PROCEEDINGS

ONE HUNDRED AND EIGHTEENTH ANNUAL MEETING

OF THE

UNITED STATES ANIMAL HEALTH ASSOCIATION

SHERATON KANSAS CITY HOTEL
KANSAS CITY, MISSOURI
OCTOBER 16 – 22, 2014
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United States Animal Health Association
4221 Mitchell Ave.
Saint Joseph, MO 64507
Tel: (816) 671-1144
Fax: (816) 671-1201
www.usaha.org
usaha@usaha.org

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Editors
Benjamin Richey
Kelly Janicek

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ABOUT USAHA

USAHA’S VISION AND MISSION…

The United States Animal Health Association (USAHA) is the leading forum for animal health issues in the United States, promoting active participation from industry, academia, and government. USAHA provides a national venue for stakeholders to identify the most effective methods to protect and improve animal health and welfare and public health.

The United States Animal Health Association develops and promotes sound animal health solutions for the public good.

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USDA, Cooperative State Research, Education and Extension Service  
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USDHS, Science and Technology Directorate  
USDHS, Office of Health Affairs  
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American Association of Zoo Veterinarians
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Life Members: 125
Student Members: 124
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A. Officers

2013-2014 Executive Committee

Front row (from left): David Meeker, VA, Immediate Past President; Stephen Crawford, NH, President; Bruce King, UT, President-elect. Back row (from left): Barbara Determan, IA, Third Vice President; Boyd Parr, SC, Second Vice President; David Schmitt, IA, First Vice President. Not Pictured: Annette Jones, CA, Treasurer.
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<td>Craig Shultz</td>
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<td>Douglas Corey</td>
<td>Professional Rodeo Cowboys Assoc.</td>
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<td>Rhode Island Div. of Agriculture</td>
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<td>A. Gregorio Rosales</td>
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<td>Dustin Oedekoven</td>
<td>South Dakota Animal Industry Board</td>
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<td>Boyd Parr</td>
<td>South Carolina Livestock &amp; Poultry/Clemson University</td>
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<td>Charles Hatcher</td>
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<td>Dee Ellis</td>
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<td>Douglas Meckes</td>
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<td>Jonathan Sleeman</td>
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<td>Bruce King</td>
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<td>Paul McGraw</td>
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<td>Herbert Richards III</td>
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<td>Jewell Plumley</td>
<td>West Virginia Dept. of Agriculture</td>
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<td>James Logan</td>
<td>Wyoming Livestock Board</td>
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II. 2014 Annual Meeting Proceedings
   A. USAHA/AAVLD President’s Reception and Dinner
   B. USAHA/AAVLD Plenary Session
   C. USAHA Scientific Posters, Papers and Abstracts
   D. USAHA Membership Meetings
   E. Committee Reports
   F. Other Reports
A. USAHA/AAVLD President’s Reception and Dinner

INVOCATION

David Schmitt

MEMORIAL SERVICE

Bruce King

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:

James H. Steele, Texas
James McKean, Iowa
Murray Fowler, California
Robert L. Hartin, Oklahoma
John Orsborn, Jr., California
Floyd Jones, Texas
Darrell Trampel, Iowa

Let us humbly pause for silent prayer in remembrance of these deceased members. Amen.
Richard Fordyce, a fourth-generation Missouri farmer from Bethany was named Director of the Missouri Department of Agriculture in December 2013 by Governor Jay Nixon. Fordyce has held leadership roles in agriculture on the local, state and national levels for more than 20 years. Since 2008, he has served as chairman of the Missouri State Soil and Water Districts Commission.

Fordyce received the 2012 Soil Conservationist of the Year award from the Conservation Federation of Missouri. He has held leadership positions with the Harrison County Farm Bureau, including serving as its president from 1993 to 2010, and has been involved on various boards and committees of the Missouri Farm Bureau and the American Farm Bureau Federation.

Other organizations that Fordyce has held leadership positions in include the National Biodiesel Board, the Missouri Soybean Merchandising Council, Agricultural Leaders of Tomorrow, University of Missouri Extension and the Northwest Missouri State Fair. He is also one of only three directors from Missouri on the United Soybean Board.

He has served his community as a member of the South Harrison R-II School Board, on the Green Hills Regional Planning Commission, on the Sherman Township board of trustees, and on the Community Foundation of Northwest Missouri. Fordyce also has served on advisory groups to Cong. Sam Graves and former U.S. Senators Kit Bond and Jim Talent.

Fordyce and his wife, Renee, grow soybeans and corn as well as raise beef cattle on the family farm in Harrison County.
Dr. Scott Marshall invited attendees to make plans for the 2015 Annual Meeting in Providence, Rhode Island. Marshall provided a narrative of the city’s highlights, along with a short video featuring the city. The meeting will be held October 22-28, 2015.
II. A. USAHA/AAVLD PRESIDENT’S RECEPTION AND DINNER

DINNER SPONSOR’S RECOGNITION

Heather Van Lin
GlobalVetLink, LC

Jill Greene
Life Technologies
USAHA President’s Address

Stephen Crawford

It has truly been my honor to serve as President of USAHA over the past year. I’m not one for long-winded speeches, so I intend to keep this brief. This evening is a time of recognition and celebration of those that have provided significant contributions to our organizations and our industry.

However, I have not shied away from sharing some facts on New Hampshire at each opportunity at the podium. New Hampshire’s motto of “Live Free or Die” is important to the residents there. We are home to the largest state legislature in the U.S., with 400 Representatives and 24 Senators. Representation is important up there, and I think that concept is something that USAHA and AAVLD have embodied over our long history, and much credit to our history of success.

I began my tenure on the USAHA Executive Committee in 2009, and it is amazing how quickly that time has passed. I have enjoyed working with my colleagues over this time period, and am grateful for the work of my predecessors in guiding this organization. But tonight isn’t about me – it’s about honoring the members of these organizations that work tirelessly without much recognition, or compensation for their time and efforts.

I want to thank my current executive committee colleagues; clearly a top-notch group of individuals and a pleasure to work with professionally and to know personally. This organization is in good hands with the leadership for the future. I can’t say that without also expressing my gratitude to all the committee leadership and dedicated members that make USAHA tick. For our sister organization, AAVLD and Cat Barr, it has been a pleasure to serve along-side with you and promoting our missions together.

Finally, this isn’t possible without support from back home. I want to thank my wife Kelly, whom I’m fortunate to have with me this year, for the
support and juggling schedules with our children and her career to contribute to our greater good. Thank you, Kelly.

I am looking forward to welcoming all of you up to my neck of the woods in New England at next year’s meeting in Providence. As Dr. Marshall has alluded to, I think you’ll find it a great venue for USAHA and AAVLD. With that, please enjoy the evening and the meetings to come this week. Thank you!
II. A. USAHA/AAVLD PRESIDENT'S RECEPTION AND DINNER

AAVLD President’s Address

Cat Barr

Over this past year, AAVLD has worked to improve communication, with our Executive Director, Jim Kistler, taking the lead. The newsletter has gone out electronically every month, and membership dues updates have been automated. Behind the scenes, banking processes have been streamlined and a new web-based document exchange system has been developed to support the Accreditation Committee’s processing of applications, reports and responses. The new system is now being beta-tested. We are exploring additional value-added opportunities for our membership, including potentially being able to access CABI’s VetMed Resource Database through AAVLD’s web site.

We have reviewed and re-affirmed AAVLD’s strategic plan, mission, vision and goals, and posted these on our website. They have also been distributed for discussion in committee meetings, and we requested that the committees develop action items to support the organization’s strategic plan. We have worked with committee chairs to revitalize committee rosters and reports, in efforts that these can be shared with our members in a timely way.

We have established recognition of activities at our annual meeting as Continuing Education (CE) by more than half of state veterinary licensing boards, and this effort will continue. This year we are providing CE certificates to meeting participants on request. We are also beginning development of a library of CE materials, having contracted for videography of this year’s QA Symposium so that it can be accessed later via the AAVLD web site.

We partnered with USAHA and the Association of American Veterinary Medical Colleges (AAVMC) to welcome trainees to our annual meeting and introduce them to career paths in public and laboratory veterinary medicine. In addition to the Trainee Travel Awards program, our Foundation offered new competitive Staff Travel Awards this year. The initially proposed three
awards were expanded as our members and coworkers responded to the offer, and six Staff Travel Awards were ultimately presented.

The editorship of Journal of Veterinary Diagnostic Investigation (JVDI) morphed this year, as we established a third scientific editor and installed KJ Yoon alongside Pat Blackall and Paco Uzal. Effective November 1, Grant Maxie took over the reins from Jerry Saliki as Editor-in-Chief of our fine journal.

On our efforts toward procurement of funding for the National Animal Health Laboratory Network (NAHLN), AAVLD has put in a lot of effort for the past several years. The first fruit, authorization of NAHLN funding at $15M in the Farm Bill, was passed in February of 2014. However, authorization is only an initial step, and we continue to lobby for full appropriation of the authorized monies. Members of the Executive Board and Government Relations Committee lobbied in Washington D.C. in March, meeting with staffers of Senate and House Agriculture Appropriations Committees and with Chief Veterinary Officer John Clifford. An industry letter generated in cooperation with American Veterinary Medical Association (AVMA), USAHA and the Animal Ag Coalition was signed in support by 38 national and 83 state animal industry organizations.

As AAVLD President, I joined our lobbyist, Brad Mollet, to meet again with staffers of the House Agriculture Appropriations Committee at the end of July and I also discussed NAHLN funding strategies with APHIS Administrator Kevin Shea.

It's been a challenging year to be AAVLD President, and while I've been in the thick of it, clearly all this is a team effort among the members of our Executive Board, Foundation Committee, Accreditation Committee, Government Relations Committee, Publications and so many more, with able coordination provided by Jim Kistler, and support from Reda Ozuna to keep us all on track and moving forward. Thank you for the opportunity to fill this role and experience the massive teamwork that makes veterinary diagnosticians an effective community.
Recognition of 2014 Sponsors
Cat Barr and Stephen Crawford

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Good evening. It is with sincere pleasure that I join you this evening to present the APHIS Administrator’s Award.

Although the Award I’m presenting today honors one individual who has made a significant impact in the field of animal health, it also represents the deep appreciation we at APHIS have for the outstanding work done by USAHA and AAVLD members.

You rank among our greatest partners in the effort to protect animal health, and your collective contributions are very much appreciated. Together, we’re keeping agriculture healthy and profitable, which is good for America. Our work and partnership helps feed and clothe the world and provides a base that allows our economy to thrive. I’m glad that agricultural exports continue to grow and remain vital to our overall American economic recovery.

So, please think of the award I present tonight as a symbol of APHIS’ esteem for all of you: our longstanding partners in animal health.

Past recipients of the APHIS Administrator’s Award have included program directors and developers, regulators and researchers, educators and advisors. What they have all had in common is a remarkable, lifelong commitment to animal health.

In conducting their work, these exemplary professionals do not seek awards—but their worthiness to receive distinction is the inevitable outcome of striving to make a difference.

Today, I have the great honor of presenting the APHIS Administrator’s Award to Dr. Don Ritter.

