Muscovy ducks in a LBM in PA. The finding was epidemiologically connected to a Philadelphia LBM which tested positive for H5 viral RNA. Also, an H1N8/LoNDV mixed infection virus was isolated from the duck specimens, and the H1N8 virus was isolated from environmental samples from PA. In an unrelated event, H5 viral RNA was detected in Muscovy ducks in a retail LBM in Kings County, NY; no virus was isolated. For APMV; 56 viruses were isolated, 53 APMV-1 from 9 states (CA, FL, MA, MD, MI, NY, OK, PA, RI), with APMV-4 and APMV-6 from PA and APMV-6 from NY. Pathogenicity of representative APMV-1 isolates obtained from birds was determined by the intracerebral pathogenicity index (ICPI, n=11) test and/or by analysis of the deduced amino acid profile at the fusion protein cleavage site (n=24). All were characterized as low virulent (lentogenic pathotype) strains; the remaining 3 were characterized as APMV-4 (1) and APMV-6 (2) viruses.

Low Pathogenicity Avian Influenza (LPAI) in Commercial Poultry

Surveillance for AIV in commercial poultry is conducted 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 controls for the rRT-PCR test in addition to confirmation and identification testing of positive specimens. For commercial poultry during FY 13 a single event of H7 AI (PCR and sera) was reported. Antibody to H7N7 AI
and H7 viral RNA was detected in a broiler breeder flock in Scott Co, AR. Specimens were collected from 44 wk old broilers as the result of a drop in egg production. No AI was detected as the result of further surveillance, and the index flock was depopulated. In addition, LPAI isolated from turkeys in OH H3 (1) and WV H1N1 (7) (Table 1).

The NVSL received 393 submissions (2789 sera) for AI antibody confirmation and subtyping in FY13 from 36 states and one international submission. Antibodies to influenza H1 and/or H3, with N1 and/or N2 antibodies in 262 submissions were detected in samples from 14 states (AR, FL, IA, MA, MI, MN, NC, OH, OK, PA, SC, SD, VA, WI). The majority of these detections were in turkeys (93.5% of submissions) where vaccination is common; the remaining detections were from chickens and one submission from pheasants. Antibodies to H4 (MN), H6 (OH), H9 (AR, MN, OK), and H11 (MN, OH) were also detected in turkeys. In separate events, H7 antibody was detected in broilers from AR (see above), backyard poultry from MA, and LBM chickens from PA. For PA, a follow-up investigation was conducted, and swabs tested negative for AI viral RNA. H5 antibody was detected from upland game pheasants in WI. No virus or viral RNA was detected from subsequent specimen collection.

Al Diagnostic Reagents Supplied by the NVSL

During FY 2013, a total of 11,375 units of AGID reagents (antigen and enhancement serum) were shipped to 61 state, university, and private laboratories in 34 states. The quantity is sufficient for approximately 1,365,000 AGID tests. An additional 862 units (103,440 tests) were shipped to 14 foreign laboratories in 12 countries. One hundred twenty-three laboratories were invited to participate in an AI Proficiency Test; 90 panels were shipped (including Canada (2), Mexico (1), and Chile (1)). A total of 67 laboratories from 36 states plus Puerto Rico passed with a score of 90% or better. Positive amplification (PAC) as well as positive extraction (PEC) control for the AI matrix (M), H5 and H7 rRT-PCR assays were distributed to National Animal Health Laboratories for AI rRT-PCR testing and support of NPIP and LBM surveillance. A total of 82 vials of PAC were shipped in FY13 to 18 states, and 366 vials of PEC were shipped to 35 states. Additionally, 24 vials of PAC (M, H5 & H7) and 8 vials of PEC were shipped to 4 countries.

rRT-PCR Proficiency Test Panels

The 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 testing. In FY 2013, AI (matrix/H5/H7) PTs were distributed to 249 diagnosticians in 56 laboratories and to 244 diagnosticians in 54 laboratories for APMV-1 (Newcastle disease) rRT-PCR. A total of 236 diagnosticians have been approved to conduct rRT-PCR testing for AI and 229 for APMV-1 in 55 labs. In addition to NAHLN laboratories AI and ND rRT-PCR proficiency panels were distributed to Canada and Mexico as
AIV Surveillance in Wild Waterfowl
Since the curtailment of the National Wild Bird Surveillance Program in March of 2011, NVSL has supported the surveillance of AI in wild waterfowl by subtyping (determination of hemagglutinin and neuraminidase subtype) all viruses and pathotyping (amino acid sequencing and/or chicken inoculation) H5 and H7 viruses submitted by university and independent researchers as well as the United States Geological Survey (USGS). Virus isolation (VI) and rRT-PCR testing is conducted on mortality event specimens. In FY2013, 343 wild bird specimens were received for confirmation, subtyping and characterization and, from mortality events, VI and rRT-PCR. No HPAI H5N1 was detected; however, LPAI H5N1 virus was detected in specimens submitted from 2 states (OH and IL). Predominant H5 and H7 subtypes were H5N2, H7N7, and H7N3. All H5 and H7 AIVs were characterized as LPAI viruses of North American lineage. All wildbird subtypes are listed in Table 2 by state and subtype.

Isolations of Virulent Newcastle Disease Virus (vNDV) and PPMV-1
In FY2013, no vNDV was isolated from domestic poultry. Pigeon paramyxovirus type-1 (PPMV-1) was isolated from racing and other pigeons in 8 states (CA, FL, MD, MI, MN, NJ, PA, WI). Virulent NDV was isolated from wild cormorant specimens from FL and OR (4 submissions). In addition vNDV was isolated from poultry in Honduras. All vND and isolates were characterized by the intracerebral pathogenicity index (ICPI) and/or amino acid sequence analysis of the fusion protein cleavage site; PPMV-1 isolates were identified by the HI test with monoclonal antibodies specific for PPMV-1 and sequence analysis of fusion protein cleavage site.

Isolations of Low Virulent Newcastle Disease Virus (LoNDV)
During FY2013, LoNDV was isolated and/or characterized from 119 APMV-1 viruses or specimens received for characterization or isolation at the NVSL. The specimens and viruses were received from LBM and NPIP surveillance and diagnostic submissions. The specimens originated from poultry and environmental samples in 14 states (CA, DE, FL, IA, IN, MA, MD, MN, NC, NY, OK, PA, RI, WI). All of the isolates were characterized as LoNDV by the ICPI and/or by deduced amino acid motif at the fusion protein cleavage site.

NDV Diagnostic Reagents Supplied by the NVSL
During FY2013, a total of 224 vials of LaSota APMV-1 inactivated antigen (2.0 ml per vial) was shipped to 5 domestic and 7 foreign state, university, and private laboratories. One hundred four vials of APMV-1 antiserum (2.0 ml per vial) for the hemagglutination-inhibition test were shipped to 8 domestic and 10 foreign labs respectively. Positive amplification (PAC) as well as positive
extraction (PEC) controls for the APMV-1 rRT-PCR assay were distributed to National Animal Health Network Laboratories for support of APMV-1 rRT-PCR testing. A total of 36 vials (18 states) of PAC, and 167 vials (27 states) of PEC were shipped. An additional 12 vials of PAC (4 countries) and 7 vials of PEC (3 countries) were shipped internationally.

Table 1. FY2013 IAV isolates from LBM, backyard, and commercial submissions by state and H-type.

<table>
<thead>
<tr>
<th>Purpose</th>
<th>Subtype</th>
<th># isolates</th>
<th>Source</th>
<th>State</th>
</tr>
</thead>
<tbody>
<tr>
<td>LBM/ back yard</td>
<td>H1N1</td>
<td>2</td>
<td>Turkey</td>
<td>VA</td>
</tr>
<tr>
<td></td>
<td>H1N2</td>
<td>1</td>
<td>Turkey</td>
<td>SD</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>Duck</td>
<td>PA</td>
</tr>
<tr>
<td></td>
<td>H1N8</td>
<td>1</td>
<td>Muscovy duck</td>
<td>PA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>Duck</td>
<td>PA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>environment</td>
<td>PA</td>
</tr>
<tr>
<td></td>
<td>H4N6</td>
<td>1</td>
<td>environment</td>
<td>PA</td>
</tr>
<tr>
<td></td>
<td>H4N9</td>
<td>1</td>
<td>Duck</td>
<td>PA</td>
</tr>
<tr>
<td></td>
<td>H5N2</td>
<td>1</td>
<td>Muscovy duck</td>
<td>PA</td>
</tr>
<tr>
<td></td>
<td>H6N2</td>
<td>1</td>
<td>Chicken</td>
<td>AL</td>
</tr>
<tr>
<td></td>
<td>H6N8</td>
<td>2</td>
<td>Pheasant</td>
<td>NJ</td>
</tr>
<tr>
<td></td>
<td>H11N9</td>
<td>1</td>
<td>Duck</td>
<td>OK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>Duck</td>
<td>PA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>Muscovy duck</td>
<td>PA</td>
</tr>
<tr>
<td></td>
<td>H12N5</td>
<td>1</td>
<td>guinea hen</td>
<td>MA</td>
</tr>
<tr>
<td>Other Commercial</td>
<td>H1N1</td>
<td>7</td>
<td>Turkey</td>
<td>WV</td>
</tr>
<tr>
<td></td>
<td>H3</td>
<td>1</td>
<td>Turkey</td>
<td>OH</td>
</tr>
</tbody>
</table>

Table 2. FY2013 wild bird IAV isolates by state and H-type.

<table>
<thead>
<tr>
<th>State (# isolates)</th>
<th>H-type (n=233)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AK (2)</td>
<td>H3</td>
</tr>
<tr>
<td>AR (7)</td>
<td>H1, H7, H10, H11, H14</td>
</tr>
<tr>
<td>CO (1)</td>
<td>H3, H6</td>
</tr>
<tr>
<td>IA (1)</td>
<td>H10</td>
</tr>
<tr>
<td>IL (19)</td>
<td>H1, H2, H3, H4, H5, H6, H7, H10, H11</td>
</tr>
<tr>
<td>LA (30)</td>
<td>H7, H10</td>
</tr>
<tr>
<td>State</td>
<td>Code</td>
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<tr>
<td>-------</td>
<td>------</td>
</tr>
<tr>
<td>MD</td>
<td>57</td>
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<td>WI</td>
<td>18</td>
</tr>
<tr>
<td>WY</td>
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TRANSMISSIBLE DISEASES OF POULTRY AND OTHER AVIAN SPECIES

POULTRY SALMONELLA, MYCOPLASMA, AND PASTEURELLA DIAGNOSTICS AT NVSL

B.R. Morningstar-Shaw, Diagnostic Bacteriology Laboratory, National Veterinary Services Laboratories, USDA
(proceedings summarized from presentation by the Chair)

Salmonella serotyping

The Diagnostic Bacteriology Laboratory within the National Veterinary Services Laboratories (NVSL) routinely serotypes *Salmonella* isolates submitted by private, state, and federal laboratories as well as veterinarians, researchers and other animal health officials. This report summarizes *Salmonella* serotyping submissions to NVSL from January 1 through December 31, 2012 originating from poultry. The *Salmonella* isolates are identified as clinical (clinical signs of salmonellosis from primary or secondary infection) or non-clinical (herd and flock monitoring programs, environmental sources, food). Serotyping data from isolates submitted for research purposes are not included in the summary. From January 1 to December 31, 2012, there were a total of 10,357 clinical and non-clinical submissions, of these 4,577 isolates were from chicken or turkey sources submitted to NVSL for *Salmonella* serotyping. The most common isolates from chickens and turkeys are listed in Tables 1 and 2 respectively.

### Table 1: Most common serotypes in 2012: Chicken

<table>
<thead>
<tr>
<th>Rank</th>
<th>Clinical</th>
<th>Non-Clinical</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Enteritidis</td>
<td>Heidelberg (up from 5&lt;sup&gt;th&lt;/sup&gt;)</td>
</tr>
<tr>
<td>2</td>
<td>Kentucky</td>
<td>Kentucky</td>
</tr>
<tr>
<td>3</td>
<td>Typhimurium</td>
<td>Enteritidis (down from 1&lt;sup&gt;st&lt;/sup&gt;)</td>
</tr>
<tr>
<td>4</td>
<td>Rough O: g,m:-</td>
<td>Senftenberg (down from 3&lt;sup&gt;rd&lt;/sup&gt;)</td>
</tr>
<tr>
<td>5</td>
<td>Muenchen</td>
<td>Mbandaka (down from 4&lt;sup&gt;th&lt;/sup&gt;)</td>
</tr>
</tbody>
</table>

### Table 2: Most common serotypes in 2012: Turkeys

<table>
<thead>
<tr>
<th>Rank</th>
<th>Clinical</th>
<th>Non-Clinical</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Senftenberg</td>
<td>Senftenberg (up from 4&lt;sup&gt;th&lt;/sup&gt;)</td>
</tr>
<tr>
<td>2</td>
<td>Albany</td>
<td>Muenster (up from 5&lt;sup&gt;th&lt;/sup&gt;)</td>
</tr>
<tr>
<td>3</td>
<td>Typhimurium (up)</td>
<td>Hadar (down from 1&lt;sup&gt;st&lt;/sup&gt;)</td>
</tr>
<tr>
<td>4</td>
<td>Saintpaul (up)</td>
<td>Kentucky (up)</td>
</tr>
<tr>
<td>5</td>
<td>Montevideo</td>
<td>London (up)</td>
</tr>
</tbody>
</table>

Salmonella Molecular Typing

The xMAP Salmonella assay developed by CDC has been implemented at the NVSL. Currently some samples are being tested by xMAP with the goal of
REPORT OF THE COMMITTEE

initial testing of all isolates via the xMAP assay and complete typing as needed with antisera.

Observations with the molecular typing is that it is faster and less cumbersome than conventional serotyping (high throughput), it eliminates some sera QC issues and subjective interpretation, genotype versus phenotype is not affected by expression, and the method is less labor intensive, needs expensive equipment, and the reagent cost varies.

Salmonella Pullorum and Gallinarum

The NVSL provided 725 ml of S. Pullorum tube antigen, 2,375 ml of S. Pullorum stained microtiter antigen, and 346 ml of control antisera to testing laboratories.

Pasteurella

NVSL received 152 isolates for somatic typing, 108 isolates for DNA fingerprinting and supplied 48 reference isolates and 10 vials of antisera.

Mycoplasma

NVSL performed 660 hemagglutination inhibition tests, and supplied 555 ml of hemagglutination antigen and 712 ml of control antiserum to laboratories.
The Centers for Disease Control reported eight *Salmonella* outbreaks linked to contact with live backyard poultry in 2012. With the number of backyard flocks increasing in the United States, evaluating the epidemiology of *Salmonella* in these flocks is important to understanding measures that can be utilized to prevent transmission of the bacteria between flocks and prevent zoonotic transmission to humans. Colorado State University and collaborators recently conducted two studies in an effort to further understanding of this issue.

The aim of the first study was to measure the frequency of isolation of *Salmonella* from the environment of poultry exhibits at agricultural fairs. The results of this study are published in *Zoonoses and Public Health* [KL Pabilonia, KJ Cadmus, et al. Environmental *Salmonella* in agricultural fair poultry exhibits in Colorado. *Zoonoses and Public Health* (epub ahead of print 2013)]. Poultry cage litter, feed and environmental samples (floors and tables) were collected from 11 agricultural fairs. *Salmonella* was detected in 91% of fairs and 50.9% of all samples collected. Eleven *Salmonella* serotypes were detected, including Enteritidis, Infantis, Kentucky and Braenderup. Results demonstrate that environmental surfaces of agricultural fairs can be contaminated with *Salmonella* and could potentially serve as a route of transmission to bird owners and the general public.

The aim of second study was to assess the prevalence of *Salmonella* in baby poultry enclosures at feed stores. Cage litter and drag swab samples were collected from 30 feed stores. *Salmonella* was detected in 63% of the stores and 13 serotypes were identified. Feed stores sourced baby poultry from ten different hatcheries in seven states. Results of this study are currently being submitted for publication.
The USAHA Committee on Salmonella met on October 22, 2013 and heard presentations from the below speakers. Details of the program can be found on the Committee’s full report.

Drs. Tara Anderson and Stacey Bosch of CDC who discussed the ongoing outbreaks of Salmonellosis in humans attributed to live baby poultry, with special emphasis to the recent outbreak associated with Typhimurium.

Dr. Kristy Pabilonia shared her research work looking at Salmonella in backyard poultry specifically at fairs and shows and also feed stores.

Brenda Morningstar-Shaw presented the annual Salmonella update from NVSL.

Dr. Eileen Thacker with USDA-ARS shared an update on NARMS. Apparently the NARMS program is in a state of flux. They are looking at testing ceca in processing plants as a predictor of the salmonella on farm.

Dr. Dayna Harhay of USDA-ARS shared a very interesting look at the Salmonella issues related to beef. Apparently Salmonella can contaminate meat from external contamination, but also from internal contamination from infected lymph nodes. She showed that typically the serotypes found on the animal are not what are found in the beef.

Dr. Annette O’Connor of ISU shared the Salmonella control programs of various countries as compared to the United States. The bottom line is that on farm intervention does not work or if it does work it is not cost effective.

The Committee also discussed and passed the Resolution concerning the presence of Salmonella of any serotype whether it is antibiotic resistant or not being declared an adulterant.
Every year, the World Organization for Animal Health (OIE) updates existing terrestrial animal code chapters or drafts new ones. At its May 2013 General Session, the World Assembly of Delegates adopted new text to several existing chapters. Pertinent to the poultry industry are the following new or updated Code chapters:

**Biosecurity Procedures in Poultry Production.** In 2011, a new chapter addressing basic biosecurity and hygiene procedures during poultry production was adopted. For 2013 the chapter received some minor revisions to improve its clarity and understanding.

**Animal Welfare.** A new chapter called Animal Welfare and Broiler Chicken Production was presented and adopted during the 2013 General Session. The chapter presents recommendations for the housing and rearing of broilers. It excludes poultry reared in 'backyard' environments. The recommended measures follow basic good management practices. The US commercial poultry industry should have no difficulty meeting these recommendations.

**Responsible and Prudent Use of Antimicrobial Agents in Veterinary Medicine.** The chapter introduces some general recommendations on the use of antimicrobial agents. For the most part, the United States should be able to comply with the recommendations.

**Infection with Avian Influenza Viruses.** Although the substance and specific reporting obligations of the chapter have not changed, the United States had concerns with the proposed changes to the terminology of ‘avian influenza’ – doing away with the term “notifiable” and replacing it with simply ‘avian influenza’ or ‘highly pathogenic AI’ depending on the context of the recommendation. The President of the Commission made it clear that notification obligations did not change – the avian influenzas that are notifiable are the low pathogenicity H5 and H7 subtypes in poultry (as defined by the OIE) and all highly pathogenic strains. Brazil, another significant exporting country of poultry commodities, also expressed the same concerns. The updated chapter, however, was adopted.
The Committee met on October 21, 2013 at the Town and Country Hotel, San Diego, California, from 1:00 to 6:00 p.m. There were 24 members and 43 guests present.

Chair Snelson welcomed participants to the 2013 Transmissible Diseases of Swine Committee meeting and introduced himself and vice-chair, Dr. Lisa Becton. Dr. Snelson reviewed other house-keeping items including the changes to the sign-in sheet and requested any resolutions to be presented if they have not been submitted to date.

Dr. David Marshall brought up a new issue regarding pseudorabies virus (PRV) testing at the Kentucky laboratory and timeline for results. The problem was identified when two positive PRV sow samples were identified in North Carolina. The time from sample collection, submission to Kentucky, then to National Veterinary Services Laboratory (NVSL) for confirmation and back to North Carolina, was approximately five weeks. United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), NVSL was consulted to address the issue. The resolution included changing of testing protocol so that if there is a suspect positive sample, samples will then be automatically submitted to NVSL for expedited testing and by-pass the confirmatory testing at the Kentucky laboratory. The process will continue to be assessed for effectiveness. The update was for Committee information.
TRANSMISSIBLE DISEASES OF SWINE

Iowa State University, Veterinary Diagnostic Laboratory (ISU-VDL) Update on Porcine Epidemic Diarrhea Virus (PEDv) Diagnostics: Events, Observations and Outcomes
Rodger Main
Iowa State University, Veterinary Diagnostic Laboratory

Dr. Main reviewed events with porcine epidemic diarrhea virus (PEDv) diagnostics and reviewed the different types of assays that are available. PCR still is the predominant assay that is being used. PCR is highly sensitive and can be run in same-day; and can detect acute cases but may not be appropriate for routine surveillance of non-acute cases. Positive <35, but will report out to 40. Utility of oral fluids testing for PED is under development; very good test due to non-invasive, quick and easy to do. The test has been very valuable for ante-mortem detection of virus. It is also very sensitive for picking up environmental issues as well. However, it cannot isolate virus at this point from samples. Immunohistochemistry (IHC) is available for testing on fixed tissues, but the test appears to be relatively insensitive. Immunofluorescent antibody test (IFA) is also being utilized at this time. Good titer can be seen to PED 3-4 weeks post-exposure, but the titer does not remain for an extended period of time...data is still being collected for specific time frame of duration of titers. Multiple university efforts to develop an ELISA test. Current PED commercial assays are poor quality (international sourced). Virus isolation (VI) are underway to be completed but is a complicated and time consuming process. Sequencing does not appear to be changing from the original isolate identified from China. The S gene is the gene of interest and focus for epidemiologic purposes.

Do we know what a protective antibody would be? Not at the current time. Currently work is being done on a serum neutralizing focus. There appears to be a high amount of virus found in piglets even without clinical signs post-acute outbreak. Therefore, the serum neutralization (SN) assay will try to determine what the antibody levels mean. Virus can shed an extended amount of time in clinically normal pigs anywhere between 4-8 weeks post-outbreak.