During a career that has spanned 30 years, Don has made consistent and significant contributions to the health of American poultry. Contributions which have—in turn—increased the health and prosperity of the entire industry.

After receiving his Doctor of Veterinary Medicine in 1984 from the University of Missouri, Don earned his certificate of avian medicine internship the following year and immediately began building a very steady and impressive record of accomplishments.

As the Corporate Veterinarian for Showell Farms, Don oversaw poultry health and food safety programs for total broiler production of 3.3 million birds per week in five states.

After ten years with Showell, Don moved on to serve as the Delmarva Regional Veterinarian for Perdue Farms and then to his current position as Director of Health Services for Mountaire Farms.

For the past 19 years, Don has worked diligently at Mountaire to create and implement poultry health and food safety programs for total broiler production of six million birds per week in four states.
Under Don’s leadership, Mountaire has grown considerably and is now the sixth largest broiler chicken production company in the United States—an even more significant achievement when you consider that the United States is the world’s largest producer and second largest exporter of poultry meat.

Don is actively involved in industry organizations including the National Chicken Council, the Delmarva Poultry Industry, the American Association of Avian Pathologists, the American College of Poultry Veterinarians, the American Veterinary Medical Association, and the Association of Veterinarians in Poultry Production.

Not only is Don a great asset to industry, he is an invaluable partner to USDA. Don served as chairman of the National Poultry Improvement Plan’s (NPIP) General Conference Committee.

NPIP is an indispensable partner that represents nearly 80 years of Federal, State, and industry cooperation. It’s the ideal collaborative program—a tremendously successful effort that deservedly remains the “gold standard” for poultry disease control programs.

In his role with NPIP, Don advised the Department on poultry health issues, assisted in the planning and execution of the biennial NPIP conference, and made recommendations for how USDA can help industry combat poultry health problems.

During his time as Chairman, Don was instrumental in the Agency’s efforts to increase the General Conference Committee’s diversity to ensure that the group better reflects the American population we serve.

He was also a strong advocate for APHIS moving some NPIP materials from the Code of Federal Regulations to program standards where testing and sanitation requirements could be changed more readily. This greatly increased the flexibility of the NPIP and supports one of APHIS’ central goals—pursuing nonregulatory solutions.

Don has also used his position at Mountaire to assist USDA by hosting international guests, allowing them to visit Mountaire’s hatcheries and processing plants. These visits educate our trading partners about U.S. commercial poultry production systems and help us to secure access to new markets.

This past July, I had the opportunity to visit Mountaire Farms and see Don’s work firsthand. His passion and dedication for his work was evident and I was impressed by Mountaire’s operation and commitment to safeguarding animal health and ensuring food safety.

Don has also been instrumental in the development and implementation of the Live Bird Market System working group and is a strong advocate for avian influenza indemnity funding.

Over the many years he has dedicated to poultry health, Don has done much to advance the industry, to the benefit of his colleagues and of American consumers.

So Don, we join in recognition of your many past accomplishments, and in thanking you for all the work you continue to do to promote the health of
the Nation’s poultry. Please come up now and receive your well-deserved award.

I would ask all of you to now join me in congratulating Dr. Don Ritter: winner of the 2014 APHIS Administrator Award.

*Dale Lauer accepts on behalf of Donald Ritter the 2014 APHIS Administrator’s Award.*
II. A. USAHA/AAVLD PRESIDENT’S RECEPTION AND DINNER

AAVLD Distinguished Service Award
Tom McKenna

The AAVLD Distinguished Service Award is bestowed upon an individual who has generously volunteered their time, energy, and professionalism to substantially enrich and advance AAVLD and the field of diagnostic veterinary medicine.

It is my pleasure to announce Dr. Herbert J. Van Kruiningen as the winner of the AAVLD Distinguished Service Award. Dr. Van Kruiningen is a faculty member of the University of Connecticut where he has served as Head of the Department of Pathobiology and Veterinary Science in addition to his service at the Université de Lille, in Lille, France; the Tufts University School of Veterinary Medicine; and the New York State Veterinary College at Cornell University.

Dr. Sandra Buschmich accepts the AAVLD Distinguished Service Award from McKenna on behalf of Dr. Herbert J. Van Kruingen.
The AAVLD E.P. Pope Award is bestowed upon an individual who has made noteworthy contributions to the AAVLD and the field of Veterinary Diagnostic Laboratory Medicine.

I am honored to present my friend and colleague Dr. Tim Baszler as the AAVLD E.P. Pope Memorial Award winner. Dr. Baszler is a Professor of Pathology and Infectious Diseases, and Director of the Washington Animal Disease Diagnostic Laboratory at Washington State University.

McKenna presents Dr. Tim Baszler with the prestigious E. P. Pope Award for 2014.
II. A. USAHA/AAVLD PRESIDENT’S RECEPTION AND DINNER

USAHA Federal Partnership Award
Stephen Crawford

In 2011, USAHA 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.

Sarah Tomlinson is a veterinary medical officer (VMO) and the Coordinator located in Fort Collins, Colorado. She is responsible for management of the National Animal Health Laboratory Network (NAHLN) program and staff listed below to coordinate all NAHLN activities, projects, and stakeholder collaborations.

Since May 2013, Dr. Sarah Tomlinson has been the Coordinator of the NAHLN. She has been one of the Associate NAHLN Coordinators since February 2010 with her responsibilities primarily focused on surveillance, preparedness, the NAHLN information technology (IT) system, and collaborations in animal health diagnostics and surveillance. Previously, she served for two years as the Assistant Director of the Center for Epidemiology and Animal Health’s National Surveillance Unit (NSU). She joined NSU in 2004 as one of the first members of the then newly formed unit. Dr. Tomlinson began her career in Veterinary Services working with the National Animal Health Monitoring System (NAHMS) on the 2002 Dairy Study. Dr. Tomlinson completed her undergraduate training in Zoology at Arizona State University and Doctorate of Veterinary Medicine from Colorado State University in 2004.

"The “Partnership” award is especially appropriate for Dr. Tomlinson because of the way she has approached the NAHLN and particularly the NAHLN IT system as a true state-federal partnership. By drawing on the best available resources from both, she has successfully created the connections necessary for a truly functional system.”

Dr. Tomlinson has been instrumental in coordination of the NAHLN laboratories to conduct surveillance for swine influenza, pandemic H1N1 and more recently SECD as well as foreign animal diseases. She has led the development and implementation of the Laboratory Messaging System. She has advocated for an increased role for NAHLN laboratories in emerging disease detection and supported the NAHLN Methods Technical Working Group’s expansion of responsibilities. Dr. Tomlinson has led the NAHLN
Coordinating Council’s recent efforts in strategic planning. She has truly demonstrated the value of partnering to accomplish more.

Sarah’s commitment is clearly evident in her work.

A colleague of hers added the following: "Knowing Sarah makes it evident where that comes from. Each year since 2009, she finds the time and energy to organize a local charity golf outing in memory of her Father, a Vietnam veteran active during his lifetime in the United Way. Sarah donates proceeds to local charities. This past year her donations to “Ram Strength” made it possible for some cancer survivors to pay medical bills, receive college scholarships and offered support for other basic life needs. We are all fortunate to be part of Sarah’s extended family, and benefit greatly from her devotion and commitment in all respects."

Sarah enjoys camping with her family - husband, Dustin and children - Jordan, age 11 and Gracie, age 9.

Clearly the role of NAHLN Coordinator is a vital position to animal health in this country, and we are fortunate to have great leadership and partnership from Dr. Tomlinson with states and industry. For this, we are pleased to honor Sarah with the USAHA Federal Partnership Award.

Crawford presents Dr. Sarah Tomlinson with the 2014 Federal Partnership Award.
II. A. USAHA/AAVLD PRESIDENT’S RECEPTION AND DINNER

USAHA Medal of Distinction Award

Stephen Crawford

The USAHA Medal of Distinction is awarded annually to recognize distinguished USAHA members who have demonstrated outstanding leadership, provided exemplary service, and have made significant contributions to the advancement of USAHA. This year’s recipient has been touted as a “behind the scenes” member who, through his various actions, has fostered advancement USAHA and animal agriculture as a whole. And while he may only occasionally appear behind the podium at USAHA meetings, his work and efforts are well known.

His leadership positions have been instrumental in the relationships and effective dialogue we have with our federal government partners, as well as and many key industry leaders. Tonight, we are pleased to honor former USDA Under Secretary Bill Hawks.

His roots trace back to Mississippi, becoming the first in his family to earn a college degree at Mississippi State University. Following military service, he got his start as a dairy farmer, and his interests and success in agriculture grew from there. Hawks grew to understand that agriculture is as much about politics as it is about production. That understanding led him to public service; he served in leadership positions on numerous state and national agricultural and producer boards for over 20 years. He was elected to the Mississippi State Senate and, while Senator, he served as Vice Chairman of the Environmental Protection, Conservation and Water Resources Committee and also as Vice Chairman of the Agricultural Committee.

Hawks was tapped by Presidential Appointment to serve as Under Secretary of Agriculture for Marketing and Regulatory Programs in 2001. In that role he directed three agencies, including formulating policies and regulations; Animal Plant Health Inspection Service (APHIS), Grain Inspection, Packers and Stockyards Administration (GIPSA) and Agricultural Marketing Service (AMS).

During Hawks’ tenure as Under Secretary of Marketing and Regulatory Programs, he maintained a strong relationship between USAHA and the USDA. He not only attended the annual USAHA meetings and took part at the highest levels, he encouraged USDA employees to attend the meetings and to actively serve on committees. To all USDA employees he worked with, Hawks stressed the importance that the recommendations of USAHA be considered when decisions were being made. He worked closely with USAHA and USDA leadership during the outbreaks of Avian Influenza and New Castle Disease, just to name a few. The relationships that he supported with his “Working Together Works” attitude at USAHA, and with the USDA employees that he led, continues today, even after his departure from USDA.

In addition, Hawks supervised and managed policy initiatives on critical issues including national animal identification, bovine spongiform encephalopathy (BSE) surveillance, plant and animal sanitary and
II. A. USAHA/AAVLD PRESIDENT’S RECEPTION AND DINNER

phytosanitary trade impediments, marketing practices, agreements, standards and orders, biotechnology and agro terrorism helping to bring the resources and the right people to the table to keep those projects funded and alive. Hawks represented the U.S. Department of Agriculture in numerous international trade negotiations on issues related to animal and plant health and at local, state, national and international meetings involving agriculture officials and industry.

He maintains membership on several committees at USAHA, although due to his health, he has not been able to remain as active as he would like to be. Still he maintains an active presence in Washington, D.C. on issues of keen interest to this organization, supporting efforts on rabies, and the battle against Foreign Animal Diseases, especially Foot and Mouth Disease.

Many describe him as “putting his money where his mouth is” when it comes to supporting the agriculture industry as a whole in the United States. Industry leaders know that as long as he is at the table, their best interests are being represented. For that we appreciate his dedication, and his advocacy for this organization and the work of its members.