The clinical effect on neonates is significant up to 100% mortality, but in older pigs, clinical presentation varies. Disease in growing animals could be readily missed.

Is there a more effective means to report ongoing cases versus what is being collected currently? The current information does show a barometer of what is going on in the industry. However, to understand national prevalence, different information and potentially another sample source would need to be incorporated. The PED event highlights the need for continued disease surveillance, rapid detection and appropriate response for swine disease issues.
Pork Industry Update on Porcine Epidemic Diarrhea Virus (PEDv)
Paul Sundberg
National Pork Board

Dr. Sundberg provided an update on activities for PED by the Pork Board. Focusing on research and outreach efforts in response to the virus, new and ongoing cases of PED occurring within the industry were outlined. The current data that is available for case numbers cannot be used for disease analysis, so effort is being made to incorporate premise identification numbers for laboratory submissions. Producer permission has to be granted to be utilized and provide assurance it will be maintained correctly.

First issue was to convene groups that can identify specific needs. There was a real need to make sure that samples are continued to be submitted for PED and that there was guidance on how best to submit samples. Working groups were convened in order to address specific areas: biocontainment; biosecurity and transportation; and packing plant group. Different guidelines have been developed to address specific areas of biosecurity that could add risk of spread of the PED virus. Manure hauling guidelines were developed to address such an area. For more detailed information and the specific guidelines, go to www.pork.org/ped. A common biosecurity theme that has arisen is the concept of the line of separation to reduce chance of spread of PED. The concept highlights the need to keep people/equipment in respective areas so to not transmit disease.

Extensive communication efforts have been underway to make sure that this information is available to producers, veterinarians, and other stakeholders to assist in ongoing disease management. Other information that is available includes updates on all research that has been funded to date for PED. There are currently nine projects underway. Updates on progress are reported bi-weekly.

Many key lessons have been learned including the need for premise identification on laboratory submissions for disease surveillance, biosecurity focus is needed on all production fronts, biocontainment is also critical, and the industry and government have definitive roles that will continue to be refined.

Continued focus should be in preventing contamination of trailer cabs with the virus (PED or even porcine reproductive and respiratory syndrome (PRRS)).

Centers for Epidemiology and Animal Health (CEAH) Update on Porcine Epidemic Diarrhea Virus (PEDv) Epidemiology Efforts
Andrea Beam, VMO (Epidemiology)
USDA-APHIS-VS-CEAH

Presentation provided by teleconference.

Dr. Beam gave a review of the investigations for PED as well as an update on the 2012 National Animal Health Monitoring System (NAHMS) swine study. The first epidemiologic study was to look at the first cases of PED and to identify potential risk factors or commonalities between these first index cases. CEAH assisted with questionnaire development and data analysis. Data confidentiality covered by Confidential Information Protection and Statistical
EFFICIENCY ACT (CIPSEA) and would not be subject to Freedom of Information Act (FOIA). The first study was completed and results were published by American Association of Swine Veterinarians (AASV). Several feed variables were associated with this being a case farm. No smoking gun has been identified at this point in time, but cannot completely rule these out due to low sample size.

The second epidemiologic study is to do spatial analysis and a prospective study. University of Minnesota, College of Veterinary Medicine (CVM) is performing this study. This study is to better understand risk factors for lateral spread of PED. An Oklahoma case is utilized to look at the spatial analysis. Additional information and updates can be found on www.pork.org/ped. The second component is the prospective study. North Carolina is the focus for evaluation of lateral spread which will have both case and non-infected controls for the data analysis. CEAH has developed the biosecurity questionnaire with data analysis. Spatial analysis is ongoing and should be available within the next few weeks. Data for airborne spread is also being analyzed and will be available within the next several weeks. The prospective study is underway and data collection will occur soon.

The 2012 NAHMS swine study has two parts: farms with herds > 100 head and the second with < 100 head. Data analysis is ongoing for both studies. Biologic collection datasets are currently being validated.

**Feral Swine Brucellosis/PRV Subcommittee Report**
Joe Corn, Southeastern Cooperative Wildlife Disease Study (SECWDS)
University of Georgia

Southeastern Cooperative Wildlife Disease Study (SECWDS) collects and distributes data for feral swine populations. They began distributing maps in 2002 with over 600 additions made since 2008. There are 36 states reporting populations of feral swine. Monitoring of feral swine is done on high risk populations and will test for swine brucellosis (SB), pseudorabies virus (PRV) and other diseases. In 2013, 3000 samples were collected in 34 states. For 2014, more aggressive management of feral swine funding will be looked at.

National Center for Foreign Animal and Zoonotic Disease Defense (FAZD) gave a presentation on the impact of feral swine for commercial populations and the impact if a foreign animal disease (FAD) enters the US. An intensive feral swine study was performed in California and utilized global positioning systems (GPS) data to track movements of existing feral swine.

Another presenter provided an update on the incidence of B. suis in dairy cattle and potential problems associated with consumption of raw milk. This project was initiated and ongoing in Georgia.

Members approved the report as given. A complete report can be found following the Committee on Brucellosis Report previously in these proceedings.
Secure Pork Supply Project Update and Vaccine Needs for a Potential Foot and Mouth Disease (FMD) Outbreak

Jim Roth
Iowa State University College of Veterinary Medicine

Dr. Roth reviewed the changes in North American agriculture and the difficulties of dealing with a Foot and Mouth (FMD) outbreak. Traditional methods for dealing with FMD (stop movement and stamping out) would not be easily accomplished within the United States for many different reasons. Stamping out would be a logistical issue due to large sizes of operations. Another issue is the extensive movement of animals in transit at any given time. This also provides another logistical challenge for dealing with a foreign animal disease (FAD). Pork export value is rising and was at $6.3 billion for 2012. Events such as a FAD could create a devastating reduction of value for pork products abroad. The varied sizes of swine operations create a challenge for identifying and providing data to show freedom of disease. These challenges have led to the development of a Secure Pork Supply (SPS) Planning Committee that represents all stakeholders within industry and government to assess what can be done during an outbreak. Diseases to be assessed for SPS plan: FMDv, Classical Swine Fever (CSF), African Swine Fever (ASF), and Swine Vesicular Disease (SVD). None are zoonotic diseases and all but one are swine-specific diseases. The first draft was circulated in July 2013 and requested back by August 31. The comments will be integrated into the updated document and the next draft will be available soon. There are voluntary pre-outbreak preparedness components to the plan. Plans will be based on current capabilities and will evolve with science, risk assessments and new capabilities. Final decisions will be made by responsible officials during an outbreak. There will be outreach and training pre and post outbreak.

For biosecurity, there will be Level 1 and 2 biosecurity for producers and veterinarians to follow. Level 1 is pre-outbreak and recommended for prevention of endemic diseases. Level 2 will be required to move your pigs during an outbreak. Pre-outbreak will be voluntary and will involve certification. Biosecurity standards are being reassessed after experience with PEDv. There is a traceability component to include the use of Premises Identification Number (PIN). The focus is on where the animal was for the last 28 days and also trace forward for 28 days. Surveillance will be incorporated in the event of an outbreak in order to move animals, and then show proof of virus freedom (for OIE and trading partners). Controlled movement of animals would be utilized vs. stop movement. Decisions need to be made on how to handle the start of an outbreak and then determine how movements will restart as the outbreak becomes under control. Specific requirements for controlled movement are outlined in the draft document. The draft document has been sent to Food Safety and Inspection Service (FSIS). A new working group will be formed next to include FSIS, packers and Animal and Plant Health Inspection Service (APHIS).
Vaccines for FMD outbreak are needed in order to manage the disease. USDA has stated the FMD stocks are not at a sufficient quantity to support the outbreak and provide vaccination in high animal dense areas. A white paper was developed for the industry and delivered to Dr. Paul Sundberg at the National Pork Board for review last week. There are several potential options for securing FMD vaccines if needed. However, none of the options are ideal or approved at this time. Ideally, a combination of approaches would be utilized to secure adequate supplies of vaccine, with necessary funding: immediate availability; short-term availability; and long-term availability. There is the potential for use of novel technologies for vaccine development for FMD – there are four different technologies that could gear up and produce vaccine quickly and safely.

Pork Industry Update on Flu and Fairs
Jennifer Koeman
National Pork Board

Dr. Koeman provided an update on National Pork Board’s update on activities surrounding influenza in swine. Influenza is a common disease of swine. Activities for surveillance were initiated prior to 2009. However, the H1N1 pandemic initiated a more aggressive approach for influenza surveillance for swine. Several educational materials were developed for both veterinarians and producers. The passive surveillance plan was undertaken by USDA-APHIS-VS and is an anonymous plan. Objectives include development of diagnostics, awareness of current influenza isolates in circulation and determine vaccination needs. The plan does include a component of coordination and collaboration with Center for Disease Detection (CDD) to encompass human health issues. Results of the influenza surveillance plan are reported by USDA, National Surveillance Unit (NSU), isolates go to National Veterinary Services Laboratory (NVSL) and then can be shared within Genbank to show genetic diversity. Through July 2013, more than 8,300 case submission have been submitted to the plan. The influenza report can be viewed in the National Animal Health Laboratory Network (NAHLN) Quarterly report.

The 2012 diagnosis of influenza associated with swine exhibitors at fairs was of concern. The viruses identified were seen in the swine surveillance plan since 2010. Observation and evaluation of those isolates is ongoing. The response to this outbreak was different than what occurred in 2009. The focus was on biosecurity on-farm, at exhibits and with exhibitors. Messaging was discussed between both human health and animal health organizations and a standardization of language for naming of variant viruses was an outcome of that collaboration. Additional resources included an updated biosecurity document for exhibitors. A working group was convened to assess the experiences from the summer, evaluated the risk factors and then developed additional guidelines for handling exhibitions and influenza. Subsequent documents were developed in 2013 from the National Association of State Public Health Veterinarians (NASPHV) and also from the National Assembly of
Influenza at Fairs and Exhibitions Study

Andy Bowman
Ohio State University, College of Veterinary Medicine

Dr. Bowman provided an update on activities at fairs and exhibitions. There is evidence of pigs playing a role in the ecology and epidemiology of influenza A virus infecting humans. Zoonotic transmission of influenza involves direct contact between humans and pigs. Fairs provide a unique situation for increased chance of influenza infections to spread between humans and pigs. The group wonders if there were pigs in the population that were shedding virus without showing clinical signs and what is the impact for the transfer of virus? Nasal swabs were taken at the end of Ohio fairs and then tested. Sampling occurred in 2009-2011. There were 12 fairs that did have sick pigs and flu infected pigs. Eighteen percent of subclinical pigs were seen for influenza. The summer months of June and July showed the most amount of influenza at fairs. Subclinical influenza A was present in swine at fairs. Visual inspection alone could not predict infection status of swine. Therefore, the quantifiable risk to humans for subclinical pigs with influenza was unknown. Genomic evaluation was performed on isolates identified from the pilot study. Different constellations of virus within fairs and by year were visible. There could be assortment within fairs and that remaining for future fairs.

Surveillance was also accomplished during 2012 at 40 different Ohio fairs. At the same time, the H3N2v isolate was identified. Human cases had prolonged exposure/contact with swine. Seven of the 14 fairs that had H3N2v identified were already in the surveillance project. The dendogram of influenza shows that human and swine isolates are clustered closely together. The dendogram also showed a very quick dissemination of influenza within shows. Additional steps should be taken to stop bi-directional spread of virus. The fair recommendations that were developed mirrored what is needed to better manage the risk of influenza infections.

For 2013, there were additional fairs samples across the U.S. and targeted 100 fairs. There seems to be 25% of influenza identified for the fairs sampled. Two thousand forty eight samples tested to date included 4,217 pigs; 17.4 % positive by polymerase chain reaction (PCR); 205 isolates have been recovered. (These are all initial results). There is a mixed set of strains that have been identified within pig and within fairs. There is a different assortment going on within the isolates identified at fairs (H3N2 isolates).

Another project is to utilize snout wipes at the entry to fairs. The wipes seem to coordinate well with nasal swabs. This may be an additional tool to use for understanding status of pigs at entry. Evaluating an infrared
thermometer, but not as useful to sort out influenza pigs vs. not. Also evaluating the use of air sampling to see level of virus in the air and what risk that might pose. All of this work has been a very collaborative effort to address influenza status for swine.

**National Animal Health Laboratory Network (NAHLN) Update**
Sarah Tomlinson
USDA-APHIS-VS

*Presentation provided by teleconference.*

Dr. Tomlinson reviewed the purpose of NAHLN, the current activities, what is next and the impact for the swine industry. NAHLN is 10 years old and is a network partnership between USDA – Animal and Plant Health Inspection Service (APHIS), National Institute of Food and Agriculture (NIFA), and American Association of Veterinary Laboratory Diagnosticians (AAVLD). The focus is on early detection, rapid response and showing proof of freedom of disease.

The NAHLN concept paper was developed in 2011 by the NAHLN Coordinating Council that described the restructuring of the NAHLN to increase capacity and flexibility for detecting and responding to emerging and zoonotic diseases. In 2012, the council further developed the paper and it was then published in the Federal Register. The next steps after receiving comments will be to develop responses and incorporate those comments moving forward with Code of Federal Regulations (CFR) writing and development of program standards. A revision of the NAHLN strategic plan will be developed. There is a concerted focus on Quality Management Systems Training (QMST) that started in 2010 and has increased in demand through 2013. This training will continue through 2014. The NAHLN Information Technology (IT) system is converted to Laboratory Messaging Service (LMS) with the Health Level 7 (HL7) standards. Swine influenza virus (SIV) messaging is now a part of this system. Pseudorabies virus (PRV) will be next. National Veterinary Services Laboratories (NVSL) is now messaging. Next phase is to work with other Veterinary Services (VS) systems. This is also a concurrent effort with State Animal Laboratory Messaging Service (SALMS) (B. Akey – Cornell). Also in development is the NAHLN Portal in conjunction with Kansas State University (KSU) and University of Minnesota (UMN). Modules are under development and will be deployed within the month and through the end of 2013. National surveillance is accomplished by NAHLN for various diseases of swine, both foreign and emerging disease.

NAHLN also participates in preparedness activities for Foreign and Emerging Diseases (FAD’s). This includes the Laboratory Capacity Estimation Model (LCEM) and has an Exercises and Drills Working Group (EDWG). The group is developing a routine exercise program for NAHLN laboratories available through the NAHLN Portal.

Validation studies are also a key component of NAHLN laboratories. Review inter-laboratory comparison and negative cohort studies (i.e. FMD studies). Collaborating partners include NVSL, Foreign Animal Disease
Diagnostic Laboratory (FADDL) and National Center for Foreign Animal and Zoonotic Disease (FAZD) and other collaborators. In evaluation, the negative cohort of an FMD penside antigen assay (Lateral Flow Device). Upcoming studies include an FMD 3 ELISA that will include swine for fall of 2013.

What’s next? Communications and policies will be of focus for the future. Issues exist with commercial test kits and use of those kits. International collaboration is needed moving forward as well. The focus on early detection is critical. Need to address the immediate needs with information technology and integrate with other systems both internal to VS and external systems. Focus on ASF as well as FMD testing.

USDA Swine Health Programs Update
Lee Ann Thomas
USDA-APHIS-VS

Dr. Thomas provided an update on swine health activities to date. Covered were basics of PED management and have shown that PED is not a regulatory disease. Plans are still being formulated on how to deal with a non-regulatory disease. Partnering of USDA and industry is critical for moving forward with non-regulatory diseases. USDA will work with FDA on importation of feeds and feedstuffs and how that is evaluated for risk to industry. Agricultural Research Service (ARS) will be funded for PED study to gain further learning.

Pseudorabies virus/Brucella suis (PRV/SB) program – concept paper was published in February of 2013 and comments are being reviewed. The next step is to discuss with stakeholders and develop a future plan. This will potentially incorporate the use of non-regulatory concepts for moving forward. Sample streams were reviewed for surveillance of current PRV. The cull sows and boars line were also surveyed for swine brucellosis. There were no commercial herds identified as PRV positive for FY2013. The intent of looking at surveillance is to see where efficiencies can be gained and still be able to provide necessary disease surveillance information for the industry and international standards for slaughter surveillance. Need to be able to prove that less than 1% of herds are infected (fewer than 1 in 100,000 are infected). Communications are ongoing with states and industry. For FY2014, continue PRV at NAHLN labs and possibly look at SB testing to NAHLN.

Influenza A virus in swine – surveillance is ongoing. Much activity is taking place for management of influenza at fairs and exhibitions. (See previous information from Drs. Koeman and Bowman for specifics of response and subsequent materials and recommendation development.) Funding for surveillance is good through 2014 and will become tight in 2015 as funds are finite.

Classical Swine Fever (CSF) - surveillance in ongoing in various streams. No current samples are positive. Over 9,000 samples tested.

Swine Health Protection Act – garbage feeding is still permitted in 28 states plus Puerto Rico (PR) and the Virgin Islands (VI). These areas are considered high risk and are targeted at a higher rate for diseases. Garbage
feeders are inspected for compliance for adherence to recommendations. One hundred sixty non-licensed feeders have been found and it does present potential risk for introduction of unwanted diseases.

Feral Swine Initiative – developing a goal to reduce feral swine population. Potential funding for 2014 could be up to $20 million, which would go for operations to control or eradicate where possible. There will also be funds for surveillance and modeling. Plans are progressing. One million was provided for a pilot in Mexico and initiated in 2013 by Wildlife Services. WS will work closely with state counterparts for control of feral swine.

Committee Business:
Existing Resolution Review:

1. Seneca Valley Virus (SVV) - #14; Agricultural Research Service (ARS) has had conversation with North Carolina (NC) on obtaining samples to evaluate this disease. Funding sources are limited to be able to address this issue. ARS does not currently have tissues or virus from NC; ARS and NVSL did obtain samples from Hawaii, but samples were too degraded to work with. Samples will be obtained from NVSL to evaluate this. Testing for real-time PCR is under development for SVV and potentially available for use.

2. CISS 2011 – the resolution was passed and a response was given in 2012. Dr. Snelson read the response from 2012 and is available through USAHA archives. A suggestion was made to update the dates and language for the resolution and resubmit for consideration. The Committee wants to make sure that the issue of CISS continues for development and implementation. **Final Committee decision is to ask for an update at NIAA for 2014.** Motion was made and seconded. Passed by majority voice vote.

New Resolutions:

1. **Information Sharing for Herd Health:** There is a mechanism available to allow producers to access premises identification and be able to have that information. Motion was made to accept the resolution as written and seconded. Passed by majority voice vote.

2. **Emerging Disease Response Infrastructure and Planning:** Motion made to accept the resolution as written and seconded. This also supplements the Swine Futures Project from the 1990’s for disease surveillance and response. Passed by a majority voice vote.

3. **Risk Analysis:** Motion made to accept the resolution and seconded. A friendly amendment was accepted. The motion passed by a majority voice vote.
REPORT OF THE COMMITTEE ON TUBERCULOSIS
Chair: Dustin Oedekoven, SD
Vice Chair: Beth Thompson, MN

John Adams, VA; Sara Ahola, CO; Bruce Akey, NY; Wilbur Amand, PA; Joan Arnoldi, WI; James Averill, MI; Kay Backues, OK; Lowell Barnes, IN; Bill Barton, ID; Peter Belinsky, RI; Warren Bluntzer, TX; Steven Bolin, MI; Joyce Bowling-Heyward, MD; Richard Breitmeyer, CA; Becky Brewer-Walker, AR; Gary Brickler, CA; Charlie Broaddus, VA; Charles Brown II, WI; William Brown, KS; Mike Chaddock, DC; John Clifford, DC; Michael Coe, UT; Jim Collins, GA; Kathleen Connell, WA; Thomas Conner, OH; Walter Cook, WY; Donald Davis, TX; Thomas DeLiberto, CO; Jere Dick, MD; Leah Dorman, OH; Brandon Doss, AR; Anita Edmondson, CA; Dee Ellis, TX; Steven England, NM; Donald Evans, KS; John Fischer, GA; James Foppoli, HI; W. Kent Fowler, CA; Nancy Frank, MI; Mallory Gaines, DC; Tam Garland, TX; Robert Gerlach, AK; Michael Gilsdorf, MD; Chelsea Good, MO; Velmar Green, MI; Stephane Guillossou, MO; Thomas Hagerty, MN; Rod Hall, OK; Steven Halstead, MI; Noel Harrington, ONT; William Hartmann, MN; Greg Hawkins, TX; Carl Heckendorf, CO; Terry Hensley, TX; Linda Hickam, MO; Bob Hillman, ID; Christine Hoang, IL; Donald Hoenig, ME; Thomas Holt, FL; Dennis Hughes, NE; John Huntley, WA; Billy Johnson, AR; Jon Johnson, TX; Shylo Johnson, CO; Jamie Jonker, VA; Karen Jordan, NC; Susan Keller, ND; Bruce King, UT; Diane Kitchin, FL; Paul Kohrs, WA; Maria Koller-Jones, ONT; John Lawrence, ME; Maxwell Lea, Jr., LA; Rick Linscott, ME; Jason Lombard, CO; Konstantin Lyashchenko, NY; Daniel Manzanares, NM; Bret Marsh, IN; Chuck Massengill, MO; Susan McClanahan, MN; Paul McGraw, WI; Robert Meyer, WY; Susan Mikota, TN; Michele Miller, FL; Eric Mohlman, NE; Ernie Morales, TX; Henry Moreau, LA; Julie Napier, NE; Sherrie Nash, MT; Alecia Naugle, MD; Cheryl Nelson, KY; Jeffrey Nelson, IA; Kenneth Olson, IL; Mitchell Palmer, IA; Elizabeth Parker, ITA; Boyd Parr, SC; Elisabeth Patton, WI; Janet Payeur, IA; Kris Petrini, MN; Alex Raeber, CHe; John Ragsdale, NM; Jeanne Rankin, MT; M. Gatz Riddell, Jr., AL; Suelee Robbe-Austerman, IA; Keith Roehr, CO; Mo Salman, CO; Larry Samples, PA; Bill Sauble, NM; Shawn Schafer, ND; Joni Scheftel, MN; Irene Schiller, CHe; David Schmitt, IA; Dennis Schmitt, MO; Stephen Schmitt, MI; Andy Schwartz, TX; Charly Seale, TX; Laurie Seale, WI; Craig Shultz, PA; Kathryn Simmons, DC; Daryl Simon, MN; Nick Striegel, CO; Rodney Taylor, NM; Tyler Thacker, IA; Charles Thoen, IA; Kenneth Throlson, ND; Darren Turley, TX; Paul Ugstad, NC; Arnaldo Vaquer, VA; Kurt VerCauteren, CO; Jesse Vollmer, ND; Mark Walter, PA; Ray Waters, IA; Scott Wells, MN; Diana Whipple, IA; Ellen Wiedner, FL; Richard Willer, HI; Brad Williams, TX; Kyle Wilson, TN; Ross Wilson, TX; Josh Winegarner, TX; Nora Wineland, MO; David Winters, TX; Jill Bryar Wood, TX; Ching Ching Wu, IN; Stephanie Yendell, MN; Marty Zaluski, MT.