Crawford congratulates Mr. Bill Hawks as the 2014 Medal of Distinction Honoree.
II. A. USAHA/AAVLD PRESIDENT’S RECEPTION AND DINNER

**National Assembly Award**

Charles Hatcher  
National Assembly President

The 2014 National Assembly Award is presented to Dr. Tom Holt, whom recently retired as State Veterinarian of Florida in July.

Dr. Holt came to Florida in March 2004 after serving with the U.S. Department of Agriculture (USDA) as an Associate Regional Director and was a leader on a number of animal disease surveillance and control programs across the country.

His experience as a nationally known expert in emergency preparedness fit well with Florida’s leading role in responding to agricultural disasters. Dr. Holt’s strong ties to the USDA proved to be very beneficial in developing a cooperative working relationship between the USDA and the Florida Department of Agriculture and Consumer Services.

During his service to Florida, Dr. Holt’s strength has been building relationships among employees, divisions of the department and other agencies as well as other partners. Most importantly, Dr. Holt has worked tirelessly to build working relationships with agricultural producers and the owners of Florida’s herds and flocks. He has been responsive and helpful to every sector of Florida’s diverse animal industries and included them in the decision-making process.

Dr. Holt is a longtime member of the United States Animal Health Association (USAHA) and the Florida Veterinary Medical Association. He is a member of the Florida Farm Bureau, the Florida Cattlemen’s Association and a number of other organizations.

As State Veterinarian, Dr. Holt supported Florida’s veterinary practitioners who care for our pets and our livestock. He directed the modernization of the Bronson Animal Disease Diagnostic Laboratory, which is now as a Biosecurity Level III laboratory and stands ready to serve the interests of Florida with excellence.

In the next chapter of life, Dr. Holt plans to travel and spend time with his friends and family. His four young grandchildren are looking forward to this as much as he is!
Charlie Hatcher, Tennessee State Veterinarian (r) presented the 2014 National Assembly Award to Tom Holt, former Florida State Veterinarian, accepted on his behalf by Diane Kitchen.
II. B. USAHA/AAVLD Plenary Session
“Achieving Perspectives to Feed the World”

What Consumers Expect - Charlie Arnot, Center for Food Integrity

Meaningful Conversations - Randy Krotz, US Farmers & Ranchers Alliance

Animal Feed vs Human Food - Jude L. Capper, Livestock Sustainability Consultancy

Antibiotic Stewardship as a Driver of Legislative, Regulatory, and Consumer Agendas that will Shape the Future of Antibiotic Use in Agriculture - Mike Apley, Kansas State University

Animal Welfare Landscape: Current Scientific and Consumer Challenges - Candace Croney, Purdue University

Trends in Food Safety: Public Perception vs. Reality - Richard Raymond, Food Safety/Public Health Consultant

The New Consumer Value Proposition - David Fikes, Food Marketing Institute
WHAT CONSUMERS EXPECT

Charlie Arnot
Center for Food Integrity

Every organization operates with some level of “social license” — the privilege of operating with minimal formalized restrictions based on maintaining public trust. Social license is granted when you operate in a way that is consistent with the ethics, values and expectations of customers, employees, the local community, regulators, legislators and the media. Once lost, through a single event or a series of events that erode public trust, social license is replaced with social control — regulation, legislation, litigation or restrictive market action. Operating with social license is flexible and low cost. Social control increases costs, reduces operational flexibility and increases bureaucratic compliance. What can be done to maintain public trust that grants social license? You begin by recognizing that transparency is no longer optional. Anyone with a cell phone is an on-the-scene reporter. Research in recent years clearly indicates that consumers increasingly go online to look for information to answer their questions about food. Growing skepticism about food safety and the use of technology fuel online communities that are raising issues and making their voices heard with increasing volume and frequency. When Center for Food Integrity (CFI) asked consumers what it takes for them to be more trusting of food, they said they don’t believe that today’s food system is transparent. They also believe that large companies are likely to put profit ahead of public interest. To overcome this bias, the food system must dramatically increase the commitment to transparency. CFI’s consumer trust research has identified seven elements of transparency that can make a significant contribution to building trust. The research shows these elements had the most positive impact on those who tend to be most skeptical about the food system – women and early adopters. All of our research has shown that early adopters, those who are better educated, have higher incomes and broader social circles, and women tend to be significantly more skeptical than men and later adopters when it comes to food issues. As we increase both the distance most consumers have from farming, food processing and the level of technology we implement in food production, we must dramatically improve our ability and commitment to build trust with stakeholders who grant social license. To be successful we have to build and communicate an ethical foundation for our activity and demonstrate our commitment to practices that are ethically grounded, scientifically verified, and economically viable.
MEANINGFUL CONVERSATIONS

Randy Krotz
U.S. Farmers & Ranchers Alliance

U.S. Farmers & Ranchers Alliance (USFRA) consists of more than 80 farmer – and rancher-led organizations and agricultural partners representing virtually all aspects of agriculture, working to engage in dialogue with consumers who have questions about how today’s food is grown and raised. USFRA is committed to continuous improvement and supporting U.S. farmers and ranchers efforts to increase confidence and trust in today’s agriculture.

USFRA believes in the following values and commitments by farmers and ranchers:
- Americans and their children eat and drink what we grow and raise.
- Our life’s work feeds and nourishes our families, our neighbors, our communities, and our country.
- We embrace this great responsibility as stewards of our food, our land and our animals.
- We commit to working together, regardless of type, size or philosophy of our farms and ranches, to continue improving our food supply.
- We commit to doing everything in our power to protect and improve human health and the enjoyment of our food.
- We commit to making the environment – the land, air and water that belongs to all of us – healthier and sustainable for all generations.
- We commit to keeping our animals healthy and well cared for.
- We commit to the business of farming and the health of our economy, knowing that what makes our businesses stronger is producing the highest quality products.
- And we commit to sharing information about our methods freely and openly.
- Farming and ranching is our profession – but for most of us, it is also our life. The food we grow and raise reflects our characters, our commitments and our lives.
II. B. USAHA/AAVLD PLENARY SESSION

ANIMAL FEED VS. HUMAN FOOD

Jude L. Capper
Livestock Sustainability Consultancy

The global population is predicted to rise to over nine billion by the year 2050. As resources for food production will decline over this time, how we should ensure that our children and grandchildren have the same access to food that we currently enjoy? Groups opposed to animal agriculture contend that we should adopt a vegetarian or vegan diet in order to “save the planet”, however, continuous improvements in efficiency have allowed U.S. livestock producers to considerably reduce environmental impact. Compared to 1944, U.S. dairy producers use 77% less feed, 90% less land, 65% less water and have achieved a 63% reduction in the carbon footprint per gallon of milk. Similarly, the modern U.S. beef industry uses 19% less feed, 12% less water, 33% less land and has a 16% lower carbon footprint than production systems characteristic of the 1970’s. Moreover, the U.S. EPA reports that meat production contributes 2.1% of national greenhouse gas emissions (GHG) emissions. If all of the USA’s 314 million inhabitants removed meat from their diet for one day per week, the annual reduction in national GHG emissions would only be equal to 0.30%. Reduced meat consumption would also necessitate new sources for the many by-products from animal agriculture, including leather, fertilizer, fats, fibers and pharmaceuticals. Another popular argument for reducing meat consumption is that human nutrient requirements could be met by shifting grain use from livestock feed to human food. Corn only accounts for 7% of the total feed used to produce a unit of U.S. beef, and globally, over 7 billion acres of pastureland are used to raise livestock. Only a small fraction of these are suitable for food crop production due to terrain, water or nutrient restrictions, and they also maintain habitats for many bird, animal and insect species that would be lost if converted to cropland. By-products from the food and fiber industries also play significant roles in feeding livestock. Approximately 37 pounds of livestock feed is produced from every 100 pounds of plants grown for human food – what would be the environmental consequences of instead diverting these human-inedible by-products to landfill? Furthermore, as 30% of all food purchased in the USA is discarded by the consumer, making a concerted effort to reduce food waste could significantly reduce environmental impacts. To maintain food availability for future generations, it is essential to continue the tradition of continuous improvement within animal agriculture that has reduced environmental impact over time, and to consider the additional areas where considerable reductions can be made.
II. B. USAHA/AAVLD PLENARY SESSION

ANTIBIOTIC STEWARDSHIP AS A DRIVER OF LEGISLATIVE, REGULATORY, AND CONSUMER AGENDAS THAT WILL SHAPE THE FUTURE OF ANTIBIOTIC USE IN AGRICULTURE

Mike Apley
Kansas State University

The interface of antimicrobial use in food animals and the potential for selection of resistant organisms which could affect human health lies within a wide variety of food animal production systems. These systems are comprised of unique combinations of scale, physiological and disease challenges, technological inputs, and management intensity. Innovations in efficiency bring rewards in an economic system where commodity prices tend to approach the cost of production; early adapters of new efficiency technology obtain a competitive advantage in the period prior to the uniform adoption across the industry.

Antimicrobial use in livestock production will continue to evolve due to pressures from regulatory, legislative, and supply chain entities. The supply chain perspective may include evaluation of available data, but also involves marketing pressures driven by the latest trends on Twitter, Facebook, and the blogosphere; all of which we might agree pull us away from rational assessment of issues at least to some extent. Come to think of it, maybe the same argument could be made for legislative and regulatory pressures also. Regardless, the supply chain is the most likely to drive immediate and substantial changes in food animal antimicrobial use.

If we attempt to use data to drive decisions about antibiotic use in agriculture, our challenge becomes that of defining risks and benefits of antimicrobial use in different production scenarios and then evaluating these outcomes based on our collective values. As these values will seldom reach consensus, it is reasonable to assume that views of risks and benefits (and in fact the morality) of the use of antibiotics in food animals will seldom reach consensus.

The issues of food chain transfer, or direct transfer, of resistant bacteria such as Salmonella, E. coli, and Campylobacter from food animals to humans at least lend themselves to metrics which can help us evaluate the risk of certain practices within a food system. We may disagree about the probabilities associated with each node along a quantitative risk assessment, or about the acceptability of the overall calculated risk distribution, but at least we can find some points on which to focus. In contrast, the concept of the “reservoir of resistance” defies assessment of the system as a whole due to the nebulous nature of the concept, and paints us in the corner of deciding whether or not to invoke the precautionary principle.
II. B. USAHA/AAVLD PLENARY SESSION

ANIMAL WELFARE LANDSCAPE: CURRENT SCIENTIFIC AND CONSUMER CHALLENGES

Candace Croney
Center for Animal Welfare Science, Purdue University

Farm animal welfare remains a highly contentious topic in the U.S. Continuous confinement housing and behavioral restriction of animals continue to be primary areas of concern. However, a number of issues exist that are at least as significant in regard to potential infringement on animal well-being, but which have received comparatively less public attention. These include inappropriate animal handling and other poor quality human-animal interactions on farms. Handling of non-ambulatory animals continues to present a challenge for many farms, and painful practices, performed without analgesia, such as castration, tail docking and dehorning remain problematic. On-farm euthanasia methods and the timeliness of euthanasia decisions also warrant attention, along with the distress, injury and mortality that can occur during loading and transport of animals.

While scientists, veterinarians, farmers and food animal industry organizations have invested significantly in addressing farm animal welfare, and consequently perceive themselves to be the go-to experts on the subject, a recent Purdue University study suggests that consumers do not necessarily look to these particular groups for information on animal welfare. An online survey of 798 U.S. households examined relationships between key household characteristics (demographics, geographic location and experiences), reported levels of concern about animal welfare, and sources of information people use to inform themselves on the topic. Because of the level of media attention dedicated to recent undercover videos of swine care practices on farms, specific questions pertaining to modern pork production were posed.

Over half of those surveyed (56%) could not identify a specific source for animal welfare information. Those who did have a source most commonly reported using information provided by the Humane Society of the United States (HSUS) and People for the Ethical Treatment of Animals (PETA). Respondents were most concerned about confinement housing of sows, identifying gestation and farrowing stalls as even more troubling than castration, teeth clipping or tail docking of piglets. Additionally, respondents reported acting on these concerns, with 14% subsequently decreasing their pork consumption by as much as 56%.

It is increasingly critical for the scientific and veterinary communities to be well versed in current scientific advancements and challenges relative to farm animal welfare as well as the nature and reasons for public concerns. The latter is particularly important to facilitate improved communication, trust and perceived competence relative to current and emerging farm animal welfare issues.
II. B. USAHA/AAVLD PLENARY SESSION

TRENDS IN FOOD SAFETY: PUBLIC PERCEPTION VS. REALITY

Richard Raymond
Food Safety and Public Health Consultant

This addresses recent trends in food safety and media coverage of outbreaks, such as the recent Foster Farms associated Salmonella outbreak, that tend to cause mistrust with the food industry in consumers’ minds. The issue of the use of antibiotics in animals raised for food, and what, if any, risk this practice poses to human health thru the development of antibiotic use will also be discussed. Also discussed will be the use of technologies to increase production output and efficiency in an effort to feed a growing population with an increasing income. Finally, a discussion of where consumers are getting their information about agriculture and food production, and why that needs to change.
Strongly held beliefs about environmental issues, the ethical treatment of food animals, and the way a food item is produced are becoming more pronounced variables in the consciousness of the American consumer. These emotionally charged concerns - along with food safety considerations - are increasingly factoring into U.S. shopper's decisions about where they shop, the products they purchase and the brands they support. Additionally, consumers are expecting their food retailer to be engaged in these value considerations and in some instances, active advocates acting on behalf of the customer's views for improvements. Sharing research about what builds customer trust, trends regarding shopper values and emerging consumer attitudes about food safety and animal welfare considerations, we will explore the expanding role of the food retailer in addressing customer values.

The new value proposition of consumers extends beyond economics and encompasses more esoteric concerns and belief systems. It is making exploration of these value-driven issues up and down the value chain a necessary conversation, requiring deeper dialogue, better information exchange and more intimate engagement between retailers and producers.
II. C. USAHA Joint Scientific Session Papers, Abstracts, and Posters

1. Papers and Abstracts


A Novel Avibacterium sp. Causes Mortality in Laying Hens - Darrell Trampel, Sarah E. Tilley, Timothy Frana, Margie E. Lee

Bioinformatics for Improved Pathogen Detection: Maintenance of the Virotype® PRRSV RT-PCR Reagents for Improved Accuracy- Nevena Djuranovic, Christine Gaunitz, Carsten Schroeder, Jessie D. Trujillo, Marco Labitzke, Stephen Hennart

Characterization of Genotypically Distinct Enteric and Respiratory Bovine Coronaviruses Alexa Ukena, Joe Anderson, Ben Hause, Elizabeth G. Poulsen, Richard Hesse

Characterization of H1N2 Variant Influenza Viruses in Pigs - Jinhwa Lee, Michael A. Duff, Jingjiao Ma, Qinfang Liu, Yuekun Lang, Bhupinder Bawa, Jianfa Bai, Juergen Richt, Richard Hesse, Wenjun Ma

Comparison of Two Extraction Methods for Monensin in Feed by LCMSMS - Paula M. Imerman, Dwayne Schrunck, Ray Grover, Wilson K. Rumbeiha, Steve M. Ensley

Detection and Characterization of a Porcine Deltacoronavirus from Pigs with Diarrhea – Yan Zhang, Leyi Wang, Beverly Byrum

Development and Testing of a Multiplex Molecular Diagnostic Assay for Simultaneous Detection and Differentiation of Multiple Bacterial and Viral Causes of Respiratory Disease in Pigs - Pejman Naraghi-Arani, Jason A. Olivas, Alda C. Carrillo, Gary Anderson


Hepatogenous Chronic Copper Toxicity in a Charolais Heifer - Benjamin Newcomer, Dwight Wolfe, Manuel Chamorro, Thomas Passler, Kellye Joiner
Histological Lesions in Piglets Associated With a Swine Deltacoronavirus – Yan Zhang, Leyi Wang, Jeffrey R. Hayes, Craig Sarver, Beverly Byrum

Identifying Vaccinal-Type Strains of BoHV-1 in Bovine Abortion Using Single Nucleotide Polymorphisms: 10 Herd Episodes - Donal O’Toole, Myrna M. Miller, Christopher C. Chase


Oklahoma Equine Cases Presenting with Clinical Signs of Central Nervous System Disease– 2012-2013 - Kristin M. Lenoir, Janisue C. Jones, Perla Encarnacion-Astudillo, Grant Rezabek

One-Step Triplex Real Time RT-PCR Assay for Simultaneous Detection and Differentiation of Three Vesicular Viruses in Swine – Xiju Shi, Qing Sun, Jianfa Bai, Amy Beckley, Jishu Shi

Outbreak and Elimination of PRRSV from Switzerland in 2012/2013 - Collaboration of Swiss Animal Health Authorities and QIAGEN Leipzig - Nevena Djuranovic, Carsten Schroeder, Christine Gaunitz, Guido Fritsch, Patrica Scheer, Barbara Thur

Pathology and Diagnosis of Necrotic Enteritis of Chickens - Carlos Gornatti Churria, Francisco Uzal, Gabriel Senties Cue, Horacio Shivaprasad

Point of Need Detection of Canine Respiratory Disease Pathogens on POCKIT, a Portable Molecular Detection System - Jessie D. Trujillo, Uri Donnett, Chuan Fu Tsai, Yun-Long Tsai, Pei-Yu Lee, Fu-Chun Lee, Hsiu-Hui Chang, Pin-Hsing Chou, Bor-Huah Chen, Li-Juan Ma, Yu-Han Shen, Hsiao Fen GraceChang, Thomas Wang

Rapid Detection of Pathogens from Swine Clinical Samples Using a Broad Spectrum Microbial Detection Array - Crystal Jaing, James Thissen, Pam Hullinger, Nicholas Monday, Raymond R. Rowland

Real-Time RT-PCR comparison to Ensure Accurate Detection of PEDV and TGEV – Douglas Marthaler, Marie G. Culhane, Kurt D. Rossow, Yin Jiang

SNP Analysis Used to Select Conserved Regions for an Improved Newcastle Disease Virus Real-time RT-PCR Test – David Suarez, Lauren Marbut
II. C. 1. PAPERS AND ABSTRACTS

Updating PCR Assays for Influenza Subtyping - Mia Kim Torchetti, Janice C. Pedersen, Mary Lea Killian, Nichole L. Hines, David Suarez

Variant Strain of Porcine Epidemic Diarrhea Virus Caused Mild Histological Lesions in the Small Intestines of Piglets – Yan Zhang, Leyi Wang, Jeffrey R. Hayes, Beverly Byrum
A NEW APPROACH TO THE RAPID ANALYSIS OF TOXINS AND TOXICANTS USING MATRIX-ASSISTED LASER DESORPTION IONIZATION MASS SPECTROMETRY

Christina Wilson¹,², Mary Mengel¹, Jonathan Butz¹, Stephen B. Hooser¹,²

¹Department of Toxicology, Purdue University, West Lafayette, IN; ²Department of Comparative Pathobiology, Purdue University, West Lafayette, IN

Matrix-assisted laser desorption ionization time-of-flight mass spectrometry (MALDI-TOF-MS) has been a commanding tool for the high-throughput analysis of biomolecules such as proteins, polymers, nucleic acids and bacterial cells/cultures. However, using Matrix-assisted laser desorption ionization (MALDI) mass spectrometry to analyze low-molecular weight analytes has historically been challenging. This is due to several factors which include the abundant presence of several matrix ions which can interfere with detection of analytes < 500 Da and limitations in instrument sensitivity. However, exploiting advances in the sensitivity of new MALDI instrumentation, and through matrix manipulations, a procedure has been adapted for the detection of toxins and toxicants that are of interest in diagnostic veterinary toxicology. Using a Bruker microflex™ laser range finder (LRF) high performance bench-top MALDI Time-of-Flight (TOF) mass spectra (MS), which is equipped with an additional gridless reflectron, provides the superior resolution and mass accuracy needed to accommodate detection of low molecular weight analytes. Several toxins and toxicants, including microcystins, brodifacoum, strychnine, and ractopamine, have been analyzed using this MALDI-TOF-MS. Methods adapted for the analysis of these compounds included: external calibration of the instrument using α-cyanohydroxycinnamic acid matrix ions in both positive and negative ion mode, a reflector voltage set at 19.99 kV, a detector scan range of 0 to 1,000 Da, and approximately 1,000 laser shots of data summed per sample. Prior to analysis, the samples are co-crystallized with α-cyanohydroxycinnamic acid matrix in a ratio of 1:1. Using this method, microcystin-LR (995 m/z), microcystin-LA (910 m/z), microcystin-RR (1038 m/z), and microcystin-YR (1045 m/z) can be detected at concentrations as low as 0.01 ppm. Additionally, rodenticides such as brodifacoum (523/525 m/z), strychnine (334 m/z), and ractopamine (301 m/z) are also detectable with estimated detection limits ranging from 0.1 ppm to 1 ppm. Although some sample preparation is involved in using this method, the MALDI-TOF-MS is a high-throughput format technique that can prove to be a rapid reliable tool for detection and confirmation of a variety of toxins and toxicants for diagnostic veterinary toxicology.
A NOVEL AVIBACTERIUM SP. CAUSES MORTALITY IN LAYING HENS

Darrell Trampel¹, Sarah E. Tilley², Timothy Frana¹, Margie E. Lee²

¹Department of Veterinary Diagnostic and Production Animal Medicine, Iowa State University, Ames, IA;
²Department of Population Health, University of Georgia, Athens, GA