The Committee met on October 22, 2013 at the Town and Country Hotel, San Diego, California, from 1:00 p.m. to 6:00 p.m. There were 76 members
and 37 guests present. Dr. Oedekoven introduced himself, welcomed members and guests, and introduced the vice chair, Dr. Thompson.

The first presenter was Dr. Robert Meyer who presented the Report of the Scientific Advisory Subcommittee (SAS.) A motion to accept the report of the SAS was made and seconded. The motion was passed. The full text of the report is included in this report.

Dr. Chuck Massengill presented the Elephant Tuberculosis (TB) Subcommittee Update. The Subcommittee approved a resolution, for presentation to the TB committee regarding the replacement of the TB Stat-Pak Assay with the DPP VetTB Assay as a presumptive or screening test for TB in elephants.

Dr. Massengill, U.S. Coordinator for the U.S.A./Mexico Bi-National Committee for the Eradication of Bovine Tuberculosis and Brucellosis (BNC) reported on the meeting held by that group during the annual meeting of Mexico’s National Confederation of Livestock Organizations in May, 2013. Discussions focused on programs designed to reduce the prevalence of bovine tuberculosis in the U.S. and in Mexico. USDA proposed changing the design of “zones” or regions in Mexico from single state areas to areas which may contain more than one state or portions of more than one state. The proposal would require that two or more states would have to work in unison and share the disease status based on their joint efforts. The BNC also received reports on Mexico’s national animal identification/animal disease traceability program (SINIIGA) as well as a report on a web based system (SICAMORA) for documentation of compliance with export requirements for export of cattle from Mexico to the U.S.

The BNC made specific requests of USDA-APHIS-VS regarding the simplification of the documents which must be presented at the border for the export of cattle, consistency of requirements based the exporting on state status, and allowing the use of an ‘M’ brand on both steers and spayed heifer.

Dr. Lee Ann Thomas presented the National Tuberculosis Program Update. The full text of the update is included in this report.

Dr. Jose Alfredo Gutierrez Reyes presented the Mexico National Tuberculosis Report.

Individual state updates were provided as follows:

**Dr. James Averill, Michigan:** Five newly-detected TB-affected herds, including three beef and two dairy herds were identified in FY 2013. One dairy and one beef herd are in the modified accredited zone (MA). The dairy herd is currently under a test-and-remove herd management plan. The beef herd in the MA zone was depopulated with federal indemnity.
A dairy located in the accredited free zone (AF) was detected through slaughter surveillance and the subsequent investigation led to the detection of TB in two beef herds and in a feedlot, also located in the AF zone. The three herds were depopulated with federal indemnity. A decision is pending regarding the management plan for the feedlot. Feedlots with infected animals are not classified as affected herds. Wildlife surveillance is being conducted in the AF zone in proximity to the affected herds.

In addition, two dairies and one beef herd are continuing under a test-and-remove herd plan in the MA zone. The dairies were originally detected in 2004 and 2012 and the beef herd was detected in 2012. Two affected captive cervid herds that were detected in FY 2009 remain under quarantine in the MA zone.

**Dr. Anita Edmondson, California:** One newly-detected TB-affected dairy herd was identified in California during FY 2013. The affected herd was detected through slaughter surveillance, and is under a test-and-remove management plan. In addition, two TB cases were detected in adult cattle (> 2 years of age). The most likely source for one case in a culled dairy cow was a dispersed Jersey herd. The second case occurred in a beef cow and is currently under investigation. One California dairy quarantined in 2011 was released from quarantine in February 2013.

**Dr. Susan Keller, North Dakota:** A single infected cow has been identified in a TB-affected cow-calf operation. This animal was purchased from a TB affected beef herd located in Texas that was depopulated in FY 2012. The herd is being managed under a test-and-remove herd plan and no additional infected animals have been detected. A decision is pending regarding wildlife surveillance.

Dr. Paul Kohrs, also provided an update for Washington.

Dr. Dee Ellis provided a presentation on Calf Ranch High Risk Evaluation and Inspection Process that is being developed and implemented in Texas.

Dr. Ken Olson spoke on the New Multistate Initiative on Mycobacterial Disease in Animals.

**Committee Business:**

At the conclusion of formal presentations, Dr. Oedekoven determined there was a quorum. Four resolutions were approved and forwarded to the Committee on Nominations and Resolutions. Resolution topics included:

- Modify the reporting of ‘Top 40’ cow kill plants to include official ID collected and recorded on VS form 6-35
- Allow the designated TB epidemiologist to consider herd and animal history along with a Dual Path Platform result when classifying animal status in farmed cervidae herds
TUBERCULOSIS

- Replace the Elephant TB Stat-Pak with the DPP VetTB Assay as a presumptive or screening test
- Allow the evaluation of the CervidTB Stat-Pak for use in sika and mule deer

Other business:

The Elephant TB subcommittee’s charge was determined to be completed. The United States Animal Health Association (USAHA) Committee on Tuberculosis recommends that the United States Department of Agriculture (USDA), Animal Plant Health Inspection Service (APHIS) collaborate with the American Association of Zoo Veterinarians (AAZV), the Management and Research Priorities of Tuberculosis for Elephants in Human Care Stakeholders Task Force (ECT), the National Assembly of State Animal Health Officials (NASAHO), the National Association of State Public Health Veterinarians (NASPHV), and others to revise the Guidelines for the Control of Tuberculosis in Elephants in an effort to ensure that the most current Guidelines referenced and used by regulatory officials reflect the best science, data and research available as well as meaningful and valuable stakeholder input.

The United States Animal Health Association (USAHA) Committee on Tuberculosis recommends formation of a working group by USAHA, to determine TB risk from importation of Durango cattle, and to formulate solutions for identified issues. The group would include APHIS, industry and states, and others as needed. The group will develop recommendations within 180 days for consideration by the USAHA TB committee. Presentation of information to the USAHA Board of Directors and/or Executive Committee will be determined by the chairperson of the TB committee.

A motion to adjourn was made, and seconded. The meeting concluded at 6:00 p.m.
The following presentations were made at the 2013 TB SAS meeting:

**Clinical and Diagnostic Developments of a Gamma Interferon Release Assay (Bovigam™) for Use in Bovine Tuberculosis Control Programs**

K. E. Bass¹, B. J. Nonnecke², M. V. Palmer², T. C. Thacker², R. Hardegger³, B. Schroeder³, A. J. Raeber³, and W. R. Waters²

¹Iowa State University, Ames, IA
²United States Department of Agriculture, Agricultural Research Service, National Animal Disease Center, Ames, IA
³Prionics AG, Schlieren, Switzerland

Currently the Bovigam assay is used as an official supplemental test within bovine tuberculosis control programs. The objectives of the present study were to evaluate two *Mycobacterium bovis* specific peptide cocktails, purified protein derivatives (PPDs) from two sources, liquid and lyophilized antigen preparations, and a second generation IFN-γ release assay (Bovigam, Prionics AG). Three strains of *M. bovis* were used for experimental challenge: *M. bovis* 95-1315, *M. bovis* Ravenel, and *M. bovis* 10-7428. Additionally, samples from a tuberculosis-affected herd (i.e. natural infection) were evaluated. Robust responses to both peptide cocktails HP (PC-HP) and ESAT-6/CFP10 (PC-EC), as well as PPDs were elicited as early as three weeks after challenge. Only minor differences in responses to Commonwealth Serum Laboratories (CSL) and Lelystad PPDs were detected with samples from experimentally infected animals. For instance, responses to Lelystad *M. avium* derived PPD (PPDa) exceeded respective response to CSL PPDa in *M. bovis* Ravenel infected and control animals. However, 1:4 dilution of stimulated plasma demonstrated greater separation of PPDb from PPDa responses (i.e., PPDb – PPDa) with use of Lelystad PPDs, suggesting that Lelystad PPDs provide greater diagnostic sensitivity than CSL PPDs. Responses to lyophilized and liquid antigen preparations did not differ. Responses detected with first and second generation IFN-γ release assay kits (Bovigam) did not differ throughout the study. In conclusion, antigens may be stored in a lyophilized state without loss in potency; PC-HP and PC-EC are dependable biomarkers for aiding detection of bovine tuberculosis, and second generation Bovigam kits are comparable to current kits.

**Impact of the Cut-off Value on the Performance of the Interferon-gamma Detection Assay for Diagnosis of Bovine Tuberculosis**

Dr. Julio Alvarez

Centro de Vigilancia Sanitaria Veterinaria (VISAVET), Instituto Ramón y Cajal de Investigación Sanitaria (IRYCIS), Madrid, Spain

Due to the limitations of the tuberculin skin test, typically performed as the first-line screening technique, the interferon-gamma assay has been
increasingly applied in several countries for either maximization of diagnostic test sensitivity (parallel use) or specificity (serial use) in the diagnosis of bovine tuberculosis. However, alternative protocols have been used for test interpretation, including different cut-offs. The effect of using different thresholds is evaluated here using field data (more than 66,000 tests performed on more than 30,000 cattle from infected and TB-free herds) by the alternative application of those cut-offs in place in different countries of Europe and in the USA. The use of different thresholds leads to significant differences in the number of reactors detected. Proportion of animals in which tuberculosis-infection was confirmed by bacteriology also revealed a significant effect of the cut-off associated with the age of the animal and the number of herd-tests performed in the herd since disclosure of the outbreak. Results from officially free of bovine *tuberculosis* (OTF) herds indicated a major impact of the threshold also in terms of specificity: those thresholds performing better in infected herds yielded significant higher numbers of false positive reactors in OTF herds. Therefore, in order to maximize the performance of the test a feasible option may be the alternative use of different thresholds depending on the epidemiological setting and the purpose of its use (maximize sensitivity in the case of infected settings and/or maximize specificity if the test is going to be used in situations in which the disease is not expected).

**Evaluation of New Diagnostic Blood Tests for Bovine Tuberculosis in Cattle**

Dr. Om Surujballi, Canadian Food Inspection Agency

There are a number of serological tests for bovine tuberculosis (TB) that are currently commercially available or are in development for use in a variety of animal species. Serological tests offer a number of advantages over the technologies that are currently being used for diagnosis of this disease. Government regulators, including the Canadian Food Inspection Agency (CFIA) are interested in examining the potential of these emerging technologies for use in bovine TB control and eradication programmes. This report describes the evaluation of two serological tests, the *Mycobacterium bovis*- *Mycobacterium tuberculosis* Antibody Test Kit, DPP® BovidTB-M Assay (Chembio Diagnostic Systems Inc., currently available for experimental use only) and the *Mycobacterium bovis* Antibody Test Kit, an OIE-certified test that is commercially available from IDEXX Laboratories. A blinded panel comprised of 400 sera from cattle from which the *Mycobacterium bovis* bacterium was isolated, and 909 sera from cattle with no previous history of bovine TB, provided by the USDA Bovine Tuberculosis Serum Bank, was examined in this study. A second panel comprised of 1549 sera from cattle with no previous history of bovine TB, provided by the CFIA Epidemiology and Surveillance Section Serum Bank was also examined in this study. The performances of the DPP® BovidTB-M Assay and the IDEXX ELISA were evaluated with these two serum panels in this study and the findings will be discussed in this presentation.
Dr. Jeff Nelson of the National Veterinary Services Laboratory, USDA-APHIS, gave two presentations via web-conference titled:

Detection of Bovine Tuberculosis Antibody Response in Sensitized Cattle Using the IDEXX M. bovis Ab Test, and Impact of Blood Sample Storage Time and Temperature on Detection of Bovine Tuberculosis Antibodies Using the IDEXX M. bovis Ab Test.

Subcommittee business:

Use of Optical Density (OD) Reader to Interpret the Chembio Dual Path Platform (DPP) Results in Cervid TB Testing

On August 26, 2013 the Tuberculosis (TB) Scientific Advisory Subcommittee (SAS) received a document from APHIS-VS TB Program Staff concerning use of the newly licensed Chembio dual path platform (DPP) diagnostic assay for tuberculosis in cervids. Current testing protocols involve primary testing with the Chembio CervidTB Stat-Pak® (visual interpretation) with DPP as the secondary test (visual interpretation) on all Stat-Pak® positive animals. A positive result on the first DPP is followed by a second DPP (visual interpretation), using serum collected no sooner than 30 days after the first DPP. The APHIS-VS document describes an unacceptably high number of false positive results in preliminary field-testing. Recently, over 5,200 cervids were tested, as described, with 16.2% of the samples judged positive by Stat-Pak® and 2.3% of these samples judged positive on the first DPP test. Retesting DPP responders with a second DPP yielded 1.08% positive, leaving 52 of the animals as reactors and recommended for postmortem examination. To date, 36 animals have been examined with no gross lesions of TB seen. From these examinations, 23 tissue samples have been processed for mycobacteriological isolation with no M. bovis identified. This large number of false positive results was unanticipated and is unacceptable. APHIS-VS has requested comment from the TB SAS on the acceptability of use of a calibrated optical density (OD) reader to measure reflectance in relative light units (RLU) of colored antigen bands, producing a numeric value as the final DPP result as described elsewhere. Use of an OD reader is not currently included in the APHIS approved protocol for cervid TB testing. Numerical cut-off values for DPP results are suggested in the accompanying document.

TB Program Staff posed four specific questions found below with responses.

1. Will it be scientifically sound and justifiable to replace visual DPP test readings with OD reader values for designating a DPP test as positive or negative?

It is the opinion of the TB SAS that use of a calibrated, properly functional OD reader to analyze DPP results, is superior to interpretation by visual inspection. Adjustment of the protocol to use numeric OD values to classify a DPP test as positive or negative would be a useful change to current practices. The OD cut-off values proposed will accomplish the goals to decrease the
number of false positive results, decrease the number of quarantined herds, and decrease the number of deer sent for postmortem examination. Some practical questions can be raised concerning the instrument type, frequency of calibration, maintenance and proficiency testing. However, assuming APHIS, VS addresses these issues in the lab(s) that are approved for testing, use of OD numerical values should be superior to visual inspection and interpretation.

2. If OD cutoff values are used, are the proposed cut-off values appropriate for achieving the necessary specificity while maintaining reasonable sensitivity?

The ROC analysis provided (attached document), even with irregularities in the data sets, shows that attempting to optimize both Se and Sp results in an unacceptably low Sp with resultant high false positive rates. At the same time, ROC analysis illustrates that increased Sp comes at the cost of significantly decreased Se. Use of the proposed DPP cut-off values for each species increases Sp 1-4%, maintaining a Se ≥70%, similar to that seen in previous studies.¹ The proposed values clearly accomplish the goals listed above, but decrease the test’s ability to identify infected animals. The reasonableness of this decrease in Se must be viewed in the context of both scientific and non-scientific factors, including advantages of serological tests such as decreased number of handling events, decreased animal stress, and decreased risk of injury to animals compared to skin testing. In addition to these practical advantages, one must also consider regulatory, policy, and logistic elements that are clearly relevant in TB testing of cervids. Given all the factors that must be considered, the TB SAS concludes that it is reasonable to accept the proposed OD cut-off values for the DPP with their associated Sp and Se.

3. Can these OD cutoff values be statistically justified from the number of animals tested to date in each species group?

The limited number of each species available for testing complicates statistical justification in this case. This is especially true in the case of fallow deer and reindeer. Furthermore, the apparent prevalence of disease in the cervid population is so low that it is impossible to acquire a sufficient number of naturally infected animals to truly evaluate Se. As for Sp, the VS National Surveillance analysis determined that if no infection was found in 30 animals examined postmortem, there was a 95% chance the current testing protocol had a Sp < 97.5%. This Sp was shown to be unacceptable. More than the required 30 animals have been examined postmortem and tissues processed for mycobacterial isolation, with all results being negative. Therefore, the TB SAS concludes that a sufficient number of the various species have been tested and examined to reasonably, but not statistically, justify the proposed cut-off values.

4. Is there any problem using currently held serum samples to reevaluate the existing suspect and reactor animals retroactively with the newly established cutoff values and clearing those below the new cutoff levels?
It is the opinion of the TB SAS that if currently stored serum samples are re-analyzed using the same standards as all other samples being analyzed (i.e. same reader, cut-off values, etc.), retroactive re-classification of test results would not be improper. From a policy viewpoint, re-testing using OD reader values for re-classification should be done in close collaboration with individual state animal health officials, and in keeping with any state regulations that may be relevant. From a sample quality viewpoint, the usefulness of stored serum samples is a function of collection and storage. Assuming that samples were collected, processed and stored appropriately, the samples should be suitable for use in retrospective sampling.

References
Development of Proposed Brucellosis/TB Regulations

APHIS completed new regulations and supporting standards for the brucellosis and TB programs in FY 2012. Under the proposed approach, The Code of Federal Regulations will provide the legal authority for the programs while the details of the programs will be described in a program standards document. These new regulations and supporting standards were under departmental review during FY 2013. APHIS is hopeful that Proposed Rule and Program Standards will be published in early 2014. Upon publication, APHIS plans to provide an extended comment period of 90 days.

Bovine State Status

As of September 30, 2013, 48 States, two Territories, and one zone were TB accredited-free (AF), including Puerto Rico and the U.S. Virgin Islands. California was modified accredited advanced (MAA). Michigan continued to have AF, MAA, and modified accredited (MA) status.

Captive Cervid State Status

All States and territories have MA status.

TB Program Reviews

APHIS conducted an on-site TB program review in California during September 2013. This review was conducted to evaluate the status of the TB eradication program in California, which has modified accredited advanced status.

TB-Affected Herds Identified in FY 2013

Seven TB-affected cattle herds, four beef and three dairy, were detected during FY 2013. These herds were located in California (one dairy), Michigan (three beef and two dairy), and North Dakota (one beef). Five of these TB-affected herds (two dairy and three beef herds) were detected as a result of slaughter surveillance and the subsequent epidemiologic investigations. In addition, TB infection was detected in one Michigan feedlot subsequent to the investigation of an affected Michigan dairy.

Four cattle herds (one dairy and three beef herds, Michigan) were depopulated with Federal indemnity. The three remaining herds are under test-and-remove management plans (one dairy, California; one beef herd, North Dakota, one dairy, Michigan). Three cattle herds detected prior to FY 2013, including two dairies and one beef herd in Michigan, are continuing under test-and-remove management plans. Two captive cervid herds in Michigan remain under quarantine.
National TB Surveillance

Granuloma Submissions: From October 1, 2012, through June 30, 2013, 8,804 granulomas were identified during postmortem slaughter inspection and submitted for diagnostic testing from 146 federally inspected establishments. In addition, 200 granulomas were submitted from 13 state inspected establishments. The minimum standard for slaughter surveillance is 1 granuloma submitted per 2,000 adult cattle slaughtered annually. This standard is applied to each slaughter establishment. The 40 highest volume adult cattle slaughter establishments met or exceeded the submission standard through the third quarter of FY 2013. These 40 highest volume establishments slaughter approximately 95 percent of all adult cattle slaughtered in the United States.

Slaughter Cases: During FY 2013, a total of 29 granuloma submissions had histology consistent with mycobacteriosis. Of these, TB was confirmed in 22 (75.9 percent) cases. TB is confirmed by polymerase chain reaction testing of formalin-fixed tissue and culture of fresh tissue. Of the remaining 7 cases, other Mycobacterium species were identified for 6 cases and fresh tissue was not available for culture for one case.

Four of the 22 confirmed cases occurred in adult cattle over two years of age, and 18 cases occurred in feeder cattle. The four adult cattle cases included one adult dairy cow that led to detection of an affected dairy in Michigan. One adult TB case occurred in a dairy cow that traced to a Washington state dairy; infection was not confirmed in the herd. The third and fourth cases occurred in a dairy and a beef cow, both from California. The 18 fed cattle cases occurred in beef-type cattle and were detected at slaughter establishments in Colorado (four cases), Texas (12 cases) and Nebraska (two cases). Fifteen cases were in Mexican-origin cattle and the remaining three cases are under investigation.

Mexican-Origin Slaughter Cases: A total of 15 TB-infected animals identified through slaughter surveillance were determined to be of Mexican-origin. The official Mexican ear tags collected at slaughter indicated origin from the States of Chihuahua (one case), Coahuila (two cases), Durango (six cases), Nuevo Leon (two cases), Tamaulipas (two cases), and Veracruz (one case). An additional case originated from Mexico based on the epidemiological investigations; however, the Mexican State of origin could not be identified.

Live Animal Testing, Cattle: Information for tuberculin skin testing in cattle for FY 2013 was not available at the time of this report.

The gamma interferon test has been available as an official supplemental test in the TB program since 2005. Laboratories in five States (California, Colorado, Michigan, Nevada, Texas, and Washington) and the NVSL in Iowa are approved to conduct gamma interferon testing. A total of 11,456 tests were conducted in cattle in during FY 2013.

Live Animal Testing, Cervids: Information for tuberculin skin testing in captive cervids for FY 2013 was not available at the time of this report.

The CervidTB Stat-Pak® and Dual Path Platform® (DPP) tests were approved for program use in elk, red deer, white-tailed deer, fallow deer, and
reindeer. Official program testing began on February 4, 2013. The specificity of this testing protocol, which initially utilized a visual reading of the DPP test to interpret the result as positive or negative, did not meet the anticipated specificity indicated by previous studies. An evaluation of FY 2013 testing data determined that a colorimetric optical density (OD) reader could be used on the DPP test to determine a numerical value of the positive visible line on the DPP cassette. Therefore, a cutoff value using OD values was developed for each approved cervid species, improving the specificity of the testing protocol without a major loss of sensitivity. This change was reviewed and approved by the USAHA TB Scientific Advisory Subcommittee and implemented retroactively in September 2013.

During February 4 through August 31, 2013, a total of 5,214 Stat-Pak tests were completed and 841 samples (16.1 percent) were positive. These samples were submitted from 3,170 white-tailed deer (60.8 percent), 1,482 elk (28.4 percent), 391 fallow deer (7.5 percent), 146 red deer (2.8 percent), and 25 reindeer (0.5 percent).

Stat-Pak positive samples were tested by the DPP as a secondary test and 118 samples (2.3 percent) were positive based on the visual test interpretation. Of these, 8 animals were submitted to necropsy based on their first positive DPP test, 88 were tested with a second DPP after 30 days, and the status of one animal was pending at the time of this report. The remaining 21 animals continued under quarantine and their first DPP result was later reclassified from positive to negative in September, as a result of changes to the testing protocol described above.

Of the 88 animals tested with a second DPP, 51 (58.0 percent) were positive by the DPP visual criteria and classified as reactors; of these, 35 were submitted to necropsy and 16 remained under quarantine. After the DPP test protocol was changed in September, 14 animals were reclassified from DPP positive to negative and 2 animals remained classified as reactors and their status is pending.

A total of 43 animals have been submitted for necropsy. Representative lymph nodes and grossly lesioned tissues were evaluated by histopathology and culture. All samples were negative for TB by histopathology. Thirty one cultures have been completed and \textit{M. bovis} has not been identified; the remaining cultures are pending.

Collaborations with Mexico

In FY 2013, APHIS and Secretaría Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación (SAGARPA) developed a joint strategic plan designed to minimize the risk of TB while providing a framework to facilitate trade in the future. There were no official reviews of Mexican State TB programs; however, APHIS personnel assisted SAGARPA with completed pre-certification reviews in Durango, Nuevo Leon and Tamaulipas during FY 2013.

TB Serum Bank
APHIS continues to obtain well-characterized serum samples including skin test results for both uninfected and infected animals. Histopathology and TB culture results are also obtained for samples from TB-infected animals. A total of 49 samples from cervid species and 111 samples from cattle were added to the serum bank in FY 2013. The serum bank contains 5,340 serum samples from cattle, of which 524 are from TB-infected animals, and 3,737 samples from cervids, of which 92 are TB-infected. Serum bank samples continue to be available to researchers and diagnostic companies for serologic test development. States are encouraged to submit blood and tissue samples from potentially infected cattle and captive cervids, as well as blood samples from presumably uninfected cattle and cervid species from accredited free States during FY 2014.

**IDEXX ® M. bovis Antibody Test Kit**

The IDEXX ® *M. bovis* Antibody Test Kit was approved for official TB program use in cattle during FY 2013. Guidance for the use of the test can be found in VSG 6702.1 - The IDEXX Antibody (Ab) Test Serological Test for Diagnosing Bovine Tuberculosis (TB) in TB-Affected Cattle Herds. The test is available at NVSL and has been used in two TB affected herds in FY 2013. Based on evaluation of the performance of this test, additional uses for the test and additional laboratories to conduct the test may be approved.
The Committee on Wildlife Diseases met on October 20, 2013 at the Town and Country Hotel, San Diego, California, from 12:30 – 5 p.m.. There were 89 persons attending: 31 members and 58 guests. The Chair and Co-Chair welcomed those in attendance and reviewed the agenda.

**USAHA/AAWV Travel Scholarships**

Vice Chair, Dr. Colin Gillin of the Oregon Department of Fish and Wildlife, introduced two students who received travel scholarships from USAHA and the American Association of Wildlife Veterinarians to attend the annual USAHA meeting. Charles Alex is a veterinary student at Virginia-Maryland, Dr. Katie Haman is a PhD candidate in an NIH-funded project in British Columbia. Both students informed the committee regarding their backgrounds, career plans, and their interest in USAHA.

**Serology as a Diagnostic Tool for Avian Influenza Surveillance in Wild Birds**

Dr. Justin Brown of the Southeastern Cooperative Wildlife Disease Study (SCWDS) updated the committee on potential uses of serology for avian influenza virus (AIV) surveillance in wild birds. Surveillance for Avian Influenza Virus (AIV) in wild birds historically has relied on virus isolation and/or reverse transcriptase polymerase chain reaction (RT-PCR) to detect AIV shedding in oral or cloacal swabs. Serology has been
underutilized in wild bird AIV surveillance, because many of the assays routinely used for antibody detection in domestic galliforms (e.g. agar-gel immunodiffusion test) perform poorly in important wild bird hosts for AIV, including waterfowl. The development of species-independent commercial blocking enzyme-linked immunosorbent assays (bELISA) provided a diagnostic tool that reliably detects type-specific antibodies to AIV in a wide-diversity of avian species. Consequently, over the recent years, serologic testing, using the bELISA, has been increasingly incorporated into wild bird AIV surveillance efforts. As a compliment to virus isolation and RT-PCR, type-specific serologic data have provided a wealth of valuable information on viral exposure in wild birds, which has improved our ability to interpret virus isolation/RT-PCR-based data, expanded our understanding on AIV epidemiology in wild birds, and guided future surveillance efforts. Although valuable, type-specific serologic data have provided very limited information on population immunity.

Subtype-specific serologic tests are necessary to begin to address the dearth of information on AIV immunity within wild bird populations. Historically, however, subtype-specific serologic assays, such as the hemagglutination inhibition (HI) and virus neutralization (VN) tests have only been used sporadically in wild birds to screen for exposure to specific AIV subtypes on the population level. There are many challenges associated with using subtype-specific serologic assays in wild birds, including a lack of understanding on the duration of the detectable antibody response or how the measurable antibody response relates to protective immunity, the potential for cross reactions between related HA or neuraminidase (NA) antigens, a lack of understanding on the effects of repeated infections with multiple subtypes, and the demand for high serum volumes to test for multiple subtypes. In order to begin to address these issues, we have developed a VN assay that tests for antibodies directed against HA1-12 and requires a relatively low volume of serum. We are currently validating this assay on field and experimental serum samples in multiple wild avian species. Preliminary results indicate that this test has good sensitivity and specificity; however, as expected, there is some evidence of cross reactions between matched NA antigens. Validation results, as well as preliminary field trials with this assay, are promising and suggest there may be valuable applications for field and experimental research on AIV in wild birds. Such research will provide insights into population immunity to AIV in wild bird populations and begin to address basic questions related to the role of immunity in subtype diversity and risks for introduction of new viruses into wild bird populations (e.g. H5N1 highly pathogenic avian influenza virus).

The National Feral Swine Mapping System
Dr. Joseph Corn, Southeastern Cooperative Wildlife Disease Study (SCWDS), University of Georgia, provided an update on the National Feral Swine Mapping System (NFSMS). SCWDS began producing nationwide feral swine distribution maps in 1982 by working directly with state and territorial natural resources agency personnel. In 1982, 17 states reported feral swine in a total of 475 counties. With support from USDA-APHIS-Veterinary Services
(VS), SCWDS developed and implemented the National Feral Swine Mapping System (NFSMS) in 2008. The NFSMS is an interactive data collection system used to collect and display current data on the distribution of feral swine in the United States. The feral swine distribution maps are produced using data collected from state and territorial natural resources agencies, USDA-APHIS-Wildlife Services (WS), and other state/federal wildlife and agriculture agencies. The map is available to be viewed by the public on the NFSMS home page. Distribution data submitted by agency personnel are evaluated by SCWDS on a continual basis, and the distribution map is updated with verified additions on a monthly basis. Feral swine populations and/or sightings are designated either as established breeding populations, or as sightings, but only established breeding populations are included on the map and in the total of the number of states with feral swine. Over 600 additions have been made to the feral swine distribution map through the NFSMS since January 2008. Additional data are provided to state/federal agencies and universities on request. Although the distribution of feral swine continues to increase in the United States, feral swine were recently eliminated from Nebraska. Established feral swine populations were reported in 37 states in 2011, but currently in 2013 are reported as present in 36 states. The NFSMS is accessed via the internet at http://www.feralswinemap.org/.

Investigation of *Brucella suis* in Dairy Cattle

Dr. Joseph Corn, Southeastern Cooperative Wildlife Disease Study (SCWDS), University of Georgia, on behalf of Dr. Cristopher Young, USDA-APHIS-VS AVIC for Florida and Georgia, who was unable to attend. Dr. Corn reported to the committee that the impact of the growing feral swine population in the United States is creating disease pressure for interspecies infection with *Brucella suis*. Of particular interest is the infection of dairy cattle with *B. suis* and the subsequent risk from raw milk consumption. A Grassroots Project is on-going in Georgia to evaluate and define the interface of feral swine and dairy cattle, to perform targeted brucellosis surveillance, develop a survey instrument to evaluate risk factors for dairy farms, and finally to develop materials for outreach.

Bighorn Sheep Disease Sampling Workshop

Dr. Peregrine L. Wolff of the Nevada Department of Wildlife reported that a bighorn sheep disease sampling workshop was coordinated at the request of Western Association of Fish and Wildlife Agencies, Wildlife Health Committee (WAFWA WHC) in order to standardize diagnostic testing protocols for bacterial pathogens. The rationale for bringing together wildlife health professionals that work on wild sheep included 1) numerous tests are available but there is often confusion on interpretation of results; 2) different laboratories use different methods leading to results that cannot be compared from laboratory to laboratory; and 3) there was a need to review and update the 2009 WAFWA WHC sheep sampling guidelines.
Wildlife Veterinarians and Wildlife Health specialists / Pathologists from eight western states and two Canadian provinces attended, and WAFWA Wild Sheep Working Group members surveyed for input prior to the workshop.

Focus of the workshop was to review tests that are available for major pathogens in Pneumonia Complex in bighorn sheep: Pasteurella species (phenotypic culture, bio-typing, MALDI -TOF, 16S, PFGE, PCR); Mycoplasma ovipneumoniae (culture, PCR, ELISA); respiratory viruses (PI3 / BRSV) (virus isolation, serum titers). Specific questions asked included: What do the specific tests tell you? Are the tests available commercially? What is needed for each sheep in each situation?

The workshop participants also discussed standardized descriptions of histologic lesions, development of necropsy protocols (laboratory and field), and identification of specific tests for various situations, such as herd health assessment, pre-trap and transplant, disease/mortality events in populations. Goals and products of this workshop included: developing protocols to implement during the 2013-14 capture season, and in interpreting herd test results, updating the 2009 WAFWA/WHC sheep sampling guidelines, and defining terms (health herd, disease event, die-off, etc.). Follow up reports to this workshop will be presented at Wild Sheep Working Group meeting in Reno, Nevada in 2014, and at the Wild Sheep and Goat Council meeting in Fort Collins, Colorado in 2014. The workshop participants also plan to implement specific disease sampling training for wild sheep managers.

Exotic Lice and Hair-Loss Syndrome in Native Deer of the Western United States

Vice Chair, Dr. Colin Gillin of the Oregon Department of Fish and Wildlife, reported that exotic lice on North American deer have been observed since the 1940’s, with recent outbreaks occurring in several western states. Two louse species of Eurasian origin (Bovicola tibialis and Damalinia (Cervicola) forficola) have infected populations of mule deer (Odocoileus hemionus hemionus) and black-tailed deer (Odocoileus hemionus columbianus) respectively.

In 1995, black-tailed deer in west-central Washington were observed with a barbered hair loss appearance. The condition spread throughout western Washington, and by 1998 it was observed in Oregon deer populations west of the Cascade Mountains.

Deer with hair-loss syndrome (HLS) often appear emaciated with barbered pelage over regions of the thorax, flanks, and hind-quarters. Deer with this condition engage in excessive grooming and severely affected individuals may become progressively weak and die. Those that have been observed to recover regrow a normal hair coat. Other conditions in affected deer include verminous pneumonia (caused by Dictyocaulus spp., Protostrongylus sp., etc.), pediculosis (large numbers of chewing lice), peripheral lymphadenopathy (stimulation of the immune system), and high internal parasite burden and diarrhea.

Hair-loss syndrome from Damalinia spp. primarily affects black-tailed deer but has not been confirmed in mule deer. The syndrome has not been reported
in Roosevelt elk (*Cervus elaphus roosevelti*) occupying similar habitats with affected deer. Research shows lice can live off the host in cool temperatures (40-50 degrees F) up to 2 days and at room temperature up to 7 days. Lice survivability off the host provides another means of indirect transmission in deer resting areas and day beds used by different deer.

Deer in Oregon exhibiting hair loss syndrome show seasonality for the condition with occurrence in winter and spring. Fawns and does between 6-12 months of age are most often affected. HLS west of the Cascades occurs throughout the range of black-tailed deer but less frequently above 600 m elevation. Affected deer are seen in all major habitat types of western Oregon and Washington. There appears to be the potential for localized deer population declines due to HLS with an observed prevalence of 20-80% that may affect winter fawn survival in local populations.

*Damalinia* spp. infection does not appear to affect livestock or humans. Roosevelt elk in Washington, Oregon, and California have been observed to carry the louse but no hair-loss has been documented. HLS has been observed in Columbia white-tailed deer (*Odocoilius virginianus columbianus*) and the louse has been experimentally transferred from BTD to mule deer, but biologists have not seen the louse in free-ranging mule deer.

Another exotic louse species (*Bovicola tibialis*) has been observed in mule deer and BTD in British Columbia during 1941-54; BTD in Mendocino Co, California 1973; and on fallow and axis Deer in Pt. Reyes California in 1970. More recently this species has been causing similar clinical signs on mule deer as *Damalinia* in Washington (2005), South Dakota (2008), Wyoming, Idaho, California, Nebraska (2009), and Nevada and Oregon (2011).

**Cost Benefit Analysis for Reducing Bovine Brucellosis Prevalence in Southern Greater Yellowstone Area Elk**

Dr. Brant Schumaker of the University of Wyoming reported to the committee that cattle producers and state wildlife management agencies have undertaken several management strategies to reduce the risk of elk (*Cervus elaphus*)-cattle (*Bos taurus*) brucellosis transmission in the southern greater Yellowstone area (GYA). However, cases of brucellosis continue to appear in cattle and domestic bison in the GYA, and the wildlife-livestock brucellosis interface has the potential to expand. With decreasing funding available to combat brucellosis, a better understanding of the regional cost-effectiveness of management strategies is necessary. We surveyed cattle producers in the southern GYA to determine where their cattle herds were located and whether producers observed elk overlapping with their cattle during winter months. We used this information to create a resource selection function for elk-cattle overlap. We then used the elk-cattle overlap model as an input to a risk model to estimate the number of years until a cattle case was expected. We modeled three management strategies (Test and Slaughter, Strain 19 vaccination, and low density feeding) to effect varying reductions in elk seroprevalence, thus increasing the number of years until a spillover event was expected. Next, we compared the net change in the annualized cost of a brucellosis case to the
annualized cost of the management strategy. For all three management strategies, costs exceeded estimated benefits. If the maximum that society is willing to pay for a management strategy is equal to its expected benefit, none of these three management strategies should be employed. However, if society is willing to pay more for management than its expected benefit, or if the costs of a brucellosis outbreak increase, one or more strategies may be adopted. Based upon our cost-benefit analysis, low-density feeding of elk has the least-negative net benefit and should be the top strategy chosen.

Yellowstone National Park Science Panel on Brucellosis Management Strategies

David E. Hallac, Chief, Yellowstone Center for Resources, National Park Service (NPS), reported that the NPS and Montana Fish, Wildlife, and Parks held a workshop with a group of scientists to review the science surrounding brucellosis in bison and to evaluate disease management strategies, including remote vaccination, contraception, periodic culling, and to provide research ideas. Eight scientists, with a variety of experiences in wildlife management, disease ecology, immunology, and human dimensions of wildlife management, came together for several days in February, 2013 for the discussion. The eight science review panelists authored a report that includes consensus panel conclusions and rationale, research recommendations, panelist bios, abstracts on background scientific publications, and the meeting agenda. The following conclusions were stated:

1. The best available data do not support that vaccination of wild bison with currently available vaccines will be effective at suppressing brucellosis to a level that changes bison management strategies under the Interagency Bison Management Plan.
2. Anticipate that remote vaccination would have behavioral impacts on bison (e.g., reduced tolerance of people, vehicles, etc.).
3. Control of bison population size will likely include culling or removal as tools in the future, along with hunting. Past and current culling practices have not had an apparent effect on reducing the overall prevalence of brucellosis in the bison population.
4. Intervention through contraception is not needed to achieve the current goals of the Interagency Bison Management Plan (IBMP). Contraception could potentially be a valuable tool for brucellosis suppression, but the available data are insufficient to make a judgment at this time.

High priority research ideas included:
1. A cost/benefit analysis of:
   a. Management options and goals (vaccination, eradication, etc.), and
   b. Producing a more effective vaccine in livestock vs. a more effective vaccine in wild bison or elk.
2. Improve understanding of genetic effects of culling based on seroprevalence
WILDLIFE DISEASES

3. Characterize and understand human values and attitudes towards conservation of wildlife affected by brucellosis to improve effective exchange of knowledge for collaborative decision making in the GYA. The report will be available on the Yellowstone National Park’s website at: nps.gov/yell

Chronic Wasting Disease Ecology and Epidemiology of Mule Deer and White-tailed Deer in Wyoming

Dr. Brant Schumaker of the University of Wyoming reported that the effects of high chronic wasting disease (CWD) prevalence in free-ranging deer populations are unknown. In south-central Wyoming, CWD prevalence exceeds 50% in hunter harvested deer. We hypothesized that 1) vital rates are depressed by CWD and the finite rate of population growth (λ) is subsequently lowered, 2) CWD alters normal deer behavior during preclinical and clinical disease, and 3) genetic differences associated with CWD incubation periods drives natural selection to favor less susceptible deer. To test these hypotheses, we radio-collared white-tailed deer (Odocoileus virginianus) and mule deer (Odocoileus hemionus) and monitored them to determine a) survival probability, pregnancy rates, and annual recruitment, b) cause of death, c) home range area and habitat use, d) migration patterns, e) dispersal behavior, and f) genetic variation in incubation period based on CWD-status. Deer were tested for CWD using tonsil tissue collected by biopsy at capture and immunohistochemistry. White-tailed deer positive for CWD were 4.5 times more likely to die annually compared to CWD-negative deer. High CWD prevalence depressed survival of young females and resulted in an unsustainable white-tailed deer population (λ < 1.0); however, when female harvest was eliminated, the population became stable (λ =1.0). Female CWD-positive white-tailed deer maintain locally high CWD incidence as they migrated less and occupied smaller home ranges compared to other deer. Male CWD-positive white-tailed deer migrated at the highest proportion and likely contributed to spread of CWD to disparate populations. In the last nine years, mule deer genetically associated with prolonged incubation periods to CWD have increased in frequency in the population. However, it is still unknown whether or not this change will counteract the negative impacts of CWD on the population. The white-tailed deer population is adversely affected by high CWD prevalence; however, implementing management techniques to increase annual survival of females may maintain deer populations. The impact of CWD on mule deer populations is currently unknown; however, the present study is in its final stages with results to be completed in the near future.

A Long Look at Hemorrhagic Disease

Dr. John Fischer, Southeastern Cooperative Wildlife Disease Study (SCWDS), University of Georgia, reported on results of analyses of the occurrence of hemorrhagic disease (HD) of deer in the United States. The analyses were performed by Dr. David Stalknecht, also of SCWDS. Temporal
trends in reporting of HD in the Midwest and Northeast United States were investigated using a 33 year (1980-2012) questionnaire-based data set. These data were supported by an additional 19 years (1994-2012) of bluetongue virus (BTV) and epizootic hemorrhagic disease virus (EHDV) isolation results from clinically affected white-tailed deer (Odocoileus virginianus) in these regions. The number of counties that were reported positive for HD and the northern latitudinal range of reported HD increased with time. A similar increase was observed with both the number of states annually reporting HD and the number of counties where HD was reported. Excessive reporting, characteristic of large-scale outbreaks that occurred in 1988, 1996, 2007, and 2012, and the scale of these individual outbreaks also increased with time. The predominant virus isolated from these regions was EHDV-2, but the prevalence of EHDV-6, which was first detected in 2006, appears to be increasing. Temporally, the extent of regional HD reporting was correlated with regional drought conditions. The significance of increases in reported HD and the incursions and establishment of new BTV and EHDV in the United States currently are unknown.