In January 2014, a disease outbreak characterized by elevated mortality and reduced egg production occurred in a commercial in-line high-rise laying hen operation. White leghorn chickens in 3 of 9 houses on this farm were affected. Each house had an average capacity of 111,000 birds and affected flocks ranged in age from 39 to 48 weeks. The flock manager reported mildly swollen heads and conjunctivitis in a few hens housed in each of these three flocks. Macroscopic lesions consisted primarily of hepatosplenomegaly, airsacculitis, and pneumonia. Abundant caseous exudate was present in anterior thoracic air sacs and lungs were consolidated with exudate in bronchi. Livers, lungs, air sacs, and spleens were collected using aseptic technique and pooled. All samples were cultured using routine procedures on blood agar plates under aerobic and anaerobic conditions. Avibacterium sp. was isolated from lungs and air sacs and E. coli was isolated from livers. Biochemical tests suggested that Avibacterium isolated from these chickens was not Avibacterium paragallinarum, the etiologic agent associated with infectious coryza. To identify the species of Avibacterium, the 16S ribosomal gene of selected isolates was amplified by PCR and sequenced. The 16S rRNA phylogenetic tree of veterinary Pasteurellaceae species confirmed that this isolate is not A. paragallinarum and is different from other Avibacterium sp. previously isolated from chickens in the United States.
BIOINFORMATICS FOR IMPROVED PATHOGEN DETECTION:
MAINTENANCE OF THE VIROTYPE® PRRSV RT-PCR REAGENTS FOR
IMPROVED ACCURACY

Nevena Djuranovic¹, Christine Gaunitz², Carsten Schroeder², Jessie
D. Trujillo³, Marco Labitzke², Stephen Hennart²

¹QIAGEN, Inc., Scarborough, ME;
²QIAGEN GmbH, Leipzig, Germany;
³Iowa State University, Ames, IA

Accurate pathogen detection is essential in many fields, ranging from infectious diseases diagnostics in humans and animal medicine to pathogen screening for biosecurity. However, the development of tools for specific pathogen detection can be very complex due to the existence of many pathogenic strains, with varying mutations, alongside the ever-present threat of new emerging strains. Typical examples include the Influenza A virus and porcine respiratory and reproductive syndrome virus (PRRSV), which can have catastrophic economic consequences for the swine industry. Both Influenza A virus and PRRSV have high mutation rates and regional strain variations exist. Virotpe PRRSV NA/EU real-time PCR reagents are designed to detect North American and European PRRSV strains in a multiplex format with an internal positive control. Bioinformatics is used for surveillance of QIAGEN assays. Through the routine use of pathogen genomic characterization, the bioinformatics team can access the success rates of current assay oligonucleotide design, and when necessary identify critical sequences that may require assay is adaptation. In 2013, diligent bioinformatics alerted critical sequence changes, which might impact the accuracy of the virotype PRRSV NA/EU Reagent. After notification from the bioinformatics team that the reagents were missing strains of the Midwestern region of U.S. (Iowa), in silico PCR was applied to compare virotype PRRSV primer and probe design with PRRSV strains in the database. This analysis allowed for design modification for assay oligonucleotides, which was implemented to maintain accurate detection of the regional PRRSV strains, and maintain detection accuracy of other known strains. The analytical sensitivity of the modified virotype PRRSV NA/EU oligonucleotides was performed in a translational research laboratory at Iowa State University (Trujillo). Utilizing purified ribonucleic acid (RNA), from select PRRSV strains, we evaluated several modified oligonucleotides for the virotype PRRSV NA/EU Reagent alongside another commercially available PRRSV detection reagent. Results show that by utilization of bioinformatics data to aid in assay evaluation and redesign, the modified virotype PRRSV NA/EU Reagent could accurately detect the regional strain and conventional strains. Furthermore, the modified virotype PRRSV NA/EU Reagent demonstrated improved sensitivity of detection as compared to the other commercially available PRRSV detection reagents for the regional isolate (strain Iowa 21). Academic
collaboration and attainment of sequence information for atypical virus isolates coupled with diligent deployment of bioinformatics aided in assessment and successful redesign of oligonucleotides utilized in the QIAGEN virotype PRRSV EU/NA Reagent. Diligent deployment of bioinformatic analysis on a regular basis or in response to a reported outbreak, with new sequences continually being added to the internal database through collaboration will insure assay performance.
CHARACTERIZATION OF GENOTYPICALLY DISTINCT ENTERIC AND RESPIRATORY BOVINE CORONAVIRUSES

Alexa Ukena, Joe Anderson, Ben Hause, Elizabeth G. Poulsen, Richard Hesse

Department of Diagnostic Medicine and Pathobiology, Kansas State University, Manhattan, KS

Bovine Coronavirus (BCoV) causes enteric and respiratory diseases in cattle and is a component of the bovine respiratory disease complex (BRD). The Kansas State Veterinary Diagnostic Laboratory (KSVDL) routinely performs quantitative PCR surveillance on the respiratory viruses associated with BRD. Surveillance over a three year period demonstrated that 13% of 1,135 tissue samples and 29% of the 776 swab samples submitted were positive for BCoV. BCoV was the sole pathogen detected in 34% of tissue samples and 56% of swab samples. The spike gene on a subset of positive samples was sequenced. The Spike glycoprotein is believed to be responsible for host range and is the leading mediator of viral entry. Along with the data provided by KSVDL, genomic information of the spike gene was compared with data publicly available in Genbank. Looking at the phylogenetic tree, the spike genomes fell into two distinct clades; Clad one being the vaccine strains and Clade two being the current respiratory disease. The virus isolates from KSVDL were primarily respiratory samples but there was one enteric sample and all samples align in Clade 2 in sub Clade B. The enteric also fell in this range along with the respiratory samples. Future work will investigate the antigenic relationship between enteric and respiratory viruses however our results suggest that BCoV is one of the major contributors to bovine respiratory disease (BRD). Further studies of complete BCoV genomes are needed to elucidate the genetic basis for host tropism and the underlying mechanisms of pathogenesis as well as provide information to assess the serological differences between the respiratory and enteric viruses.
CHARACTERIZATION OF H1N2 VARIANT INFLUENZA VIRUSES IN PIGS

Jinhwa Lee, Michael A. Duff, Jingjiao Ma, Qinfang Liu, Yuekun Lang, Bhupinder Bawa, Jianfa Bai, Juergen Richt, Richard Hesse, Wenjun Ma

Department of Diagnostic Medicine/Pathobiology, Kansas State University
College of Veterinary Medicine, Manhattan, KS

Introduction of the 2009 pandemic H1N1 virus (pH1N1) into swine herds has led to reassortment between the pH1N1 and endemic swine influenza viruses (SIVs) worldwide. Recently, reassortant H3N2 and H1N2 variants that contain only the M gene from pH1N1 and the remaining seven genes from North American triple-reassortant (TR) SIVs have emerged. These variant viruses have caused more than 300 cases of human infections and one death in the USA, creating a major public health concern. To date, the pathogenicity and transmissibility of H1N2 variant viruses has not been investigated using an animal model. Through passive surveillance of Kansas swine herds, we isolated 25 H1N2 SIVs: 16 of these viruses are reassortant viruses with genes from pH1N1 and 12 of those are variant viruses with only the M gene from pH1N1. This suggests that H1N2 variants with only M gene from pH1N1 have become established in Kansas swine herds. To further determine the pathogenicity and transmissibility of novel reassortant H1N2 viruses, we selected two reassortant H1N2 SIVs from our isolate pool to infect pigs: one is a swine H1N2 variant virus (swH1N2v) with the M gene from pH1N1; the other is a reassortant H1N2 virus (2+6 rH1N2) with two surface genes from endemic North American TR H1N2 SIVs and six internal genes from pH1N1, using a human H1N2 variant (huH1N2v) and an endemic TR H1N2 SIV (eH1N2) isolated in 2011 as controls. All four viruses were able to infect pigs and replicate in the lungs. Both H1N2 variant viruses caused more severe lung lesions in infected pigs when compared to the eH1N2 and 2+6 rH1N2 viruses. Although all four viruses are transmissible in pigs and were detected in the lungs of contact animals, the swH1N2v replicated more efficiently than the other three viruses in the respective sentinel animals. Additionally, the huH1N2v displayed delayed and inefficient nasal shedding in sentinel animals. Taken together, the swine and human H1N2 variant viruses are more pathogenic and the swH1N2v more transmissible in pigs and could pose a threat to public and animal health.
II. C. USAHA/AAVLD PAPERS, ABSTRACTS AND POSTERS

COMPARISON OF TWO EXTRACTION METHODS FOR MONENSIN IN FEED BY LCMSMS

Paula M. Imerman, Dwayne Schrunck, Ray Grover, Wilson K. Rumbeiha, Steve M. Ensley

Veterinary Diagnostic Laboratory, Iowa State University, Ames, IA

Monensin, Lasalocid, Salinomycin, and Narasin also known as polyether antibiotics are mainly used as coccidiostats in animal feed. These compounds possess unique structural properties which allow them to act as cation carriers across biological membranes. Thus they have microbiological activity against gram positive bacteria. Also ionophores can act as growth promoters in animals. Due to the potential of these compounds to be toxic above recommended levels or their interaction with certain drugs to potentiate their effects monitoring levels in feed is essential. This study compares two extraction methods for the determination of Monensin using liquid chromatography-tandem mass spectrometry (LCMSMS) as the output. Association of American Feed Control Officials (AAFCO) feeds at various concentrations (ppm) i.e., low (20), medium (300), and high (1,200) were used in the study. Method 1 uses hexane:ethyl acetate (90:10) 5g/40ml and Method 2 uses methanol:water 5g/20ml (90:10) for extraction of the feeds. It was found that both extraction levels worked well for the low and medium levels falling within the range of standard deviation values given by the AAFCO. However at the high level (1,200 ppm) it was found that extraction Method 2 with standard addition method of 500 and 1,000 ppm worked best for accurate results. The LCMSMS method has an LOQ of 1ppm and an LOD of 0.1ppm for Monensin. In future for high samples gram to solvent ratio will be investigated to see if this can improve performance.
DETECTION AND CHARACTERIZATION OF A PORCINE DELTACORONAVIRUS FROM PIGS WITH DIARRHEA

Yan Zhang, Leyi Wang, Beverly Byrum

Ohio Department of Agriculture, Animal Disease Diagnostic Laboratory (ADDL), Reynoldsburg, OH

During the late January and early February in 2014, a diarrheal disease occurred in several pig farms in Ohio. The clinical signs were similar to those caused by porcine epidemic diarrhea virus (PEDV), including watery diarrhea in sows and death in piglets. However, the mortality in piglets was lower (30%–50%) than that typically observed with PEDV infection. Fecal and intestinal samples from one farm were negative for PEDV, transmissible gastroenteritis virus, rotaviruses, and Salmonella. Examination of the samples by electron microscopy showed coronavirus-like virus particles. However, all samples were negative by a pan-coronavirus PCR. A deltacoronavirus was detected in all samples. Histological lesions were moderate comparing with that caused by PEDV currently circulating in the U.S. The virus is closely related (99% identity) to the porcine coronavirus HKU15 reported in Hong Kong in 2012. This is the first time that the virus has been detected in diarrheal disease. To date, this virus has been detected in at least ten states in the U.S.
DEVELOPMENT AND TESTING OF A MULTIPLEX MOLECULAR DIAGNOSTIC ASSAY FOR SIMULTANEOUS DETECTION AND DIFFERENTIATION OF MULTIPLE BACTERIAL AND VIRAL CAUSES OF RESPIRATORY DISEASE IN PIGS