There being no resolutions or other committee business, the meeting was adjourned.
II. F. 1. 2013 Applied Animal and Public Health Research and Extension Veterinarians Symposium

Applied Animal and Public Health Research and Extension Veterinarians Symposium
Sponsored by the American Association of Extension Veterinarians

Detecting MRSA in swine production facilities - Tim Frana, Iowa State University

Communicating pre-harvest food safety to diverse audiences - David Smith, Mississippi State University

Improving the Safety and Quality of Raw Milk in Pennsylvania - Ernest Hovingh, Penn State University

Characteristics of Utah dairy farms test-positive for *Mycobacterium avium* subsp. *paratuberculosis*, *Mycoplasma* spp., or Bovine Viral Diarrhea virus - Jennifer Bunnell, Utah State University

BVDConsult: an Internet-based tool for BVDV prevention and control - David Smith, Mississippi State University

The Prevalence of *Tritrichomonas foetus* in Cull Cows at a Southeastern Abattoir - Lee Jones, University of Georgia

Factors affecting *Tritrichomonas foetus* culture and PCR test performance - Carla Huston, Mississippi State University
II. F. 1. APPLIED ANIMAL AND PUBLIC HEALTH RESEARCH AND EXTENSION VETERINARIANS SYMPOSIUM

DETECTING MRSA IN SWINE PRODUCTION FACILITIES

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Introduction: In the last decade livestock-associated methicillin-resistant S. aureus (LA-MRSA) has become a public health concern in many parts of the world. Of particular concern has been persons working in or associated with swine production facilities. Numerous studies have been conducted to determine the prevalence of LA-MRSA in these facilities as well the associated risk to people. Various sample collection devices and methods have been used in these studies. Most sampling methods have involved animal samples with or without environmental sampling. While animal sampling is perhaps testing “closest to the source”, environmental sampling has been a very reliable method as well for detecting MRSA in animal facilities. Recently we explored the use of oral fluids to detect MRSA in swine production facilities. Here we summarize our findings from various investigations.

Methods: Samples (nasal swabs, environmental sponges, and oral fluids) were collected from swine production facilities with known and unknown MRSA status. Additionally aliquots of oral fluids were taken from diagnostic samples submitted for routine testing and tested for MRSA. All samples were processed by initially placing in an enrichment broth (10g tryptone/L, 75g NaCl/L, 10g mannitol/L and 2.5g yeast extract/L) prior to streaking onto chromogenic media (BioRad MRSASelect). Suspect colonies were confirmed as S. aureus with biochemical tests (coagulase, maltose, lactose, trehalose, Voges-Proskauer) or matrix-assisted laser desorption ionization time-of-flight mass spectrometry (MALDI TOF MS). Screening for methicillin resistance was performed by testing for susceptibility to oxacillin with disc diffusion method (6 ug/ml Oxacillin disc on Mueller Hinton agar with 4% NaCl). Presence of mecA gene was determined by testing for PBP 2a protein with latex agglutination test (Oxoid Ltd., Hants, UK) and/or mecA PCR testing. Selected isolates were further characterized by staphylococcal protein A (spa) typing.

Results: MRSA could be detected from all samples of pig nasal swabs, environmental sponges and oral fluids collected at a known MRSA positive swine production farm. From pig nasal swabs and environmental sponges collected at 40 swine production facilities with unknown status, MRSA was detected in 30% (12/40) of the facilities by either sample. In this study samples from MRSA-positive facilities, either animal or environmental, were positive 60.1% (63/104) of the time. Of these, 69.4% (34/49) of pig samples and 52.7% (29/55) of environmental samples were MRSA-positive. There was no significant differences in MRSA detection between pig and environmental samples ($p = 0.08$). In a separate study oral fluids and environmental sponges were collected from 15 swine production facilities of unknown MRSA status. Four facilities were positive for MRSA (3 from oral fluids, 1 from environmental...
sponge). From diagnostic oral fluid samples, MRSA was detected in 30 of 513 (5.8%) samples. Prevalence of MRSA based on case submission was 12.2% (18 of 148 submissions had at least one positive sample). Predominant spa types found in these studies included: t002, t034, t548.

**Conclusion:** The use of environmental sponges or oral fluid samples for detection of MRSA in swine production facilities is a viable alternative to pig nasal swabs. These samples types are convenient to collect and do not stress the pigs.
II. F. 1. APPLIED ANIMAL AND PUBLIC HEALTH RESEARCH AND EXTENSION VETERINARIANS SYMPOSIUM

COMMUNICATING PRE-HARVEST FOOD SAFETY TO DIVERSE AUDIENCES

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There have been and continue to be conferences and educational materials developed that present general information about *Escherichia coli* O157 and the state-of-the-knowledge regarding interventions to reduce meat and environmental contamination. However, these have tended to be directed to a specific audience (e.g., the meat industry or the scientific community), whereas relatively little has been done to bring diverse stakeholders together or provide multi-tiered approaches to educate the broader audiences involved with this issue, including those that regulate food safety at the federal level. The objective of a 6-hour Symposium: Pre-Harvest Control of STECs in Cattle was to engage regulatory personnel, other public health decision-makers and scientists in face to face discussion on Shiga toxin-producing E. coli (STEC) control. The conference was held in Greenbelt, Maryland and made available as a webinar. The agenda and videos of the symposium are available at http://extension.wsu.edu/vetextension/ec/Pages/EcoliConf_2012.aspx

There were 50 direct (conference), 348 indirect (Internet visitors at the end of 2012) adult contacts. Participants were primarily federal or state government employees (45%) and those representing animal industries (26%). Questions were asked before the speakers began and again at the end of the symposium. Before the talks, 50% of participants agreed with the statement “Food safety policy and regulations in the United States are primarily based on risk assessment of the foodborne hazard” before the talks compared to 44% after. Most participants recognized that there was little reward for cattle producers to use pre-harvest interventions, and most dis-agreed that food safety policy and interventions should be focused on post-harvest control measures. After the talks, fewer individuals disagreed with the statement that “Adequate control measures exist for the control of other (non-O157:H7) STECs” (70% pre vs 61% post). At the end of the conference, more people disagreed with the statement “Cattle that are grass-fed have lower rates of E coli O157:H7 shedding than those that are fed high grain diets” (45% pre- vs. 98% post) and more disagreed that most of the E coli O157:H7 shedding could be managed by changing the production system (51% pre vs. 71% post). At the end of the program all of the participants that responded to the questions in the program evaluations agreed or strongly agreed that they better understood the complexity of pre-harvest control; better understood how food safety policy is made; and were confident they could create an effective message about STEC pre-harvest control.
II. F. 1. APPLIED ANIMAL AND PUBLIC HEALTH RESEARCH AND EXTENSION VETERINARIANS SYMPOSIUM

IMPROVING THE SAFETY AND QUALITY OF RAW MILK IN PENNSYLVANIA

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The sale of raw milk is a topic of much debate and regulation across the U.S. In numerous states the practice is not permitted, whereas other states such as Pennsylvania allow farmers to sell raw milk under various restrictions and conditions. Proponents of raw milk consumption are convinced that the positive health benefits to be realized by consuming non-pasteurized milk and strongly believe that raw milk sales should be permitted, whereas the FDA and numerous other regulatory agencies appear quite openly opposed to the practice, and are often in favor of making it illegal across the country.

The Penn State Veterinary Extension Team undertook a project to investigate the milk quality and prevalence of pathogens in 38 permitted raw-milk dairy herds in Pennsylvania, as well as the adoption of best management practices on these farms. In addition, a survey was distributed to the customers of the participating farms, to determine which factors were important to them when deciding to purchase and consume raw milk. A similar survey was sent to 6,000 randomly-selected Pennsylvania consumers to determine the current prevalence of raw milk consumption, as well as the general consumer’s attitudes and opinions about this practice.

An important aspect of this project was to encourage permitted raw milk producers to monitor and improve the safety and quality of their product, by providing them with knowledge, resources and tools.

A total of 447 monthly samples were tested for the pathogens Salmonella, E.coli, Campylobacter, and Listeria. Results suggest that the prevalence of pathogens is lower in permitted raw milk herds than has been observed in previously reported studies, which tested samples from randomly-selected dairy herds. Milk quality tests (eg. SCC, SPC, coliform count) demonstrated a wide range of quality between herds, as well as occasional marked variation within herd. The findings of the milk quality assessment, pathogen testing, and surveys spurred an ongoing effort to improve the knowledge, attitudes and behaviors of permitted raw milk farmers, as well as that of their customers.
II. F. 1. APPLIED ANIMAL AND PUBLIC HEALTH RESEARCH AND EXTENSION VETERINARIANS SYMPOSIUM

CHARACTERISTICS OF UTAH DAIRY FARMS TEST-POSITIVE FOR *MYCOBACTERIUM AVIUM* SUBSP. *PARATUBERCULOSIS*, *MYCOPLASMA* SPP., OR BOVINE VIRAL DIARRHEA VIRUS

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Johne’s disease (JD), *Mycoplasma* spp., and Bovine Viral Diarrhea (BVD) virus cause substantial financial loss to the dairy industry. Semiweekly bulk tank milk samples (n=5/tank) were tested from participating dairy farms (152/210=72% participation) in Utah and Idaho. Dairies detected positive were as follows: ELISA and quantitative real-time PCR (qPCR) for JD, 58/152 farms (38%); modified Hayflick culture for mycoplasma, four farms (3%); qPCR test for BVD, four farms (3%); these included two farms with JD and BVD (1%), three farms with JD and mycoplasma (2%). Visits were conducted to 22 dairy farms (21 JD, 2 BVD, 0 mycoplasma); four farms previously had mycoplasma in 2007 and were now test-negative; classic mycoplasma signs disappeared in those herds. Mean lactating herd size was 778 cows, ranging from 52-6500 cows, mean 305d milk production was 20,052 lbs, both above Utah average. Management practices reported included: feeding pooled colostrum (64%), feeding un-pasteurized milk to calves (64%), purchased animals within the last year without quarantine or testing for JD, mycoplasma, or BVD (41%), drying teats with common towel (55%), and manure handling machinery coming in contact with feed (27%). Fourteen farms, 70% of those with freestalls, had ≥30% of stalls containing manure, though the goal for dairy farms is less than 5%. Nineteen producers described clinical signs consistent with JD and BVD (86%), yet 27% were unaware of herd status. Data suggests that dairy producers have not implemented best management practices for disease prevention despite having some disease awareness and understanding. Farm visits are ongoing.
II. F. 1. APPLIED ANIMAL AND PUBLIC HEALTH RESEARCH AND EXTENSION VETERINARIANS SYMPOSIUM

BVDCONSULT: AN INTERNET-BASED TOOL FOR BVDV PREVENTION AND CONTROL

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Infection of cattle with bovine viral diarrhea virus (BVDV) is responsible for a variety of economically important syndromes in beef herds. It may be that BVDV is one of the more controllable and preventable contagious infections of cattle because of our understanding of BVDV epidemiology, the availability of efficacious vaccines and diagnostic methods. Unfortunately, many veterinarians and cattle producers fail to understand or apply appropriate BVDV biosecurity or biocontainment actions, and therefore, BVDV remains a costly infection of cattle. BVDConsult (Collaborative, Online, Novel, Science-based, User-friendly, Learning, Tool) is an internet-based tool (http://129.130.128.84/openlabyrinth/mnode.asp?id=qf4jesn1rx7jzqajxhq) for helping cow-calf producers and their veterinarian design individualized BVDV control and prevention programs. BVDConsult is the result of a multi-organization (AVC, AABP, NCBA) effort to apply BVDV biosecurity and biocontainment principles in a user-friendly format that emphasizes the key management decisions that affect program success. The interface is a series of questions and subsequent responses that mimic a conversation between a veterinarian and a cattle producer. Based on the responses to questions on the willingness of the producer to perform specific management practices, the program provides recommendations specific to the individual herd. For BVDV-infected herds, the tool can help to create a plan to remove infected cattle and establish a strategy to reduce the likelihood of the herd becoming re-infected. For uninfected herds, BVDConsult can help the producer and herd veterinarian minimize the likelihood of introducing BVDV and reduce the impact if the herd is exposed. Alternatively, the tool can help producers understand why their current practices may not be effective. Six to ten questions are asked depending on the responses given and a printable report records the plan of action and comments on its likely effectiveness for BVDV control or prevention. Extension veterinarians can play a pivotal role in creating awareness and encouraging use of BVDConsult.
THE PREVALENCE OF *TRITRICHOMONAS FOETUS* IN CULL COWS AT A SOUTHEASTERN ABATTOIR

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Trichomoniasis is a sexually transmitted disease in cattle caused by the protozoa, *Tritrichomonas foetus*. This single-celled, flagellated parasite colonizes the preputial folds of bulls who serve as asymptomatic carriers of the organism. It is a significant cause of infertility and pregnancy wastage in beef herds. Cows are infected during breeding by an infected bull, frequently resulting in infertility due to embryonic or early fetal death, abortion, and occasionally pyometra, and fetal maceration. The disease can be masked by other factors such as poor nutrition, bull subfertility, drought or other diseases like Leptospirosis and campylobacteriosis. Management practices that perpetuate this disease include introducing and/or keeping infected bulls or brood cows in the herd. In some cases pregnant cows may carry the organism and be a source of infection after calving. Real progress in controlling or eradicating the disease is hampered by the lack of knowledge of the true prevalence of the disease throughout the United States. A 2004 report of beef herds in Florida found a herd prevalence of 11.1% (herds with at least one positive bull). No reports documenting the prevalence of *T. foetus* in beef cows were found. Infertility due to infection with *T. foetus* may be a significant cause of culling in beef cows. However, due to the self-limiting nature of the disease and low sensitivity of culture in cows, testing cows for *T. foetus* is not routinely performed on the farm. The objective of this study was to determine the prevalence of *T. foetus* in the reproductive tracts of cull cows obtained from a slaughter plant in Georgia.

Samples of cervical and uterine mucous were taken from the reproductive tracts of non-pregnant and short term pregnant (less than 60 days by direct palpation and visual estimation) cows following slaughter (n=500). A sterile pipette was inserted into the cervix and uterine body and fluids were aspirated into the pipette using a 12 cc syringe coupled to the pipette. An adequate sample consisted of 1-2 cm of mucous in the lumen of the pipette. The sample was inoculated into a commercial In Pouch Trich culture pouch. Inoculated media was kept at ambient temperature until transported to the Tifton Veterinary Diagnostic Investigation Laboratory (TVDIL), Tifton, Georgia. The samples were tested for the presence of *T. foetus* by culture and Real time PCR.
Out of 503 samples tested one sample (0.2%) was positive by culture. Seven samples (1.39%) resulted positive by RT-PCR. Considering the occurrence of *T. foetus* infection in random samples tested in this study, larger herd level studies to evaluate the actual prevalence and economic impact of this problematic disease in beef herds is urgently warranted. Also this study indicates that the practice of buying and breeding cull cows with unknown *T. foetus* status as potential herd replacements represents a potential source for *T foetus* infection.
FACTORS AFFECTING TRITRICHOMONAS FOETUS CULTURE AND PCR TEST PERFORMANCE

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Trichomoniasis is a costly venereal disease of cattle and the target of many state import regulations. Current methods for the detection of the protozoan organism *Trichomonas foetus* may be ineffective in preventing the introduction of infected bulls into non-infected herds. The objective of these studies was to evaluate factors affecting *T. foetus* diagnostic test performance.

For the first study, 600 pouches of selective enrichment media (InPouch TF®) were inoculated with bacteria from the prepuce of four healthy bulls and 30 *T. foetus* were randomly inoculated into 300 pouches by random assignment. Pouches were randomly assigned to 20°C pre-incubation treatments of 0, 2 and 4 days. After holding, samples were incubated 37°C 5 days. Cultures were examined microscopically (100x) on days 1, 3, and 5. One *T. foetus* inoculated sample was culture positive. PCR testing was more sensitive than culture, with sensitivity and specificity decreasing with increased holding times.

For the second study, 40 pouches were randomly assigned to four levels of *T. foetus* inoculation (67, 670, 6,700, or 67,000 organisms/pouch) and two levels of bacteria (inoculated or not with preputial bacteria passaged twice in selective enrichment media). Pouches were incubated at 37°C and examined microscopically (100x) daily for seven days. Sensitivity was affected by the presence of bacteria (*p*<0.0001). All pouches inoculated with bacteria were culture negative; however, *T. foetus* was detected at least once from all pouches without bacteria. For pouches without bacteria, sensitivity increased daily (OR= 4.5, *p* = 0.02), but did not differ by reader (*p* = 0.39). In the third study, four 10-fold dilutions of *T. foetus* were incubated 37°C for seven days. The lower inoculums peaked in concentration later. The results of this study indicate that both bacterial contamination of sample and day of testing may adversely affect test sensitivity. PCR may have advantages over culture when bacterial contamination exists.
II. F. 2. 2013 USDA- ARS Research Reviews

New Vaccine Approaches in the ARS Research Pipeline

Moderator: Dr. Cyril Gay, National Program Leader, Animal Production and Protection, USDA-ARS

Taming of the Beast: Advanced Development of a New Foot-and-Mouth Disease Vaccine – FMD LL3B3D - Luis Rodriguez, Plum Island Animal Disease Center, Orient Point, NY

Development of Anti-Cattle Tick Vaccine through Discovery of the Genome Sequence - Felix Guerrero, Livestock Insects Research Laboratory, Kerrville, TX

Development of Vaccine Approaches for Bovine Tuberculosis in Free-Ranging White-Tailed Deer in Michigan - Mitch Palmer, National Animal Disease Center, Ames, IA

Integration of selective breeding and vaccination to improve disease resistance in aquaculture: Application to control bacterial cold water disease - Gregory D. Wiens and Timothy Leeds, National Center for Cool and Cold Water Aquaculture, Kearnesyville, WV
Foot-and-mouth disease (FMD) continues to be one of the highest threats to animal production worldwide. Countries that are free of FMDV restrict commerce of animal products with countries with the disease. In addition, the burden of FMD in animal production threatens food security in parts of the world most susceptible to food insecurity. Vaccines prepared using killed FMD virus are widely used to control disease in endemic countries. Non-endemic countries hesitate on the use of vaccination to control outbreaks because of the risks associated to vaccine production utilizing highly virulent viral strains and also because the difficulty to serologically differentiate vaccinated animals from those infected with the field virus. We have recently reported an attenuated FMD virus that lacks the Leader protease, a specific determinant of virulence and also has specific antigenic markers in proteins 3B and 3D (FMD LL3B3D). The virus is fully attenuated both in cattle and pigs, yet it grows in cell culture and allows vaccine production. We have begun a development plan for this vaccine production platform in collaboration with an industry partner and have transitioned the product from proof of concept stage to early development, including studies demonstrating the safety and efficacy of the vaccines produced with this platform. We also demonstrated that the live FMD LL3B3D virus does not cause disease in cattle or swine directly inoculated. Furthermore, there is no transmission from inoculated animals to animals in direct contact. The virus has been adapted to vaccine production cells and we are in the process of scaling up the production, developing downstream processing and developing the quality control tests for production monitoring. Since FMD virus is considered a select agent and is highly regulated under select agent rules, it is important that this attenuated vaccine strain (FMD LL3B3D) is excepted from select agent regulations. Toward this end a series of studies were conducted to document the lack of virulence and transmissibility both in cattle and pigs. Although this is not a live vaccine, but rather a platform for inactivated antigen production, we did carry out genetic stability and reversion to virulence studies that demonstrated the safety and genetic stability of this platform. Furthermore, since the main attenuating mutation is a complete deletion of a viral protein (leader) it is near impossible for the virus lacking this critical protein to regain virulence without recombinational event with a closely related virus. We tested this possibility by co-infecting cattle with live FMDLL3B3D virus and the closes relative to FMD virus, bovine rhinitis virus. No evidence of recombination was found. It is expected that the select agent exclusion will be obtained in the near future and this will allow full development of the FMDLL3B3D platform. This platform will provide an option to produce inactivated FMD vaccine in the United States decreasing our
current dependence from foreign manufacturing to supply FMD vaccine for the National Veterinary Stockpile.
DEVELOPMENT OF ANTI-CATTLE TICK VACCINE THROUGH DISCOVERY OF THE GENOME SEQUENCE OF *Rhipicephalus microplus*

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The cattle tick, *Rhipicephalus microplus*, is likely the world's most economically important external parasite of cattle. In regions where *R. microplus* is endemic, tick control programs are essential to maximize productivity of both large and small cattle operations. However, *R. microplus* has developed resistance to every class of acaricide, severely affecting animal health. We undertook a genome-based discovery approach to develop a novel anti-cattle tick vaccine that could be used alone or in combination with synthetic acaricides.