Pejman Naraghi-Arani\textsuperscript{1}, Jason A. Olivas\textsuperscript{1}, Alda C. Carrillo\textsuperscript{1}, Gary Anderson\textsuperscript{2}

\textsuperscript{1}Biology and Biotechnology Division, Lawrence Livermore National Laboratory, Livermore, CA; \\
\textsuperscript{2}Veterinary Diagnostic Laboratory, Kansas State University, Manhattan, KS

A multiplex molecular assay for the rapid and sensitive diagnosis of respiratory disease in pigs has been developed. The assay enables detection and differentiation of four bacterial (\textit{M. hyponeumoniae}, \textit{A. pleuropneumoniae}, \textit{H. parasuis}, and \textit{S. suis}) and six viral pathogens (PRRS, Flu, PCV2, Pseudorabies Virus, ASF, CSF) with no cross-reactivity to clinical and genetic near-neighbor organisms. In addition to endemic diseases, the assay is able to detect and differentiate between African swine fever (ASF) and classical swine fever (CSF). The 25-plex assay has sensitivity of 1,000 infectious units or less per mL of porcine oral fluid. For Influenza detection, a limit of detection (LOD) of 200 infectious units per mL has been demonstrated. The assay is expected to be of utility in clinical diagnosis of important endemic diseases as well as surveillance for FADs.
EFFICACY OF BIOMED TF-TRANSIT TUBES IN COMPARISON TO GOLD STANDARD BIOMED INPOUCH TF DURING TRANSIT

Julia Boehler¹, Alicia L. Alexis¹, John Ragsdale¹, Pascale Leonard², Kim Reiten¹, Dustin Cox¹, Suzanne Townsend¹, Tim J. Hanosh¹

¹Veterinary Diagnostic Services, New Mexico Department of Agriculture, Albuquerque, NM;
²Scientific Laboratory Division, New Mexico Department of Health, Albuquerque, NM

*Tritrichomonas foetus* (*T. foetus*) is a flagellate protozoan parasite that is the etiologic agent responsible for the severe reproductive disease in cattle known as bovine trichomonosis. New Mexico Department of Agriculture Veterinary Diagnostic Services (NMDA-VDS) has validated a Real-Time polymerase chain reaction (PCR) assay that was recently discussed in the Journal of Veterinary Diagnostic Investigations by Effinger and Colleagues as the only assay performed by a laboratory (Laboratory F) in their study that had perfect agreement (kappa = 1.0) with the nPCR and subsequent sequencing results they acquired. To maintain this detection level of the *T. foetus* organism for the clients the laboratory serves, NMDA-VDS performed a study to determine the efficacy of the newly offered BioMed TFTransit tubes in comparison to the gold standard BioMed InPouch transport system while in transport. This study also served to determine the impact on samples of variable transport times with regard to the detection of *T. foetus* by Real-Time PCR. The transport study was performed by using a pure strain of *T. foetus* (sequenced) to prepare a stock 10-fold serial dilution (neat through 10-6). The BioMed TF-Transit tubes and BioMed InPouch transport system were then inoculated with each dilution series in triplicate with a negative sample included per group (22 samples per collection system per group; 176 total samples). Four groups of side-by-side comparison collection methods were produced including a laboratory control group, a 48 hour transport group, a 72 hour transport group, and a 96 hour transport group. Once inoculated, samples were prepared for transport with logged temperatures throughout transport time. Upon return, each group was processed through specimen receiving for molecular processing following standard diagnostic procedures. The Molecular Biology department performed the NMDA-VDS validated chemical lysis extraction and Real-Time PCR method and added a standard *T. foetus* reference dilution series on each plate for development of a standard curve and limit of detection. The results of this study provided data toward the acceptance of the BioMed TF-Transit tube as an efficacious transport system and evidence revealed comparable analytical sensitivity when compared to the BioMed InPouch transport system. Additionally, this study yielded valuable information on acceptable transport times from collection date to date receipt in laboratory, with 96 hours being a permissible and evidence-based transport time when utilizing the validated Real-Time PCR method at NMDA-VDS.
ENHANCED SENSITIVITY OF AN ANTIBODY ENZYME-LINKED IMMUNOSORBENT ASSAY USING EQUINE ARTERITIS VIRUS PURIFIED BY ANION EXCHANGE MEMBRANE CHROMATOGRAPHY

Chungwon Chung¹, Amanda L. Grimm¹, Carey L. Wilson¹, Udeni BR Balasuriya², Peter Timoney², Chandima-Bandara Bandaranayake-Mudiyanselage¹, Stephen Lee³, Travis McGuire¹

¹Research & Development, VMRD Inc., Pullman, WA; ²University of Kentucky, Lexington, KY; ³University of Idaho, Moscow, ID

In the present study, a rapid and easily-scalable method for purifying equine arteritis virus (EAV) using an anion exchange membrane chromatography capsule (AEC) was developed. The relative advantage of AEC-purified EAV was evaluated based on the following parameters: 1) The presentation quality of the epitope defined by GP5-specific monoclonal antibody 17B7, and 2) The relative sensitivity of an antibody competitive enzyme-linked immunosorbent assay (cELISA) using AEC-purified antigen compared to an otherwise-identical commercial antibody cELISA using differential centrifugation-purified antigen. AEC-purified EAV antigen contained ~86.3% GP5 monomer while differential centrifugation-purified EAV contained less than 29.4% GP5 monomer. Improvement of cELISA analytical sensitivity without sacrifice of analytical specificity was clearly evident when cELISAs based on the two purification methods were evaluated using sensitivity check sets composed of borderline positive/negative sera from three horses vaccinated with a commercial modified live attenuated vaccine (MLV), and a time point serum set sequentially collected from an MLV-vaccinated horse. Furthermore, the AEC-purified antigen cELISA had 44.2% to 46.4% higher agreement with the virus neutralization (VN) test than the cELISA derived from differential centrifugation-purified EAV when tested with 43 borderline EAV-seropositive samples as defined by the VN test. In addition, the AEC-purified antigen cELISA had highly significant (p = 0.001) robustness indicated by intra-laboratory repeatability and inter-laboratory reproducibility when evaluated with the sensitivity check sets. The results suggest that the use of AEC-purified antigen in the cELISA may significantly contribute to further harmonization of the antibody cELISA with the OIE-prescribed VN test.
HEPATOGENOUS CHRONIC COPPER TOXICITY IN A CHAROLAIS HEIFER

Benjamin Newcomer\textsuperscript{1,2}, Dwight Wolfe\textsuperscript{2}, Manuel Chamorro\textsuperscript{2}, Thomas Passler\textsuperscript{2,1}, Kellye Joiner\textsuperscript{1}

\textsuperscript{1}Department of Pathobiology, College of Veterinary Medicine, Auburn University, AL;  
\textsuperscript{2}Department of Clinical Sciences, College of Veterinary Medicine, Auburn University, AL

A six-month old Charolais heifer presented for a two day history of lethargy and inappetence. The calf had been orphaned and was currently unweaned, received 6 L of commercial milk replacer twice daily and was kept in a 1-acre paddock of unimproved “weedy” pasture. On presentation, the calf exhibited severe icterus and was estimated to be 10% dehydrated with hard, pelleted feces. Blood collected for an assessment of the packed cell volume (PCV; 64\%) and total solids concentration (6.0 mg/dL) was dark brown in color. Nitrate toxicity is the most common cause of methemoglobinemia in cattle but does not commonly cause icterus. Furthermore, clinical signs of nitrate toxicity were not evident. The owner was unaware of exposure to other exogenous oxidants that may cause methemoglobinemia. A complete blood count and serum biochemical profile revealed a mature neutrophilia and lymphocytosis and elevated concentrations of gamma-glutamyl transferase (GGT), creatine kinase (CK), aspartate aminotransferase (AST), and bilirubin consistent with a hepatopathy. The heifer developed hemoglobinuria the following day; potential causes include leptospirosis, copper toxicity, water intoxication, alloimmune or autoimmune hemolytic anemia (IMHA), bacillary hemoglobinuria, postparturient hemoglobinuria, eperythrozoonosis, babesiosis and ingestion of toxic plants. Antibiotic therapy was initiated due to the possibility of bacterial infection; abdominal ultrasound was unremarkable and a liver biopsy was delayed due to the ongoing hemolysis. The calf was subsequently found to be seronegative for leptospirosis and anaplasmosis and the calf was treated with dexamethasone due to the possibility of IMHA. However, hemolysis continued over the next 72 hours and the PCV fell to 12\%; a blood transfusion was performed using 3.5L of whole blood. The following day the patient appeared to stabilize and a liver biopsy was performed. Histopathologic analysis of the biopsy sample revealed extensive bridging fibrosis with lymphoplasmacytic pericholangitis suggestive of toxic hepatopathy. A plant-based etiology for the observed changes was suggested by pigmentary change from chlorophyll pigments. The copper concentration was found to be significantly elevated (210 ppm). Analyzed copper levels in the milk replacer were not elevated and local soils are not deficient in molybdenum or sulfate, which moderate copper levels by binding copper molecules. Hepatogenous chronic copper toxicity results after
ingestion of hepatotoxic plants (e.g., Senecio, Heliotropium spp.) leads to liver damage and an increase in hepatocyte affinity for copper. This diagnosis was made by the presence of Senecio spp. in the pasture, elevated liver copper, histopathologic changes indicative of a plant based toxic hepatopathy, and absence of other copper sources. This case demonstrates the disease can be a diagnostic challenge and should be included on the differential list for patients exhibiting methemoglobinemia and signs of liver disease.
Porcine deltacoronavirus is a member in the genus Deltacoronavirus of the family Coronaviridae. The virus was first recognized in pigs in Hong Kong in 2012. Between the end of January and the beginning of February 2014, samples from piglets and sows were received from outbreaks of diarrheal disease resembling porcine epidemic diarrhea (PED) or transmissible gastroenteritis (TGE) from several pig farms in Ohio. Mortality ranged from 30 – 50% in piglets. All samples were negative for PED and TGE viruses. Subsequently, we detected deltacoronavirus from all samples. Phylogenetic study indicated that the newly detected virus was closely related to the porcine deltacoronavirus reported in Hong Kong. Further study showed this virus was detected in samples from nine out of ten states, demonstrating wide distribution of this virus in the U.S. Sequence analysis of all isolates from the nine states suggested that a single genotype is circulating in the U.S. Histopathologic alterations, such as attenuation and cytoplasmic vacuolation of superficial enterocytes, villus atrophy and villus fusion in small intestinal sections were similar to, but less severe, than those observed in piglets affected with PED virus infection.
IDENTIFYING VACCINAL-TYPE STRAINS OF BOHV-1 IN BOVINE ABORTION USING SINGLE NUCLEOTIDE POLYMORPHISMS: 10 HERD EPISODES

Donal O’Toole¹, Myrna M. Miller¹, Christopher C. Chase²

¹Department of Veterinary Sciences, University of Wyoming, Laramie, WY; ²Department of Veterinary and Biomedical Sciences, South Dakota State University, Brookings, SD

Three vaccine manufacturers in the United States currently sell multivalent vaccines containing modified live bovine herpesvirus 1 (BoHV-1) for use in pregnant cattle. Their use has become popular since they can be used year-round. One disadvantage is that they can be abortifacient unless vaccination is done within the previous 12 months using specific vaccine products and in accordance with label directions. Diagnostically it is impossible to distinguish iatrogenic from natural abortion on the basis of herpetic-type lesions and virus isolation alone. Use of single nucleotide polymorphisms (SNPs) in BoHV-1 was proposed as a method to resolve whether outbreaks were likely to be iatrogenic (1). We selected ten abortion episodes (2010 – 2014) where an apparent association existed between use of modified live BoHV-1 and abortion in the subsequent 1-3 months. In individual episodes the products were either used on or off label, according to the producer. All ten episodes had SNP patterns consistent with those of commonly used modified live BoHV-1 strains. Use of SNP patterns is helpful in resolving whether abortion was likely due to vaccinal virus, particularly when disagreement existed between a producer and representatives of the vaccine manufacturer.

IMPROVED DIAGNOSTIC PERFORMANCE OF A COMMERCIAL ANAPLASMA ANTIBODY COMPETITIVE ENZYME-LINKED IMMUNOSORBENT ASSAY USING RECOMBINANT MAJOR SURFACE PROTEIN 5–GLUTATHIONE S-TRANSFERASE FUSION PROTEIN AS ANTIGEN

Chungwon Chung¹,⁴, Carey L. Wilson¹, Chandima-Bandara Bandaranayake-Mudiyanselage¹, Eunah Kang², Scott Adams¹, Lowell Kappmeyer³, Donald P. Knowles³, Terry McElwain⁴, James Evermann⁴, Massaro Ueti³, Glen Scoles³, Stephen Lee⁵, Travis McGuire¹

¹Research & Development, VMRD Inc., Pullman, WA;  
²College of Veterinary Medicine, Chungnam National University, Taejon, Republic of Korea;  
³USDA-Animal Disease Research Unit, Pullman, WA;  
⁴Washington State University, Pullman, WA;  
⁵University of Idaho, Moscow, ID

The current study tested the hypothesis that removal of maltose binding protein (MBP) from recombinant antigen used for plate coating would improve the specificity of a commercial Anaplasma antibody competitive enzymelinked immunosorbent assay (cELISA). The number of 358 sera with significant MBP antibody binding (≥30%I) in Anaplasma-negative herds was 139 (38.8%) when tested using the recombinant major surface protein 5 (rMSP5)- MBP cELISA without MBP adsorption. All but eight of the MBP binders were negative (<30%I) using the commercial rMSP5-MBP cELISA with MBP adsorption, resulting in 97.8% specificity. This specificity was higher than some previous reports, so to improve the specificity of the commercial cELISA, a new recombinant antigen designated rMSP5–glutathione S-transferase (GST) was developed, eliminating MBP from the antigen and obviating the need for MBP adsorption. Using the rMSP5-GST cELISA, only 1 of 358 Anaplasma-negative sera, which included the 139 sera with significant (≥30%I) MBP binding in the rMSP5-MBP cELISA without MBP adsorption, was positive. This resulted in an improved diagnostic specificity of 99.7%. The rMSP5-GST cELISA without MBP adsorption had comparable analytical sensitivity to the rMSP5-MBP cELISA with MBP adsorption and had 100% diagnostic sensitivity when tested with 135 positive sera defined by nested polymerase chain reaction. Further, the rMSP5-GST cELISA resolved 103 false-positive reactions from selected sera with possible false-positive reactions obtained using the rMSP5-MBP cELISA with MBP adsorption and improved the resolution of 29 of 31 other sera. In summary, the rMSP5-GST cELISA was a faster and simpler assay with higher specificity, comparable sensitivity, and improved resolution in comparison with the rMSP5-MBP cELISA with MBP adsorption.
OKLAHOMA EQUINE CASES PRESENTING WITH CLINICAL SIGNS OF CENTRAL NERVOUS SYSTEM DISEASE – 2012-2013

Kristin M. Lenoir, Janisue C. Jones, Perla Encarnacion-Astudillo, Grant Rezabek

Serology, Oklahoma Animal Disease Diagnostic Laboratory, Stillwater, OK

The identification of a pathogen underlying equine neurologic symptoms plays an important role in equine and public health. A probable diagnosis can lay the groundwork for risk analysis and suspected diagnosis for equines and other mammals in the geographic vicinity, including humans. This can also facilitate preventive and control measures relevant to the disease. Testing for common agents that underlie equine central nervous system (CNS) disease, however, remained low from 2008-2011 at The Oklahoma Animal Disease Diagnostic Laboratory (OADDL). In an effort to increase testing, the Oklahoma Department of Agriculture, Food and Forestry (ODAFF) subsidized a diagnostic profile for horses presenting CNS symptoms. This profile included West Nile virus (WNV) and Eastern equine encephalitis virus (EEE) by IgM capture ELISA on serum as well as Equine Herpes Virus 1 (EHV-1) by polymerase chain reaction (PCR) on whole blood and nasal swab. Supplemental diagnostics for Equine Protozoal Myelitis (EPM), Western Equine Encephalitis (WEE), Venezuelan Equine Encephalitis (VEE), Rabies, or plant toxins was available as fee-for-service to the client. OADDL solicited submissions from Oklahoma veterinarians and attempted to collect demographics, vaccination history, and clinical signs on all cases. A total of 269 Oklahoma-resident CNS cases were submitted from January 2012 through December 2013, with 147 cases meeting the full sample requirements for the subsidized program. The data are presented as a percentage, with positive results over the total number of cases submitted for each test. Twenty-nine percent (69/237) were positive for WNV. All EHV-1 submissions (167 nasal swabs, 190 whole blood samples) were negative and all EEE submissions (213) were negative. Equine Protozoal Myeloencephalitis (EPM) combined indirect fluorescent antibody (IFAT) emerged as a common supplemental test request for which 68% (38/56) had a positive titer. Two out of ten brain specimens tested for rabies virus were positive. An inherent challenge to serological testing of horses with CNS disease is that it only identifies a probable agent, but does not confer a definitive diagnosis. Results may indicate exposure to more than one pathogen. For example, of five WNV-positive cases also tested for EPM, four were positive for EPM. A low percentage of cases reported current vaccination status at time of submission: 29% WNV, 31% EEE, and 25% EHV-1. This data contributes to surveillance for both common and zoonotic CNS pathogens and promotes awareness among equine veterinarians and owners.
ONE-STEP TRIPLEX REAL TIME RT-PCR ASSAY FOR SIMULTANEOUS DETECTION AND DIFFERENTIATION OF THREE VESICULAR VIRUSES IN SWINE

Xiju Shi¹,³, Qing Sun², Jianfa Bai², Amy Beckley¹, Jishu Shi¹

¹Department of Anatomy and Physiology, Kansas State University, Manhattan, KS;
²Veterinary Diagnostic Laboratory, Kansas State University, Manhattan, KS;
³Beijing Entry-Exit Inspection and Quarantine Bureau, Beijing, China

Vesicular Stomatitis (VS) and swine vesicular disease (SVD) are two worldwide livestock diseases that are of economical importance. They cause vesicular lesions, ulcerations of the tongue and oral tissues, and coronary bands in infected animals. VS has two major serotypes that are Vesicular stomatitis Indiana virus (VSIV) and Vesicular stomatitis New Jersey virus (VSNJV). SVD only has one serotype, but animals are often co-infected with VS strains, making it difficult for accurate clinical diagnosis. Therefore, rapid detection and accurate differentiation of these viruses is critical for effective disease management. Here we describe a novel one step triplex real time RTPCR for simultaneous detection and differentiation of VSIV, VSNJV and SVDV. The most reserved region of the L gene of VSV and the 5'UTR of SVDV were selected as detection targets. Our results showed that the multiplex assay generated similar sensitivity levels as compared to its corresponding single-target PCRs. The amplification efficiencies of multiplex real time PCRs were 96.1%, 98.6% and 98.1%, and the correlation coefficients of Ct values from the standard curves generated by the multiplex reaction and its corresponding singular reactions were 0.9994, 0.9953 and 0.9995, for VSIV, VSNJV and SVDV, respectively. The detection limits of triplex real time PCRs were about ten copies per reaction for the three viruses, which are comparable to its corresponding singular real time PCR reactions. When primers and probes of the three viruses were used in the same reaction on individual virus template, only the corresponding channel generated signal, and there is no cross-reaction or interference observed. Similar specificity was also obtained from singular reactions. This assay may be a cost-effective alternative for rapid and accurate detection and differentiation of VSIV, VSNJ and SVDV strains. This assay may be especially useful when co-infections with two or three of these viruses occur in the same animal.
We describe an outbreak of porcine reproductive and respiratory syndrome (PRRS) in Switzerland, introduced into a Swiss PRRSV negative population by boar semen and how a good collaboration of the Swiss authorities together with a reliable supplier of high quality veterinary diagnostics helped to eradicate the disease in only seven weeks. The Swiss pig population is 1.5 million and free of PRRS. Import of live pigs into Switzerland is only permitted after quarantine. Previous to 2013 up to 32,000 doses of boar semen per year were imported without restrictions. Boar facilities tested approximately 10% of boars every four weeks using enzyme-linked immunosorbent assay (ELISA) and polymerase chain reaction (PCR) from serum. In addition, boars delivering semen for Switzerland were tested every two weeks in between by PCR from semen samples. On November 27, 2012, PRRSV was detected in a German boar facility delivering boar semen to Switzerland. One blood sample and semen sample from two boars were PRRSV positive. The outbreak was confirmed by the detection of PRRSV in up to 90% of the boars in one boar-stable. The Swiss authorities were informed by the German boar station on November 28. By that time 26 Swiss farms had received boar semen from the infected boar facility in the last two weeks, five of those farms received semen from the two boars which were initially tested as PRRSV positive. All 26 farms and all 61 contact farms were put on quarantine on November 29. The sudden, overnight requirement of PRRSV PCR for 87 farms was handled by the Swiss Institute of Virology and Immunology (IVI) in collaboration with QIAGEN Leipzig. In total, over 15,000 tests (ELISA and PCR) were conducted in a seven week time frame, where in over 7,200 PCR. Samples were collected by veterinarians, vet students, and employees of the Swiss Pig Health Service. The testing was conducted in three Swiss laboratories. The costs for sample collection, diagnostic reagents, and testing service were estimated at € 1 Mill. On January 11, the PRRS free status of Switzerland was confirmed and restrictions lifted. The following new regulations, for importing boar semen into Switzerland, are now implemented by the Swiss authorities: the foreign boar station must have E.U. approval and be free of Aujeszky. Testing for PRRSV must be performed on blood and semen samples by PRRSV PCR and ELISA. Swiss farms using fresh semen are not permitted to sell pigs for
four weeks. This ban is lifted if blood samples from such farms are tested PRRSV negative four weeks after using such semen samples. Frozen semen can be used on Swiss Farms only three months after collection. During this monthly examination for PRRSV must be done on the original boar station. Virottype PRRSV PCR kit is officially approved by the German and Swiss authorities for PRRS control. The PCR assay allowed to eradicate the 2012 PRRS outbreak and will be used to reliably prevent PRRSV from entering Switzerland.
PATHOLOGY AND DIAGNOSIS OF NECROTIC ENTERITIS OF CHICKENS