The genome of *R. microplus* is large (2.5X the size of the human genome) and complex with >70% repetitive deoxyribonucleic acid (DNA) that is difficult to sequence and assemble. A combination of Illumina- and PacBio-based approaches was used to achieve a 10-fold coverage of the *R. microplus* genome. Several transcriptome studies were conducted to identify transcripts critical to tick development, feeding and pathogen transmission. Transcripts essential to these processes were considered as priority vaccine antigen candidates. Seven different candidate vaccine antigens have been produced as recombinant proteins in the yeast, *Pichia pastoris*. Three of these recombinant antigens showed 63-76% efficacy against *R. microplus* in cattle pen trials in Brazil. The remaining four antigens are scheduled for efficacy evaluations against *R. microplus* in cattle pen tests later this year. This project is an example whereby discovery research on the genome of a veterinary pest yielded direct outputs with potentially large economic impacts upon agriculture. Two of these vaccine antigens have been patented and Cooperative Research and Development Agreements are being put into place to evaluate their potential for development as tick control agents. This genome-based approach of taking discovery to development will be utilized in vaccine development projects aimed at other priority pests of livestock.
Wildlife reservoirs of *Mycobacterium bovis* represent serious obstacles to the eradication of tuberculosis from livestock, particularly cattle. In Michigan, USA, tuberculous white-tailed deer transmit *M. bovis* to other deer and cattle. One approach in dealing with this wildlife reservoir is to vaccinate deer, thus interfering with the intraspecies and interspecies transmission cycles. Oral vaccination of white-tailed deer with the human vaccine, *M. bovis* Bacillus Calmette and Guerin (BCG) decreases disease (i.e. lesion) severity, although it does not provide sterile immunity or protect from infection. Nevertheless, deer vaccinated with BCG have fewer advanced lesions characterized by liquefactive necrosis and large numbers of bacilli. Such lesions are more likely to result in disease dissemination within the host, as well as bacillary excretion and transmission of *M. bovis* to other susceptible hosts. As BCG is a live, but avirulent vaccine, safety of both the host and animals (including humans) that may consume tissues from vaccinated deer is of concern. In immunocompetent hosts, BCG is non-pathogenic; however, humans exposed to BCG may show false-positive skin test reactions, interfering with public health tuberculosis monitoring efforts. In orally vaccinated deer, BCG persisted in a few tissues for up to 12 months. However, BCG was only found in lymph nodes and intestines and never in samples of muscle (meat) that would commonly be used for human consumption. Therefore, the risk of human exposure to BCG through consumption of venison from vaccinated deer is considered to be low.
AQUACULTURE production is valued globally at $125 billion USD, employs ~24 million people, and currently provides approximately 50% of the world’s supply of seafood (1). The demand for seafood continues to increase due to population growth, increased urbanization, a shift from cereal to protein-based diets, and the health benefits associated with increased consumption of omega-3 fatty acids (2). Rainbow trout, (*Oncorhynchus mykiss*), is a native species of North America and is now being cultured in over 65 countries for food production and recreational fishing. This species is especially hardy and easy to rear in either fresh or saltwater environments, and has been subjected to a long history of domestication in the U.S. Aquaculture production of rainbow trout shows global exponential growth with production estimates of 0.85 million metric tons ($3.6 billion USD value) as of 2012 (3).

Endemic and emerging diseases have severely impacted both rainbow trout and Atlantic salmon aquaculture. Disease-related loss approaches 30% in rainbow trout aquaculture, which is considerably higher than disease loss occurring in the production of other domesticated farm animals (4). Currently, disease control options are limited by a lack of effective vaccines, a paucity of approved chemotherapeutics, and a growing concern regarding the emergence of antimicrobial resistance. Genetic improvement through family-based selective breeding is a promising approach to reduce aquaculture disease loss. Salmonid fish are uniquely suited to genetic improvement due to their high fecundity coupled with the ability to synchronize reproduction/development through photoperiod and water temperature manipulation. The control over reproduction and development allows the opportunity to evaluate, using disease challenge tests, a large number of families with animals at similar developmental stage, and at the same time, retain a subset of unexposed full siblings for future selection and breeding.

Bacterial cold water disease (BCWD) is a frequent cause of elevated mortality in rainbow trout and the development of effective control strategies is a priority within the U.S. A goal of the National Center for Cool and Cold Water Aquaculture (NCCCWA) breeding program is to produce germplasm with superior growth and survival following exposure to infectious disease. Since 2005, the NCCCWA has implemented a selective breeding program designed to increase survival following BCWD exposure (5, 6). We hypothesized that this strategy may protect early life stages prior to and through typical vaccination size, and once established, the trait would be low-cost to maintain and distribute to rainbow trout producers (7). At the NCCCWA, we have
created a resistant line in addition to two reference lines in order to quantify breeding progress and investigate the effects of selection (8). These lines are designated ARS-Fp-R (resistant), ARS-Fp-C (control) and ARS-Fp-S (susceptible) (Figure 1A). The ARS-Fp-R line was originally developed as a synthetic cross among four domesticated founder strains (House Creek, College of Southern Idaho; Shasta, Ennis National Fish Hatchery, Montana; Kamloops/Puget Sound Steelhead cross, Troutlodge, Inc., Washington; and Donaldson, University of Washington) and became a closed population beginning with the 2005 year class (YC). Beginning with the YC2005 base population and in each subsequent generation (i.e., YC2007, YC2009, YC2011 and YC 2013), between 71 and 100 full-sib families per generation have been produced and evaluated for BCWD resistance using standardize experimental challenge with *F. psychrophilum*. All challenges were conducted using a single, genome-sequenced bacterial clone from a virulent strain of *F. psychrophilum* (CSF259-93) and mortalities were recorded daily for a total of 21 days. After the first evaluation, we identified highly susceptible families and continued to randomly breed as a reference susceptible line (ARS-Fp-S). In order to directly quantify survival improvement due to effects of continued selection, we initiated a third line (ARS-Fp-C) which represents the base-line survival improvement achieved after one generation of selection. The ARS-Fp-C line has similar ancestry compared to the ARS-Fp-R and ARS-Fp-S lines, and has an

**Figure 1.** (A) Schematic showing the direction and generations of selection (y-axis) applied to rainbow trout lines in comparison to the original baseline population. (B) Phenotype of genetic lines measured in 2013. Percent family survival after 21 days challenge, n=number of families evaluated per line, each point representing a separate family (ARS-Fp-R and ARS-Fp-S lines), while for the ARS-Fp-C line, each point represents a challenge tank containing pooled families.
intermediate survival phenotype between the ARS-Fp-R and ARS-Fp-S lines (Figure 1B).

Factors influencing BCWD resistance under field conditions remain poorly understood. Studies were initiated in 2010 and 2011, as part of a multi-year field evaluation process, to measure survival at locations that routinely experience natural BCWD outbreaks and investigate *Flavobacterium psychrophilum* strain variation. Field evaluation was carried out at multiple sites in Utah in cooperation with the Utah Division of Wildlife Resources, and at one site in Idaho in cooperation with Clear Springs Foods, Inc. A total of 175,000 eyed eggs from the ARS-Fp-R line were distributed to farms in Idaho and Utah in 2010 and 2011 as part of small-scale field trial evaluation. Primary objectives of these field trials were to evaluate BCWD-specific mortality in the ARS-Fp-R line in production settings where fish are naturally exposed to the pathogen, and compare mortality in the ARS-Fp-R line to existing rainbow trout lines (Gunnison River/Harrison Lake Triploids; GHTP) and two NCCCWA reference lines ARS-Fp-C and ARS-Fp-S. In completed field trials (n = 4) in which fish had confirmed exposure to *F. psychrophilum* and BCWD was diagnosed, survival of the ARS-Fp-R line was ≥ 95.5% (mean = 96.4%) through a minimum of 80 days post initial feeding. By comparison, mean survival of the GHTP line averaged 83.8% over three field trials, did not exceed 86.8% for any single field trial, and was statistically different from the ARS-Fp-R line for each field trial. Survival of the ARS-Fp-C line was 92.4% in a single field trial and was statistically different from the ARS-Fp-R line (8). Survival of the ARS-Fp-S line was 91.2% and statistically different from the ARS-Fp-R line in one field trial, but did not differ (97.3% survival) from the ARS-Fp-R line in another field trial (8). Consistent with these results, the percentage of ARS-Fp-R fish yielding a positive culture for *F. psychrophilum* or by qPCR (9) was smaller than that for the various reference lines (8). In all field trials, observations of feeding behavior and growth rate have been favorable for the ARS-Fp-R line, and long-term growth trials (i.e., to a standard market weight) under production settings were initiated in 2013 and will be repeated in 2015. The preliminary findings from the 2010 and 2011 field trials support the release of germplasm in 2012 and the continued evaluation of the ARS-Fp-R genetic line by cooperators in production trials.

In parallel studies carried out during farm evaluation, we have been investigating genetic diversity of *F. psychrophilum* strains. Despite substantial genetic diversity among *F. psychrophilum* isolates as measured by multi-locus sequence typing, 63% (n=38) U.S. isolates from rainbow trout belong to the same sequence type (ST10) as the CSF259-93 strain. In experimental challenges using eight *F. psychrophilum* variants, survival in the ARS-Fp-R line has been consistently greater than that of the ARS-Fp-S line for the limited number of variants tested. Although these results suggest that a component of resistance against this bacterium is broad-based, the magnitude of difference in survival between the lines is clearly affected by the *F. psychrophilum* variant tested.
II. F. 2. USDA-ARS RESEARCH REVIEW

These differences in genetic resistance of the ARS-Fp-R and ARS-Fp-S lines to strain variants have led to questions of whether natural resistance can be further augmented by vaccination. Figure 2 shows the results from two vaccination trials utilizing injection exposure to either a live-attenuated \textit{Fp} strain 454 (A) or formalin-killed \textit{Fp} strain CSF259-93 whole cells (B). Vaccination increased protection in all groups studied; however, the highest survival post-challenge was for vaccinated R-line fish. These results argue that selective breeding and vaccination affect different mechanisms to improve survival, and thus can be combined to induce additive protection against specific challenge.

**Figure 2.** Vaccination augments natural resistance against experimental injection challenge with Fp strain CSF259-93. (A) R and S fish groups were vaccinated by ip injection with a live, attenuated \textit{F. psychrophilum} strain 454, and after 45 days, challenged by ip injection with Fp strain CSF 259-93. Vaccination increased survival of both R and S line fish; however, R fish showed the greatest protection. Average +/- SEM of triplicate tanks, n=60 fish/group, avg wt \textbf{R}=108\pm16g, \textbf{S}= 99\pm21g. (B) High and low SI groups (surrogated marker for resistance (7, 10)) were ip vaccinated with formalin killed CSF259-93 or PBS and after 28 days ip injection challenged with Fp strain CSF259-93. Lines represent the average of duplicate tanks, n=60 fish per group. Avg wt at vaccination High SI = 140\pm20g, Low SI = 144\pm25g. Survival data were analyzed using GraphPad Prism 4 software (version 4.01, GraphPad Software Inc.). Kaplan-Meier survival curves were compared by pair-wise logrank tests. P-values were corrected when performing multiple comparisons using the Bonferroni correction.

In summary, the last five years of research within CRIS project 1930-32000-005-00D has generated data indicating selective breeding can create considerable phenotypic divergence in selected lines. On-farm benefits have been demonstrated and improved survival is a stable trait that is manifested as small as 0.2 g and has life-time duration. The specificity of genetic disease resistance is unclear and it is not known if strains will evolve on-farm to
circumvent breeding progress. However, our preliminary data suggest that vaccination of selectively-bred lines can generate additional protection. Further research is needed to address whether vaccination with heterologous strains can produce broad-based resistance, and to determine the optimal age for vaccination. Finally, the genetic mechanisms behind improved survival remain to be determined as well as the impact of selective breeding on the immune response to other pathogens and commonly used vaccines.

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III. Organizational Matters

A. Bylaws of USAHA
B. USAHA Administrative Policies
C. Previous Meetings
D. USAHA Medal of Distinction Award
III. A. BYLAWS OF THE UNITED STATES ANIMAL HEALTH ASSOCIATION
APPROVED 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 member upon approval of the Board of Directors by a two-thirds majority vote.

c. Individual Member. Any person engaged in work related to animal production, animal health, food safety, public health, veterinary medicine and animal research and who supports the interests and objectives of
III. A. USAHA BYLAWS

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 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 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 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.

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
III. A. USAHA BYLAWS

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

5.1. Elected Officers. The elected officers of the Association shall be a President, President-Elect, First Vice-President, Second Vice-President, Third Vice-President, and Treasurer. They shall be voting members in good standing of the Association.

a. President. The President is the chief officer of the Association and shall preside at the annual meeting and all meetings of the Executive Committee and perform such other duties as customarily belong to that office or which the Board of Directors or Executive Committee from time to time may assign. The president is an ex-officio member of all Committees and may designate an appropriately qualified member as his designee to attend any committee meetings of the Association in his place and stead.

b. President-Elect. The President-Elect shall act in place of the President in the event of his/her absence, death, or inability to act. When so acting the President-Elect shall have all the powers of and be subject to all restrictions upon the President. Specifically he/she shall be the chairman of all meetings of the Board of Directors. He/she shall perform such other duties as the President, Board of Directors or Executive Committee from time to time may assign. The President-Elect shall automatically become President upon election at the close of the annual meeting.

c. First Vice-President. The First Vice-President shall act in place of the President Elect in the event of his/her absence, death or inability to act; and shall perform such other duties as the President, Board of Directors or Executive Committee may assign.

d. Second Vice-President. The Second Vice-President shall act in place of the First Vice-President in the event of his/her absence, death or
III. A. USAHA BYLAWS

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 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
III. A. USAHA BYLAWS

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.

ARTICLE VI – BOARD OF DIRECTORS

6.1. Board of Directors. The Board of Directors shall have authority over all matters of the Association within the limits of the bylaws.

6.2. Composition. The Board of Directors shall be composed of the following:
   a. The Official Agency Members or their designees
   b. One representative selected by each of the Allied Organization Members
   c. Two delegates-at-large from each of the four regional districts
   d. Past presidents of the Association
   e. The International Member who is the chief animal health executive officer representing the principal federal animal health department of Canada, Mexico, Australia and New Zealand, or said person’s designee.
   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
III. A. USAHA BYLAWS

the meeting. Notice of all meetings of the Board of Directors shall be mailed, published in the Association newsletter or transmitted electronically at least thirty days in advance of such meetings. The President, on such reasonable notice as may be practicable under the circumstances, may call emergency meetings of the Board of Directors. At any meeting of the Board of Directors, the President Elect (Chairman of the Board of Directors), with a majority vote of the Board of Directors, may call for an Executive Session limiting attendance.

6.4. Duties. The Board of Directors shall: receive all committee reports and accept or reject all or part of them; review and approve or disapprove with comment the actions of the Executive Committee; and perform such other functions set forth in the By-Laws of the Association.

ARTICLE VII – EXECUTIVE COMMITTEE

7.1. Executive Committee. The Association shall have an Executive Committee composed of the elected officers and the immediate Past President of the Association. In addition the Executive Director shall serve as an ex officio, non-voting member of the Executive Committee and shall not be counted for the purpose of determining a quorum.

7.2. Duties. The Executive Committee shall manage the financial, administrative and internal affairs of the Association when the Board of Directors is not in session. To exercise the authority of the Board of Directors, the Executive Committee must act as a whole, and must forthwith submit its action for approval at the next meeting of the Board of Directors.

7.3. Meetings. The Executive Committee shall meet at least four times each fiscal year at such time and place and upon such notice as the President determines. The Executive Committee is authorized to take action upon the concurring votes of a majority of its 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.

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 and Past Presidents.

ARTICLE IX – STANDING AND SPECIAL COMMITTEES

9.1. General. The President shall annually appoint from the members of the Association such standing or special committees or subcommittees and their chairpersons as may be required by the bylaws or as he/she may find necessary. Each committee shall meet at least once per year at the time of the annual meetings of the Association, and at such other times as the President of the Association and committee Chairman deem necessary to accomplish the work of the Committee. Only members of the Association
permitted by these by-laws are permitted to vote on the work of the committee.

9.2. Program Committee. A program committee shall be appointed by the President and shall consist of the chairpersons of all committees and the elected officers of the Association to develop the programs for the annual and any special meetings of the Association with the goal of furthering the purposes of the Association. The Program Committee shall be chaired by the President-Elect and co-chaired by the First Vice-President.

9.3. Committee on Nominations and Resolutions. The Committee on Nominations and Resolutions shall be comprised of the living past presidents of the Association, the Presidents of the Northeast, North Central, Southern and Western Regional Districts, and the President of the District-At-Large.

a. Chairman. The immediate past President of the Association shall chair this committee.

b. Nomination of Elected Officers. This Committee shall receive, consider and recommend to the Association’s membership at the annual meeting nominations for the elected officers specified in 5.1 and delegates from each district as specified in 6.2.c. The recommendation of elected officers and delegates from each district shall be submitted no later than the third day of September next preceding the annual meeting at which the election will be held.

c. Resolutions. This committee shall review all resolutions of the standing and special committees (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.
III. A. USAHA BYLAWS

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 meeting 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 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.
III. A. USAHA BYLAWS

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 the Audit Committee.

10.7. Compensation/Reimbursement. No member of the Board of Directors, committee member or elected officer of the Association shall receive any compensation for his or her services as such. The Association shall develop policies providing for reimbursement of expenses reasonably incurred in attending meetings and performing special assignments of the Association by the elected officers.

10.8. Dissolution. In the event of dissolution, the Association shall distribute its assets as required by the laws and statutes of the State of Delaware; and distribute its remaining net assets in a manner permitted an entity to maintain its status as exempt from taxation under Section 501 (c) (5) of the Internal Revenue Code of 1986, as amended, or any successor provision.
III. B. USAHA ADMINISTRATIVE POLICIES

ESTABLISHMENT AND OPERATION OF STANDING COMMITTEES
2012

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.

8. Committee rosters for the current year should be finalized no later than 30 days prior to the start of the Annual Meeting.

PARTICIPATION IN USAHA OF FEDERAL AGENCIES AND FEDERAL EMPLOYEES
2009

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. Individual membership and participation of numerous animal health, food safety, and research professionals from a variety of federal agencies is critical to the committees’ success.

A major function of USAHA is development of policies and procedures of national disease control and eradication programs. This means that many committee findings and resolutions constitute recommendations to the
III. B. USAHA ADMINISTRATIVE POLICIES

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 chairs where they would be making recommendations to their employer.

A number of committees have used federal employees as assistant chairs to good advantage. Also, committees which do not deal with federal agency policy may be chaired by federally-employed USAHA members where appropriate.

The Executive Committee is responsible for the daily activities of the Association, and represents the Association on a year-round basis. To avoid conflict of interest, federal employees should not serve in elected officer positions of the Association. Individuals that serve as an officer that become employed by the federal government should resign their officer position, and a replacement should be sought in accordance with the bylaws.

FINANCIAL AND INVESTMENT POLICY
2008

The following policy outlines the administrative principles of the United States Animal Health Association reserve funds.

Goals

1. Build and maintain two year’s operation expenses in reserves.
2. Maintain adequate liquidity in the instance funds must be called for use.
3. Earn reasonable interest on reserves to maintain principle and exceed economic inflation rates.

Delegation of Authority

Both Treasurer and Executive Director should be designated as signors on any USAHA accounts. At this time, USAHA will not employ a third-party account manager to manage investments. However, USAHA may utilize the services of a brokerage manager for locating investment opportunities and advice.

Responsibilities

- Treasurer: Primary authority for investment decisions, acting within parameters of investment policy. Responsible for monthly review of financials and chairing audit committee.
- Executive Director: Manager of investments, to act under direction of Treasurer. Provide research, recommendations to Treasurer for decisions. Responsibility for day-to-day bookkeeping and reporting (to Treasurer/Executive Committee) of financial information. Compile and distribute quarterly investment reports to EC.
III. B. USAHA ADMINISTRATIVE POLICIES

- Executive Committee: Provide regular review of investments from quarterly reports. Provide oversight of Treasurer and Executive Director decisions.
- Board of Directors: Provide approval and/or amendments to investment policy for execution.

Asset Management
USAHA shall put at risk no principle of its reserve funds or operating funds. Investments will be held in secured, FDIC insured institutions. Investments should be less than $100,000 in any single financial institution whenever possible.

All cash received will be deposited into the checking account. To the extent possible, the checking account balance should not exceed $100,000 at the end of each monthly reporting period.

Reserve funds shall be invested in Certificates of Deposit, Money Market, Treasury Bills or Treasury Notes as determined by the Treasurer. The following guidelines will assist in determining terms to allow reasonable liquidity should the reserves be needed.
- Maximum of 25% of Reserve Funds in products of greater than 4 years.
- Maximum of 25% of Reserve Funds in products of 24 months to 4 years.
- Minimum of 40% of Reserve Fund in products less than 24 months.
- Minimum of 10% of Reserve funds in money market savings account for immediate liquidity.

USAHA shall make efforts to ladder CD maturity dates so that at least $50,000 comes due in each fiscal quarter.

This policy will be reviewed annually by the Executive Committee, with any amendments to be brought before the Board of Directors.

Reserve Fund Balance (2010)
USAHA targets a financial reserves balance equal to two years of operating expenses. The Treasurer and Executive Director are responsible for monitoring this status, and reporting accordingly to the Executive Committee.

Should the reserve balance drop below the target amount, the following criteria should take place:
85-99% of Target Balance
The Executive Committee shall make appropriate budget adjustments to increase funds to target amount within one year, or an appropriate timeframe according to current economic conditions.
50% - 84% of Target Balance
The Executive Committee shall make appropriate financial cuts and budget adjustments to increase funds to target amount within three years, or a more appropriate timeframe according to current economic conditions.
III. B. USAHA ADMINISTRATIVE POLICIES

Less than 50%

The Executive Committee shall undertake a major financial overhaul of the organization and develop a plan to: 1) operate in a sustainable manner and 2) rebuild the reserve funds to the target area. Adjustments should be made immediately upon Executive Committee approval of the new plan, with modifications subject to Board of Directors at the next annual meeting.

Should the above mitigations prove unsuccessful, the Executive Committee should evaluate all options for the organization to reduce expenses to a sustainable manner. This can include merging management with other organizations, merging the organization collectively with another, or ceasing operations altogether, in which case the organization will be dissolved according to the bylaws and applicable laws.

YEAR-ROUND ACTIVITIES
2008

USAHA is a year-round organization, and is often asked to comment on specific issues related to its mission. USAHA should first refer to its resolutions to address a given issue.

USAHA staff will act upon all resolutions as directed by the membership and Board of Directors, involving necessary correspondence. For issues that arise, that pertain to resolutions, can have direct action taken as deemed necessary. No additional voting is necessary, though the input of the executive committee is encouraged.

Should an issue be presented that no resolution has been approved, the Executive Director/Secretary will coordinate with President and First Vice President (Chair of Government Relations) to determine if USAHA should address the specific issue, with consensus from the Executive Committee.

SPECIAL FUNDS POLICY
2009

USAHA will manage special funds for Committees and closely related organizations to house finances and bookkeeping services. Special funds will be held separate of the general USAHA fund, and USAHA will record transactions accordingly. USAHA will enter into a written agreement for each account with the primary representative of the group or Committee and a designated treasurer for that account. The designated account treasurer holds authority for all transactions. Special fund oversight is held by the USAHA Treasurer with support of the Secretary/Executive Director.

JOB POSTINGS FOR NEWS ALERTS AND WEB SITE
2010

USAHA has available opportunities for distributing position announcements through its daily News Alert Summaries, currently on a weekly basis. The following policy sets forth guidelines for use of this service.
III. B. USAHA ADMINISTRATIVE POLICIES

USAHA Job Postings are available to any member of the association at no fee. The association will post positions to its web site in addition to the distribution among members.

Non-member groups may also submit positions, however, are subject to review and approval for distribution. The following criteria will be considered:

1) Animal health or animal agriculture related
2) Fields of veterinary medicine, research, diagnostics, regulatory, technical services, non-profit, and/or other related supporting disciplines
3) Align with the mission of USAHA

USAHA reserves the right to refuse posting of any position.

OFFICIAL AGENCY, ALLIED ORGANIZATION MEMBER SUBSTITUTIONS

2011

Official Agency and Allied Organization Members have a designated representative to serve on the board of directors and receive the member benefits for that organization. Occasionally, the designated representative is unable to attend all or some of the annual meeting. In these instances, the representative can designate a substitution to fulfill their obligations on behalf of their agency/organization. This includes:

- Board of Directors Meetings
- Membership Meetings
- Committee Meetings (of which the original representative is an appointed member)

While the USAHA Bylaws state that proxy voting is not allowed, the substitution is treated differently as a transfer of the representative duties.

STUDENT MEMBERSHIP POLICY

2012

Students must be a full-time student in an accredited college or university, in a field of study outlined in the bylaws, part 3.1, E in order to be eligible as a student member and to receive student meeting registration rates.

POLICIES REGARDING USAHA ANNUAL MEETING

ANNUAL MEETING SPEAKER REGISTRATION/COMPLIMENTARY REGISTRATION

Revised 2011

USAHA will not provide complimentary registration to any member or regular attendee of USAHA annual meetings that is speaking on a committee agenda.
III. B. USAHA ADMINISTRATIVE POLICIES

USAHA will provide a complimentary registration to non-member, invited speakers by request for committees for the purpose of presenting to a committee or general session. Requests must be submitted to the USAHA office.

USAHA will consider providing for travel expenses for general session and committee speakers on a limited basis. Requests must be submitted to the Executive Committee in advance, with consideration being given to a proposed speaker’s expertise, timeliness of subject matter, likelihood of attending the meeting otherwise, and budgetary capabilities.

VIDEO & AUDIO RECORDING OF COMMITTEE PROCEEDINGS

USAHA prohibits third-party video and audio recording of committee meetings at the Annual Meeting.

THIRD PARTY MEETINGS

USAHA will permit related organizations, with missions consistent with those of USAHA, to partner in its Annual Meeting to provide a venue for their gatherings. Agreements are arranged on a case-by-case basis, with input from the Program Chair and approval by the Executive Committee. In general, these organizations are expected to cover related expenses to USAHA for their event. Attendees are also expected to pay registration fees for the Annual Meeting.

AAVLD PARTNERSHIP

USAHA will maintain a Memorandum of Understanding with AAVLD regarding all issues surrounding the Annual Meeting execution. The MOU will serve as a basis for coordination between the two organizations, and be reviewed annually.

ANNUAL MEETING HOST STATE BENEFITS POLICY

As the State hosting the Annual Meeting is often requested to provide support to the organization in terms of staff, supplies and time commitments, USAHA will provide reciprocal in-kind benefits to the hosting State to help offset those costs. USAHA will provide one complimentary registration for every three (3) paid registrations for host state employees. The state animal health official is responsible for communicating the complimentary registration designees to USAHA by the pre-registration deadline. Exceptions to this guideline are subject to review and approval by the Executive Committee.
III. B. USAHA ADMINISTRATIVE POLICIES

DIRECTOR, OFFICER AND STAFF RELATED POLICIES

REIMBURSEMENT AND EXPENSES

2008

In accordance with the Bylaws, Section 10.7, USAHA may provide reimbursement or stipend to its officers, board of directors or committee leadership for reasonable expenses incurred while performing specific assignments of the Association. Requests must be submitted to the Executive Committee for approval in advance of the assignment. The Executive Committee will remain judicious in granting requests and mindful of budgetary limitations when considering requests.

USAHA will reimburse staff for all reasonable expenses incurred while performing duties of the Association. Each individual will furnish full documentation of expenses for audit purposes, subject to review of the Treasurer.

Mileage will be reimbursed at the federal Internal Revenue Service rate.

CONFLICT OF INTEREST POLICY

2008

Due to increased scrutiny of non-profit organizations, by the IRS and requirements for increased transparency, USAHA should have in place a conflict of interest policy for its Board of Directors, Officers and Employees. Policy:

Any member or employee involved in a business transaction of the United States Animal Health Association in which a conflict of interest may be present, shall notify the Executive Committee promptly. Said individual shall refrain from voting on such transactions, and exclude themselves from deliberations. The individual will refrain from any personal influence on the transaction. A transaction that involves a conflict of interest should be reviewed against relative competitive bids or proposals. Decisions to pursue a transaction with a potential conflict of interest should first uphold the best interests of USAHA, and include terms that are reasonable to USAHA within the given marketplace.

Approvals will be made by the Executive Committee. A written disclosure summarizing any possible conflict of interest shall be kept on file at the USAHA office. Discussion and resolution shall be indicated in the minutes of the USAHA Executive Committee session.

Conflict of interest should be disclosed if: a transaction of USAHA involves any close relative of a Director or Employee as the direct vendor/provider, or the Director/Employee stands material gain through a transaction. A Director or Employee holds financial interest if holdings are of 5% or greater of the potential vendor, or holds position of influence with an organization that seeks to do business with USAHA.

A close relative is defined as any parent, spouse, sibling, child, grandchild, or spouse of the aforementioned. Also to be included would be
any individual residing in the same household that would resemble a parental or marital relationship.

WHISTLEBLOWER POLICY
2008
Employees and members of USAHA should report illegal or unethical activities, directly relating to the business of USAHA, to the President. The President, in consultation with the Executive Committee, will then determine appropriate actions for investigation, reporting to proper authorities, and reconciliation as necessary.

Employees and members will be provided full confidentiality for reporting such activities, and the President and Executive Committee will ensure due diligence in protecting against retaliation by the organization, its members or other employees and supervisors.

DOCUMENT RETENTION AND DESTRUCTION POLICY
2008
USAHA will maintain all financial records for seven years. They will then be disposed of by either cross-shredding or incineration.
Meeting registrations and membership renewals will be kept for three years.

USAHA PROFESSIONAL DEVELOPMENT SUPPORT
2011
USAHA sees the importance of continuing education for its employees. USAHA may support the opportunities sought by its employees to enhance his/her skill sets. The following is an outline of benefit for employees.

USAHA may provide support as follows:

General
Support for professional development must be pre-approved by the employee’s supervisor prior to commitment in order to receive benefits. Any opportunity should be directly beneficial to current job functions or can be justified as direct future benefit to the Association.

Flexible Scheduling
USAHA may work with employee to accommodate scheduling of work hours to allow for professional development. This can include:
- University/College courses during normal work hours
- Conferences/seminars for professional development
- Other events with pre-approval of supervisor

Employees should strive to maintain a full work week (40 hours) by making up any lost time at hours mutually agreed upon by employee and supervisor.

Academic Courses
III. B. USAHA ADMINISTRATIVE POLICIES

USAHA may support tuition for courses directly beneficial to the employee’s job duties, up to $1000 per fiscal year. Tuition will be reimbursed upon completion of the course by the employee, with a minimum of a C grade or relative “passing” status when grading is not applicable. Courses will be considered regardless of degree/non-degree track.

(*Reimbursements are a taxable benefit.)

Conference/Seminar Registration
USAHA may support registration costs for conferences, seminars or other related courses (self-directed, web-based, etc.) Such programs should enhance the employee’s ability to do current job functions, or expand skill sets to take on additional duties. USAHA may support up to three conferences per year to a maximum of $1000, unless employee is taking academic courses.

Travel
Travel, lodging and meals are reimbursable at federal per diem rates for development opportunities outside of local meetings, such as the St. Joseph or Kansas City areas.
III. C. Previous Meetings of the United States Animal Health Association
<table>
<thead>
<tr>
<th>Meeting</th>
<th>Date</th>
<th>Place of Meeting</th>
<th>President</th>
<th>Secretary/Executive</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, Forth 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></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>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. Cambpell, Chicago, IL</td>
</tr>
<tr>
<td>Meeting</td>
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<td>Place of Meeting</td>
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<td>Secretary/Executive</td>
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<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. Cambpell, Chicago, IL</td>
</tr>
<tr>
<td>25</td>
<td>Dec. 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, Henena, 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. W. J. 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>
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<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>
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<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>
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<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>
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<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>
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<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>
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<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. Brandenburg, 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>
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<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>Noc. 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>
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<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>
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<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>
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<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>
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<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>
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<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>
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<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>
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<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>
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<td>Place of Meeting</td>
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<td>72</td>
<td>Oct. 6-11, 1968</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>
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<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>
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<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>
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<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>
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<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>
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<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>
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<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>
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<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>
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<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>
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<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>
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<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>
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<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>
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<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>
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<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>
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<td>Meeting</td>
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<td>Place of Meeting</td>
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<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>
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<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>
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<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>
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<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>
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<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>
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<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>
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<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>
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<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>
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<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>
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<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>
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<tr>
<td>112</td>
<td>Oct. 23-29, 2008</td>
<td>Greensboro, NC</td>
<td>Mr. James W. Leafstedt, Alchester, SD</td>
<td>Mr. Benjamin Richey, St. Joseph, MO</td>
</tr>
<tr>
<td>113</td>
<td>Oct. 8-14, 2009</td>
<td>San Diego, CA</td>
<td>Dr. Donald E. Hoenig, Belfast, ME</td>
<td>Mr. Benjamin Richey, St. Joseph, MO</td>
</tr>
<tr>
<td>114</td>
<td>Nov. 11-17, 2010</td>
<td>Minneapolis, MN</td>
<td>Dr. Richard E. Breitbart, Sacramento, CA</td>
<td>Mr. Benjamin Richey, St. Joseph, MO</td>
</tr>
<tr>
<td>115</td>
<td>Sept. 29- Oct.5, 2011</td>
<td>Buffalo, NY</td>
<td>Dr. Steven L. Halstead, East Lansing, MI</td>
<td>Mr. Benjamin Richey, St. Joseph, MO</td>
</tr>
<tr>
<td>116</td>
<td>Oct. 18-24, 2012</td>
<td>Greensboro, NC</td>
<td>Dr. David T. Marshall, Raleigh, NC</td>
<td>Mr. Benjamin Richey, St. Joseph, MO</td>
</tr>
<tr>
<td>117</td>
<td>Oct. 17-23, 2013</td>
<td>San Diego, CA</td>
<td>Dr. David L. Meeker, Alexandria, VA</td>
<td>Mr. Benjamin Richey, St. Joseph, MO</td>
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III. C. PREVIOUS MEETINGS

<table>
<thead>
<tr>
<th>Key</th>
<th>Description</th>
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<tr>
<td>*</td>
<td>Deceased</td>
</tr>
<tr>
<td>**</td>
<td>Resigned Dec. 12, 1977</td>
</tr>
<tr>
<td>†</td>
<td>Reprinted in 54th Annual Proceedings</td>
</tr>
<tr>
<td>††</td>
<td>Reprinted in 66th Annual Proceedings</td>
</tr>
<tr>
<td>‡</td>
<td>Last meeting of the Interstate Association of Livestock Sanitary Boards</td>
</tr>
<tr>
<td>§</td>
<td>USAHA hired an Executive Director, effective 2006-2007</td>
</tr>
</tbody>
</table>
III. D. USAHA Medal of Distinction Award Winners
USAHA MEDAL OF DISTINCTION RECIPIENTS

110th Annual Meeting, Minneapolis, Minnesota – 2006
Dr. Clarence L. Campbell, Tallahassee, Florida
Dr. Richard H. McCapes, Davis, California

111th Annual Meeting, Reno, Nevada – 2007
Dr. J. Lee Alley, Montgomery, Alabama
Mrs. Linda B. Ragland, Richmond, Virginia

Dr. John C. Shook, Mechanicsburg, Pennsylvania

113th Annual Meeting, San Diego, California – 2009
Dr. Bret E. Marsh, Indianapolis, Indiana

114th Annual Meeting, Minneapolis, Minnesota – 2010
Mr. Neal F. Black, Eagan, Minnesota
Dr. Thomas J. Hagerty, St. Michael, Minnesota

Dr. Bob E. Hillman, Boise, Idaho

Dr. John E. Ragan, Bowie, Maryland

117th Annual Meeting, San Diego, California – 2013
Dr. Donald H. Lein, Ithaca, NY
IV. GLOSSARY OF COMMONLY USED ACRONYMS
### IV. GLOSSARY OF ACRONYMS

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3D</td>
<td>Decontamination, depopulation, and disposal</td>
</tr>
<tr>
<td>AAC</td>
<td>Animal Ag Coalition</td>
</tr>
<tr>
<td>AADAP</td>
<td>Aquatic Animal Drug Approval Partnership</td>
</tr>
<tr>
<td>AAEP</td>
<td>American Association of Equine Practitioners</td>
</tr>
<tr>
<td>AAFCO</td>
<td>American Association of Feed Control Officials</td>
</tr>
<tr>
<td>AAHSC</td>
<td>Aquatic Animal Health Standards Commission</td>
</tr>
<tr>
<td>AAMD</td>
<td>American Association of Mycobacterial Diseases</td>
</tr>
<tr>
<td>AAMMC</td>
<td>American Association of Medical Milk Commissions</td>
</tr>
<tr>
<td>AASV</td>
<td>American Association of Swine Veterinarians</td>
</tr>
<tr>
<td>AAVCT</td>
<td>American Academy of Veterinary and Comparative Toxicology</td>
</tr>
<tr>
<td>AAVLD</td>
<td>American Association of Veterinary Laboratory Diagnosticians</td>
</tr>
<tr>
<td>AAAMC</td>
<td>Association of American Veterinary Medical Colleges</td>
</tr>
<tr>
<td>AAZV</td>
<td>American Association of Zoo Veterinarians</td>
</tr>
<tr>
<td>ABADRL</td>
<td>Arthropod-Borne Animal Disease Research Laboratory</td>
</tr>
<tr>
<td>ABSL</td>
<td>Animal Biosafety Levels</td>
</tr>
<tr>
<td>AC</td>
<td>Animal Care (USDA-APHIS)</td>
</tr>
<tr>
<td>ACE</td>
<td>Antigen Capture ELISA</td>
</tr>
<tr>
<td>ACVIM</td>
<td>American College of Veterinary Internal Medicine</td>
</tr>
<tr>
<td>ADDs</td>
<td>Assistant District Directors</td>
</tr>
<tr>
<td>ADOL</td>
<td>Avian Disease and Oncology Laboratory</td>
</tr>
<tr>
<td>ADRU</td>
<td>Animal Disease Research Unit</td>
</tr>
<tr>
<td>ADT</td>
<td>Animal Disease Traceability</td>
</tr>
<tr>
<td>ADUFA</td>
<td>Animal Drug User Fee Act</td>
</tr>
<tr>
<td>AEC</td>
<td>Area Emergency Coordinator</td>
</tr>
<tr>
<td>AER</td>
<td>Adverse event reports</td>
</tr>
<tr>
<td>AF</td>
<td>Accredited free</td>
</tr>
<tr>
<td>AFIA</td>
<td>American Feed Industry Association</td>
</tr>
<tr>
<td>FRI</td>
<td>Agriculture and Food Research Initiative</td>
</tr>
<tr>
<td>AFS</td>
<td>American Fisheries Society</td>
</tr>
<tr>
<td>AFWA</td>
<td>Association of Fish and Wildlife Agencies</td>
</tr>
<tr>
<td>AGID</td>
<td>Agar gel immunodiffusion</td>
</tr>
<tr>
<td>AGPs</td>
<td>Antibiotics growth promoters</td>
</tr>
<tr>
<td>AHC</td>
<td>American Horse Council</td>
</tr>
<tr>
<td>AHEM</td>
<td>Animal Health Emergency Management</td>
</tr>
<tr>
<td>AHISC</td>
<td>Animal Health Information Systems Committee</td>
</tr>
<tr>
<td>AHP</td>
<td>Animal Health and Production Division</td>
</tr>
<tr>
<td>AHPA</td>
<td>Animal Health Protection Act</td>
</tr>
<tr>
<td>AHRSII</td>
<td>Animal Health Regulatory Science Innovation Initiative</td>
</tr>
<tr>
<td>Acronym</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
</tr>
<tr>
<td>AHS</td>
<td>African Horse Sickness</td>
</tr>
<tr>
<td>AHSIS</td>
<td>Animal Health Surveillance and Information Systems</td>
</tr>
<tr>
<td>AHSM</td>
<td>Animal Health Surveillance and Management</td>
</tr>
<tr>
<td>AI</td>
<td>Avian influenza</td>
</tr>
<tr>
<td>AICAP</td>
<td>Avian Influenza Coordinated Agricultural Program</td>
</tr>
<tr>
<td>AI-CMC</td>
<td>Avian Influenza Crisis Management Center</td>
</tr>
<tr>
<td>AIV</td>
<td>Avian influenza virus</td>
</tr>
<tr>
<td>AMD</td>
<td>Age-related macular degeneration</td>
</tr>
<tr>
<td>AMPs</td>
<td>Antimicrobial peptides</td>
</tr>
<tr>
<td>aMPV</td>
<td>Avian metapneumovirus</td>
</tr>
<tr>
<td>AMR</td>
<td>Antimicrobial resistance</td>
</tr>
<tr>
<td>ANSI</td>
<td>American National Standards Institute</td>
</tr>
<tr>
<td>ANV</td>
<td>Avian Nephritis Virus</td>
</tr>
<tr>
<td>AOCS</td>
<td>American Oil Chemists’ Society</td>
</tr>
<tr>
<td>AOS</td>
<td>Active Observational Surveillance</td>
</tr>
<tr>
<td>APHIS</td>
<td>Association and Plant Health Inspection Service</td>
</tr>
<tr>
<td>APIC</td>
<td>Association for Professionals in Infection Control and Epidemiology</td>
</tr>
<tr>
<td>ARC</td>
<td>Agricultural Research Center</td>
</tr>
<tr>
<td>ARMS</td>
<td>Antiparasitic Resistance Management Strategy</td>
</tr>
<tr>
<td>ARS</td>
<td>Agricultural Research Service</td>
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<tr>
<td>ASF</td>
<td>African Swine Fever</td>
</tr>
<tr>
<td>ASI</td>
<td>American Sheep Industry Association</td>
</tr>
<tr>
<td>AST</td>
<td>Agriculture Screening Tools</td>
</tr>
<tr>
<td>AVBP</td>
<td>Association of Veterinarians in Broiler Production</td>
</tr>
<tr>
<td>AVEP</td>
<td>Association of Veterinarians in Egg Production</td>
</tr>
<tr>
<td>AVIC</td>
<td>Area veterinarian in charge</td>
</tr>
<tr>
<td>AVMA</td>
<td>American Veterinary Medical Association</td>
</tr>
<tr>
<td>AVMC</td>
<td>Aquatic Veterinary Medicine Committee</td>
</tr>
<tr>
<td>AWA</td>
<td>Animal Welfare Act</td>
</tr>
<tr>
<td>AWI</td>
<td>Animal Welfare Institute</td>
</tr>
<tr>
<td>AWW</td>
<td>Adjusted weaning weight</td>
</tr>
<tr>
<td>AZA</td>
<td>Association of Zoos and Aquariums</td>
</tr>
<tr>
<td>BCF</td>
<td>Bacterial culture of the feces</td>
</tr>
<tr>
<td>BCG</td>
<td>Bacille Calmette-Guerin</td>
</tr>
<tr>
<td>BCWD</td>
<td>Bacterial cold water disease</td>
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<tr>
<td>BDM</td>
<td>Bio-development module</td>
</tr>
<tr>
<td>BEAP</td>
<td>Brucellosis Emergency Action Plan</td>
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<tr>
<td>BHS</td>
<td>Bighorn Sheep</td>
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<tr>
<td>BMAPs</td>
<td>Brucellosis Management Action Plans</td>
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IV. GLOSSARY OF ACRONYMS

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
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<tr>
<td>BMP</td>
<td>Brucellosis Management Plan</td>
</tr>
<tr>
<td>BMPs</td>
<td>Best management practices</td>
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<tr>
<td>BMST</td>
<td>Brucellosis Milk Surveillance Testing</td>
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<tr>
<td>BNC</td>
<td>Bi-National Committee</td>
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<tr>
<td>BOAH</td>
<td>Board of Animal Health</td>
</tr>
<tr>
<td>BoCV</td>
<td>Bovine coronavirus</td>
</tr>
<tr>
<td>BoHV-1</td>
<td>Bovine herpesvirus-1</td>
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<tr>
<td>BP</td>
<td>Border Patrol</td>
</tr>
<tr>
<td>BQA</td>
<td>Beef Quality Assurance</td>
</tr>
<tr>
<td>BQFS</td>
<td>Bison Quarantine Feasibility Study</td>
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<tr>
<td>BRD</td>
<td>Bovine Respiratory Disease</td>
</tr>
<tr>
<td>BRSV</td>
<td>Bovine respiratory syncytial virus</td>
</tr>
<tr>
<td>BRT</td>
<td>Brucellosis ring test</td>
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<tr>
<td>BSC</td>
<td>Biological Standard Commission</td>
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<td>BSE</td>
<td>Bovine spongiform encephalopathy</td>
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<td>BSL</td>
<td>Breed Specific Legislation</td>
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<tr>
<td>BSL3 (or 4)</td>
<td>Biosecurity Level 3 (or 4)</td>
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<td>BTD</td>
<td>Black-tailed deer</td>
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<tr>
<td>BTV</td>
<td>Bluetongue virus</td>
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<td>BVD</td>
<td>Bovine viral diarrhea</td>
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<tr>
<td>CABS</td>
<td>Consortium for the Advancement of Brucellosis Science</td>
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<tr>
<td>CAC</td>
<td>Codex Alimentarius Commissions</td>
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<tr>
<td>CAHFSE</td>
<td>Collaboration for Animal Health, Food Safety and Epidemiology</td>
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<tr>
<td>CAMAVET</td>
<td>Committee of the Americas for the Harmonization of the Registration and Control of Veterinary Medicines</td>
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<td>CART</td>
<td>County Animal Response Team</td>
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<tr>
<td>CAST</td>
<td>Council for Agricultural Science and Technology</td>
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<tr>
<td>CAsTV</td>
<td>Chicken Astrovirus</td>
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<tr>
<td>CBDD</td>
<td>Chemical/Biological Defense Division</td>
</tr>
<tr>
<td>CBPP</td>
<td>Contagious Bovine Pleuropneumonia</td>
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<tr>
<td>CBRNE</td>
<td>Chemical, biological, radiological, nuclear and explosive weapons</td>
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<tr>
<td>CC(T)</td>
<td>Comparative cervical (tuberculin)</td>
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<tr>
<td>CD</td>
<td>Clostridial Dermatitis</td>
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<tr>
<td>CDA</td>
<td>Colorado Department of Agriculture</td>
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<tr>
<td>CDC</td>
<td>Centers for Disease Control and Prevention</td>
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<tr>
<td>CDD</td>
<td>Center for Disease Detection</td>
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<tr>
<td>CDLVWD</td>
<td>Committee on Diagnostic Laboratory and Veterinary Workforce Development</td>
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### IV. GLOSSARY OF ACRONYMS

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>CDR</td>
<td>Complementarity determining regions</td>
</tr>
<tr>
<td>CEAH</td>
<td>Centers for Epidemiology and Animal Health</td>
</tr>
<tr>
<td>CEEZAD</td>
<td>Center of Excellence for Emerging and Zoonotic Animal Diseases</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 (Mexico)</td>
</tr>
<tr>
<td>CENASA</td>
<td>National Animal Disease Laboratory (Mexico)</td>
</tr>
<tr>
<td>CEO</td>
<td>Chick embryo origin</td>
</tr>
<tr>
<td>CF</td>
<td>Complement fixation</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>CFSAN</td>
<td>Center for Food Safety and Applied Nutrition</td>
</tr>
<tr>
<td>CFSPH</td>
<td>Center for Food Security and Public Health</td>
</tr>
<tr>
<td>CFT</td>
<td>Caudal fold tuberculin test</td>
</tr>
<tr>
<td>CFT</td>
<td>Cattle fever tick</td>
</tr>
<tr>
<td>CFTEP</td>
<td>Cattle Fever Tick Eradication Program</td>
</tr>
<tr>
<td>CFU</td>
<td>Colony forming units</td>
</tr>
<tr>
<td>CGAHR</td>
<td>Center for Grain and Animal Health Research</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>CIPSEA</td>
<td>Confidential Information Protection and Statistical Efficiency Act</td>
</tr>
<tr>
<td>CISS</td>
<td>Comprehensive and Integrated Swine Surveillance</td>
</tr>
<tr>
<td>CMC</td>
<td>Crisis Management Center</td>
</tr>
<tr>
<td>CNS</td>
<td>Central nervous system</td>
</tr>
<tr>
<td>COB</td>
<td>Continuity of Business</td>
</tr>
<tr>
<td>COEs</td>
<td>Centers of Excellence</td>
</tr>
<tr>
<td>COMEXA</td>
<td>Mexico - United States Commission on the Eradication of Livestock Screwworm</td>
</tr>
<tr>
<td>CONASA</td>
<td>Consejo Nacional de Salud Animal (Mexico)</td>
</tr>
<tr>
<td>CONSULT</td>
<td>Collaborative, Online, Novel, Science-based, User-friendly, Learning, Tool</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>Mexico - United States Commission on the Eradication of Foot-and-Mouth Disease and Other Foreign Animal Diseases</td>
</tr>
<tr>
<td>CPCVM</td>
<td>Center for Public and Corporate Veterinary Medicine</td>
</tr>
<tr>
<td>CPG</td>
<td>Compliance policy guide</td>
</tr>
<tr>
<td>Acronym</td>
<td>Full Form</td>
</tr>
<tr>
<td>---------</td>
<td>-----------</td>
</tr>
<tr>
<td>CPI</td>
<td>Consumer price index</td>
</tr>
<tr>
<td>CR</td>
<td>Continuing resolution</td>
</tr>
<tr>
<td>CRIS</td>
<td>Current research Information System</td>
</tr>
<tr>
<td>CRISPR</td>
<td>Clustered regularly interspaced short palindromic repeat</td>
</tr>
<tr>
<td>CRWAD</td>
<td>Conference of Research Workers in Animal Diseases</td>
</tr>
<tr>
<td>CSF</td>
<td>Classical swine fever</td>
</tr>
<tr>
<td>CSL</td>
<td>Commonwealth Serum Laboratories</td>
</tr>
<tr>
<td>CSPI</td>
<td>Center for Science in the Public Interest</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 (USDA)</td>
</tr>
<tr>
<td>CSTE</td>
<td>Council of State and Territorial Epidemiologists</td>
</tr>
<tr>
<td>CVB</td>
<td>Center for Veterinary Biologics (USDA)</td>
</tr>
<tr>
<td>CVB-IC</td>
<td>Center for Veterinary Biologics - Inspection and Compliance (USDA)</td>
</tr>
<tr>
<td>CVI</td>
<td>Certificate of Veterinary Inspection</td>
</tr>
<tr>
<td>CVM</td>
<td>Center for Veterinary Medicine (FDA)</td>
</tr>
<tr>
<td>CVMA</td>
<td>Canadian Veterinary Medical Association</td>
</tr>
<tr>
<td>CVR</td>
<td>Canadian Veterinary Reserve</td>
</tr>
<tr>
<td>CWC</td>
<td>Cell-wall competent</td>
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<tr>
<td>CWD</td>
<td>Chronic wasting disease</td>
</tr>
<tr>
<td>DAL</td>
<td>District at Large (USAHA)</td>
</tr>
<tr>
<td>DBE</td>
<td>Designated Brucellosis Epidemiologist</td>
</tr>
<tr>
<td>DEA</td>
<td>Drug Enforcement Administration</td>
</tr>
<tr>
<td>DHHS</td>
<td>Department of Health and Human Services</td>
</tr>
<tr>
<td>DHIA</td>
<td>Dairy Herd Improvement Association</td>
</tr>
<tr>
<td>DHS</td>
<td>Department of Homeland Security</td>
</tr>
<tr>
<td>DIVA</td>
<td>Differentiating Infected from Vaccinated Animals</td>
</tr>
<tr>
<td>DJC</td>
<td>Designated Johnne’s Coordinator</td>
</tr>
<tr>
<td>DNA</td>
<td>Deoxyribonucleic acid</td>
</tr>
<tr>
<td>DNR</td>
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<td>DOI</td>
<td>Department of the Interior</td>
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<tr>
<td>DPI</td>
<td>Day postinoculation</td>
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<td>dRIT</td>
<td>Direct rapid immunohistochemistry test</td>
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<td>DRMS</td>
<td>Dairy Records Management System</td>
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<td>DS</td>
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<td>Designated surveillance area</td>
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### IV. GLOSSARY OF ACRONYMS

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<th>Acronym</th>
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<td>DVL</td>
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<td>E2E</td>
<td>Engage to Excel</td>
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<td>EAE</td>
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### IV. GLOSSARY OF ACRONYMS

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<td>Formalin-fixed, paraffin-embedded</td>
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<td>FLUC</td>
<td>Firefly luciferase</td>
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<td>GAP</td>
<td>Good aquaculture practice</td>
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<td>GDB</td>
<td>Generic Database</td>
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<td>Gross domestic product</td>
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<td>GFRA</td>
<td>Global FMD Research Alliance</td>
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<td>GIEFA</td>
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<td>Grand Teton National Park</td>
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<td>HACCP</td>
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<td>Herrold's egg yolk medium</td>
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<td>HPLC</td>
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<td>HSIN</td>
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<td>IAI</td>
<td>Integrated agricultural intelligence</td>
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<td>IBH</td>
<td>Inclusion body hepatitis</td>
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<td>IBMP</td>
<td>Interagency Bison Management Plan</td>
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<td>ICCM</td>
<td>Institute of Computational Comparative Medicine</td>
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<td>ICE</td>
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<td>ICLN</td>
<td>Integrated Consortium of Laboratory Networks</td>
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<td>Incident Command System</td>
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<td>Idaho Department of Fish and Game</td>
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<td>IFA</td>
<td>Immunofluorescence assay</td>
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<td>IFAH</td>
<td>International Federation for Animal Health</td>
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<td>Immunohistochemistry</td>
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<td>IIICAB</td>
<td>Institute for International Cooperation in Animal Biologics</td>
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<td>ILRI</td>
<td>International Livestock Research Institute</td>
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<td>IMT</td>
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<td>Immuno-peroxidase Virus Neutralization test</td>
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IV. GLOSSARY OF ACRONYMS

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<td>International Technical Regulatory Capacity Building</td>
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<td>Idiopathic vesicular disease</td>
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<td>IVT</td>
<td>In-vitro transcribed</td>
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<td>JAC</td>
<td>Joint Advisory Committee</td>
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<td>JD</td>
<td>Johne's disease</td>
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<td>JDIP</td>
<td>Johne's Disease Integrated Program</td>
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<td>JEI</td>
<td>Johne's Education Initiative</td>
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<td>JPPD</td>
<td>Johnin purified protein derivative</td>
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<tr>
<td>JSA</td>
<td>Joint Subcommittee on Aquaculture</td>
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<tr>
<td>KAP</td>
<td>Knowledge, attitudes, and practice</td>
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<td>KBUSLIRL</td>
<td>Knipling-Bushland United States Livestock Insects Research Laboratory</td>
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<td>LA-MRSA</td>
<td>Livestock-associated methicillin-resistant <em>S. aureus</em></td>
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<td>LBMS</td>
<td>Live Bird Marketing System</td>
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<td>LC/MS</td>
<td>Liquid Chromatography/Mass Spectroscopy</td>
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<td>LCEM</td>
<td>Laboratory Capacity Estimation Model</td>
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<td>LCMV</td>
<td>Lymphocytic Choriomeningitis virus</td>
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<td>Local Health Departments</td>
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<td>LMS</td>
<td>Laboratory Messaging Service</td>
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<td>LPAI</td>
<td>Low Pathogenic avian influenza</td>
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<td>LPDV</td>
<td>Lymphoproliferative disease virus</td>
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<td>LPNAI</td>
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<td>Licensing, Serial Release, Testing Information System</td>
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<td>Long terminal repeat</td>
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<td>Market cattle identification</td>
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<td>Mid-cervical tuberculin</td>
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<td>Marek’s disease</td>
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<td>Mycobacterial diseases of animals</td>
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<td>MDR</td>
<td>Multi-drug resistant</td>
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<td>Mycoplasma gallisepticum</td>
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<td>MHC</td>
<td>Histocompatibility complex</td>
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<td>Minor Use/Minor Species</td>
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### IV. GLOSSARY OF ACRONYMS

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<td>National Disaster Medical System</td>
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<td>Newcastle disease virus</td>
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<td>National Equine Health Plan</td>
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<td>Neurotropic Equine Herpes Virus</td>
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<td>National Feral Swine Mapping System</td>
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<td>National Institute for Animal Agriculture</td>
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<td>National Institute of Health</td>
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<td>National Johne's Working Group</td>
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<td>National Pork Board</td>
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<td>National Preparedness Directorate</td>
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<td>NPIS</td>
<td>New Poultry Inspection System</td>
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<td>NPLA</td>
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<td>NPS</td>
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<td>National Response Framework</td>
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<td>NS</td>
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<td>NVAP</td>
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<td>Acronym</td>
<td>Description</td>
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<td>NVS</td>
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<td>NYSCAP</td>
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<td>OD</td>
<td>Optical density</td>
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<td>OM</td>
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<td>OMB</td>
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<td>OPPV</td>
<td>Ovine progressive pneumonia virus</td>
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<td>ORST</td>
<td>Outbreak Response and Surveillance Team</td>
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<td>ORV</td>
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<td>PAC</td>
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<td>PBS</td>
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<td>Pets Evacuation and Transportation Standards Act</td>
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<td>PFGE</td>
<td>Pulsed-field gel electrophoresis</td>
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<td>PFI</td>
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<td>Peptidoglycan hydrolases</td>
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<td>PHLIS</td>
<td>Public Health Laboratory Information Systems</td>
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<tr>
<td>PI</td>
<td>Post inoculation or Persistently Infected</td>
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<td>PI3V</td>
<td>Parainfluenza-3 virus</td>
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<td>PIADC</td>
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<td>Pasteurized Milk Ordinance</td>
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<td>Personal protective equipment</td>
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<td>PPR</td>
<td>Peste des petits ruminants</td>
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<td>PQA</td>
<td>Pork Quality Assurance</td>
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<td>Professional Rodeo Cowboys Association</td>
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<td>PReP</td>
<td>Preparedness and Response Plan</td>
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<td>PRRS(V)</td>
<td>Porcine reproductive and respiratory syndrome (virus)</td>
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<td>PSAs</td>
<td>Public Security Advisors</td>
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<td>Program Support Services</td>
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<td>PT</td>
<td>Proficiency testing</td>
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<td>PVS</td>
<td>Performance, Vision and Strategy</td>
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<td>QA</td>
<td>Quality assurance</td>
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<td>Quality Management Systems Training</td>
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<td>RA/HMP</td>
<td>Risk Assessments/Herd Management Plans</td>
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<tr>
<td>RAPIDD</td>
<td>The Research and Policy for Infectious Disease Dynamics</td>
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<tr>
<td>RE(V)</td>
<td>Reticuloendotheliosis (Virus)</td>
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<td>RES</td>
<td>Regionalization Evaluation Services</td>
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<td>RFID</td>
<td>Radio frequency identification</td>
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<td>RFS</td>
<td>Renewable Fuel Standards</td>
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<td>RML</td>
<td>Rocky Mountain Laboratory</td>
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<tr>
<td>RNA</td>
<td>Ribonucleic acid</td>
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<td>RRT</td>
<td>Real time reverse transcription</td>
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<tr>
<td>RRT-PCR</td>
<td>Reverse transcriptase polymerase chain reaction</td>
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<td>RSS</td>
<td>Runtting-stunting syndrome</td>
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<td>RSSS</td>
<td>Regulatory Scrapie Slaughter Surveillance</td>
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<tr>
<td>RT-PCR</td>
<td>Real-Time Polymerase Chain Reaction</td>
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<tr>
<td>RVNA</td>
<td>Rabies virus neutralizing antibody</td>
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<td>SAADRA</td>
<td>Southern Agriculture and Animal Disaster Response Alliance</td>
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<td>SAGARPA</td>
<td>Secretary of Agriculture, Ranching, Rural Development, Fisheries and Food Supply (Mexico)</td>
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<td>SAHA</td>
<td>Southern Animal Health Association (District)</td>
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<td>State animal health official</td>
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<td>SALMS</td>
<td>State Animal Laboratory Messaging Service</td>
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<td>SARTs</td>
<td>State Animal Response Team</td>
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## IV. GLOSSARY OF ACRONYMS

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>SAS</td>
<td>Scientific Advisory Subcommittee</td>
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<tr>
<td>SB</td>
<td>Swine brucellosis</td>
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<td>SBS</td>
<td>Secure Broiler Supply Plan</td>
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<tr>
<td>SBV</td>
<td>Schmallenberg virus</td>
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<tr>
<td>SCS</td>
<td>Surveillance Collaboration System</td>
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<tr>
<td>SCT</td>
<td>Single cervical tuberculin test</td>
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<tr>
<td>SCWDS</td>
<td>Southeastern Cooperative Wildlife Disease Study</td>
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<tr>
<td>SD</td>
<td>Salmonella Dublin</td>
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<tr>
<td>SDO</td>
<td>Standards Development Organizations</td>
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<tr>
<td>SDS</td>
<td>Sodium dodecyl sulphate</td>
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<td>SE</td>
<td>Salmonella enteritidis</td>
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<td>SECWDS</td>
<td>Southeastern Cooperative Wildlife Disease Study</td>
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<td>SENASICA</td>
<td>National Services of Animal and Plant Health, Quality and Food Safety (Mexico)</td>
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<td>SEPRP</td>
<td>Southeastern Poultry Research Laboratory (ARS)</td>
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<td>SES</td>
<td>Secure Egg Supply</td>
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<td>SFCP</td>
<td>Scrapie Flock Certification Program</td>
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<td>SFS</td>
<td>Secure Food Supply</td>
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<tr>
<td>SH</td>
<td>Salmonella heidelberg</td>
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<td>SHI</td>
<td>Synergistic Hemolysin Inhibition</td>
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<td>SHTP</td>
<td>Slaughter Horse Transport Program</td>
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<td>SICAMORA</td>
<td>Compliance documentation for exporting cattle from Mexico to the U.S.</td>
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<td>SINIIGA</td>
<td>National System of Individual Cattle Identification</td>
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<td>SIT</td>
<td>Sterile insect technique</td>
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<td>SIV</td>
<td>Swine Influenza Virus</td>
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<tr>
<td>SIV</td>
<td>Simian immunodeficiency virus</td>
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<td>SN</td>
<td>Serum neutralization</td>
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<td>SNGD</td>
<td>Scrapie National Generic Database</td>
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<tr>
<td>SODA</td>
<td>Statistical Outbreak Detection Algorithm</td>
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<tr>
<td>SOP</td>
<td>Standard operating procedure</td>
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<td>SOSS</td>
<td>Scrapie Ovine Slaughter Surveillance</td>
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<td>SPP</td>
<td>Security and Prosperity Partnership of North America</td>
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<td>SPRS</td>
<td>Surveillance, Preparedness and Response Services</td>
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<td>SPS</td>
<td>Sanitary and Phytosanitary</td>
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<td>SPV</td>
<td>Sylvatic plague vaccine</td>
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<td>SRM</td>
<td>Specified risk materials</td>
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<td>Screwworm Research Unit</td>
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<td>STA</td>
<td>Science, Technology and Analysis</td>
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<td>Acronym</td>
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<td>STEC</td>
<td>Shiga toxin–producing <em>Escherichia coli</em></td>
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<td>SVD</td>
<td>Swine vesicular disease</td>
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<td>Seneca valley virus</td>
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<td>SWAP</td>
<td>Swine Welfare Assurance Program</td>
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<tr>
<td>SWOT</td>
<td>Strengths, weaknesses, opportunities, and threats</td>
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<td>T&amp;E</td>
<td>Training and exercise</td>
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<tr>
<td>TAD</td>
<td>Targeted advanced development</td>
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<td>TB SAS</td>
<td>Tuberculosis Scientific Advisory Subcommittee</td>
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<tr>
<td>TCF</td>
<td>Tissue culture fluid</td>
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<tr>
<td>TCO</td>
<td>Tissue culture origin</td>
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<td>TDC</td>
<td>Tibial dyschondroplasia</td>
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<td>TGE</td>
<td>Transmissible gastroenteritis</td>
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<td>TIPP</td>
<td>Transatlantic Trade and Investment Partnership</td>
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<td>TLR</td>
<td>Toll-like receptor</td>
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<td>TOC</td>
<td>Turkey osteomyelitis complex</td>
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<td>TPP</td>
<td>Transpacific Partnership</td>
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<td>Trichomoniasis</td>
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<td>TRV</td>
<td>Turkey-origin reovirus</td>
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<td>TSE</td>
<td>Transmissible spongiform encephalopathy</td>
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<td>UDB</td>
<td>Unified database</td>
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<td>UEP</td>
<td>United Egg Producers</td>
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<td>UHF</td>
<td>Ultra high frequency</td>
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<td>UM&amp;R</td>
<td>Uniform Methods &amp; Rules</td>
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<td>USALIMS</td>
<td>U.S. Animal Laboratory Information Management System</td>
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<td>USAMM</td>
<td>United States Animal Movement Model</td>
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<td>United States Department of Agriculture</td>
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<td>United States Disease Outbreak Simulation</td>
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<td>USEF</td>
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<td>United States Fish &amp; Wildlife Services</td>
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<td>Voluntary Bovine Johne’s Disease Control Program</td>
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<td>VEE</td>
<td>Venezuelan equine encephalitis</td>
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<td>Vet-LIRN</td>
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<td>VFD</td>
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<td>Virus isolation</td>
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<td>Veterinary International Committee on Harmonisation</td>
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<td>Abbreviation</td>
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<td>VIC-S</td>
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<td>Vaccinal infectious laryngotracheitis</td>
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<td>Virus neutralization</td>
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<td>VNTR</td>
<td>Variable number tandem repeats</td>
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<td>World Health Organization</td>
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<td>Wyoming Livestock Board</td>
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<td>West Nile neuroinvasive disease</td>
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<td>West Nile virus</td>
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