Carlos Gornatti Churria¹, Francisco Uzal¹, Gabriel Senties Cue³, Horacio Shivaprasad⁴

¹California Animal Health and Food Safety (CAHFS), UC Davis, San Bernardino, CA;
²Faculty of Veterinary Sciences, National University of La Plata, La Plata, Argentina;
³CAHFS, UC Davis, Turlock, CA;
⁴CAHFS, UC Davis, Tulare, CA

Diagnosis of necrotic enteritis (NE) produced by *Clostridium perfringens* in poultry can be challenging, mostly because this organism is usually found as a normal inhabitant of the gut, making it difficult to determine its role in pathogenesis. We reviewed the diagnostic features of 65 cases of necrotic enteritis in chickens that were submitted to the Turlock, Tulare and San Bernardino branches of the California Animal Health and Food Safety Laboratory, between 2004 and 2013. Of these, 70% of the cases had focal or diffuse gross lesions in at least one portion of the intestine. Microscopic lesions consisted of mucosal intestinal necrosis, and in some cases necrotic changes reached the submucosa, with a few cases in which the necrosis extended into the muscularis. Heterophils were the dominant inflammatory cells in the initial stages of the disease, but mononuclear cells are also present in more chronic lesions. Large numbers of gram positive rods, usually grouped in clusters, were seen associated with the necrotic lesions. Immunohistochemistry for *C. perfringens* performed in the small intestine of ten of the birds with NE revealed the presence of strongly positive intralesional rods in all the birds tested by this technique. Microscopic intestinal lesions were observed most frequently in the jejunum-ileum (61%), duodenum (43%) and the ceca (17%). *C. perfringens* type A was isolated from the 24 (100%) cases in which anaerobic culture of the intestine was attempted. Seven (29%) of these 24 isolates carried the gene encoding for beta 2 toxin, while two (8%) each of those isolates were positive for the genes encoding enterotoxin and Net B toxin, respectively. Coccidiosis was diagnosed by fecal floatation and/or histopathology in 50% of the cases and it was the most frequent predisposing factor, but it was not always present. The number of cases NE received in these three laboratories increased ~ 100% in 2009 and ~ 200% in 2013 when compared with the average annual submission over the previous nine years. Diagnosis of NE cannot be based on gross examination alone and an acceptable level of certainty should be achieved by combining several diagnostic tests. Although NetB has been recently been associated with many cases of NE around the world, our results suggest that this toxin is not necessary for NE to occur. The dramatic increase in the number of cases of NE to our laboratory over the past few years can be related to the significant reduction in the use of antimicrobials.
II. C. 1. PAPERS AND ABSTRACTS

POINT OF NEED DETECTION OF CANINE RESPIRATORY DISEASE PATHOGENS ON POCKIT, A PORTABLE MOLECULAR DETECTION SYSTEM

Jessie D. Trujillo¹, Uri Donnett¹, Chuan Fu Tsai², Yun-Long Tsai², Pei-Yu Lee², Fu-Chun Lee², Hsiu-Hui Chang², Pin-Hsing Chou², Bor-Huah Chen², Li-Juan Ma², Yu-Han Shen², Hsiao Fen Grace Chang², Thomas Wang²

¹Center for Advanced Host Defenses, Immunobiotics and Translational Comparative Medicine, Iowa State University, Ames, IA; ²GeneReach USA, Boston, MA

Canine Distemper virus (CDV), Canine Herpes virus-1 (CHV-1), Canine Parainfluenza virus (CPIV), Canine Respiratory Corona virus (CRCoV), Canine Adenovirus-2 (CAV-2), Canine Influenza virus (CIV), and Bordetella bronchiseptica are pathogens resulting in Canine Respiratory Disease (CRD). Proper diagnosis of CRD pathogens is paramount for patient care, population medicine, and biosecurity. Time to diagnosis is critical due to their highly infectious nature and ability to cause sometimes life threatening disease. When tested, samples are shipped to reference laboratories, delaying diagnosis and thus hindering infectious disease control. Here we evaluate pathogen specific insulated isothermal PCR (iiPCR) assays in the field deployable device, POCKIT™, for the detection of important pathogens in the dog. Published or de novo, real time PCR (qPCR) assays were validated as reference assays on the BioRad CFX96. Limits of detection (LOD) were determined via pathogen standards and were performed side by side for both platforms. Clinical samples (30 positive/30 negative) were tested side by side, in triplicate. When sufficient clinical samples were not available, various dilutions of the pathogen standard or vaccine were tested as surrogate positives. Reference assay LOD for all canine pathogens fell one to three logs below one infectious unit except B. bronchiseptica with an LOD of one infectious unit. LOD for iiPCR assays on POCKIT are equivalent or within on log of the reference assays. Acceptable sensitivities for iiPCR assays on POCKIT are 98.5%, 100%, 93.3% and 96.7% for CIV, CDV, CAV-2 and CPIV assays. Specificity for all assays was 96-100%. For B. bronchiseptica, CHV, and CRCoV Sensitivity were 53.3%, 76.7% and 71%. These three reagent sets have been redesigned accordingly and evaluation of their sensitivity and specificity are underway. POCKIT™ portable molecular detection system has exceptional performance in detection of several relevant pathogens such as Canine Distemper and Canine Influenza viruses and can have profound impact on infectious disease control in canine populations such as kennels, shelters and urban areas.
RAPID DETECTION OF PATHOGENS FROM SWINE CLINICAL SAMPLES USING A BROAD SPECTRUM MICROBIAL DETECTION ARRAY

Crystal Jaing\(^1\), James Thissen\(^1\), Pam Hullinger\(^1\), Nicholas Monday\(^2\), Raymond R. Rowland\(^2\)

\(^1\)Lawrence Livermore National Laboratory, Livermore, CA; \(^2\)Kansas State University, Manhattan, KS

To best safeguard human and animal health requires early detection and characterization of disease events. This must include effective surveillance for emerging infectious diseases. Both deliberate and natural outbreaks have enormous economic and public health impacts, and can present serious threats to national security. To evaluate the initial utility of a novel and comprehensive microbial detection technology, the Lawrence Livermore Microbial Detection Array (LLMDA) to expedite faster and better detection of emerging and foreign animal disease pathogens, we analyzed a series of swine clinical samples from past disease events. The LLMDA (1) contains probes to detect >8000 species of microbes including 3,856 viral, 3,855 bacterial, 254 archael, 100 fungal, and 36 protozoan species that were sequenced through June, 2013. This microarray targets both conserved and unique genomic regions of sequenced microbial strains. The automated data analysis algorithm, Composite Likelihood Maximization, is integrated with a web interface that enables LLMDA data analysis within 30 minutes. Clinical (serum, oral fluids, tissues and fecal) samples from past disease outbreaks were collected by or submitted to Kansas State University. The samples were shipped to Lawrence Livermore National Laboratory and nucleic acid samples were extracted using Trizol. The samples were amplified using random amplification, fluorescently labeled and hybridized to the LLMDA. Porcine circovirus 2 (PCV2) and Porcine Reproductive and Respiratory Syndrome Virus (PRRSV) were the most dominant pathogens detected. We found that oral fluids were a good substitute for serum for pathogen detection. In addition to PCV2 and PRRSV, the LLMDA also detected other previously undetected viral coinfections including porcine parainfluenza, astrovirus, and bocavirus from oral fluid samples. Common bacterial co-infections detected by the LLMDA were Streptococcus suis, Actinobacillus pleuropneumoniae, Staphylococcus sp. and Enterococcus sp. We then compared array results with PCR results in the detection of PCV2 and PRRSV. Initial results showed that the LLMDA detected PCV2 and PRRSV from pig serum samples at Ct of 30 or less. Additional sensitivity testing is under way. In summary, we have demonstrated that the broad spectrum microbial detection technology, the LLMDA, is sensitive in the detection of known and emerging swine pathogens. It can be used to identify viral and bacterial co-infections, discover unknown pathogen outbreaks, and correlate the effects of microbiome to the health of animals. Its most appropriate, cost-
effective application presently is as a secondary diagnostic test to assist further in evaluation of situations where primary syndromic testing does not identify a causative agent.

References
REAL-TIME RT-PCR COMPARISON TO ENSURE ACCURATE DETECTION OF PEDV AND TGEV

Douglas Marthaler, Marie G. Culhane, Kurt D. Rossow, Yin Jiang

University of Minnesota, St. Paul, MN

Porcine epidemic diarrhea virus (PEDV) is major cause of severe diarrhea and dehydration in pigs. Belonging to the Coronaviridae family, PEDV is an enveloped, positive-sense, single-stranded RNA virus with a genome size of approximately 28kb. The first detection of PEDV was reported in 1971 from England while Japan, China, South Korea, and Thailand also have reported PEDV infections. The United States first detected PEDV in May 2013. The veterinary diagnostic laboratories quickly developed sensitive and specific real time (RT) polymerase chain reaction (PCR) real-time reverse (RRTPCR) assays to detect PEDV in a variety of porcine and environmental samples. In this study, we compared the PEDV-transmissible gastroenteritis virus (TGEV) multiplex RRT-PCR assay developed at the University of Minnesota (UMN) to a commercial TGEV-PEDV multiplex RRT-PCR assay. Porcine intestinal samples, fecal samples, fecal swabs, oral fluid samples, and environmental samples are routinely submitted to UMN Veterinary Diagnostic Laboratory for enteric pathogen testing. Sample homogenates were extracted with the MagMax 96 Viral RNA Isolation Kit (Thermo Scientific), according to manufacturer’s instructions. The commercial TGEV-PEDV multiplex RRT-PCR assay was preformed, according to manufacturer’s instructions, while the UM RRT-PCR assay utilized the Path-ID Multiplex One-Step RT-PCR kit (Thermo Scientific, according to manufacturer’s instructions. A total of 396 samples, consisting of porcine oral fluids (n=39), intestinal homogenates (n=107), fecal (n=136), fecal swabs (n=47), feedback (n=12) and environmental samples (n=55), were compared with the UMN TGEV-PEDV multiplex RRT-PCR and the commercial TGEV-PEDV multiplex RT-PCR assays. The UMN TGEV-PEDV multiplex RRT-PCR assay had lower Ct values compared to the commercial TGEV-PEDV multiplex RRT-PCR assay. The UMN TGEV-PEDV multiplex RRT-PCR assay detected 53 more positive PEDV samples (oral fluids (n=6), intestinal homogenates (n=9), fecal (n=6), fecal swabs (n=13), and environmental samples (n=19)) compared to the commercial TGEV-PEDV multiplex assay. The additional positive PEDV samples as indicated by the UMN TGEV-PEDV multiplex assay, but negative by the commercial TGEV-PEDV multiplex assay, were confirmed positive by a secondary UMN PEDV RRT-PCR assay, which targeted the N gene. The UMN TGEV-PEDV multiplex RRT-PCR assay detected 11 more positive TGEV samples (intestinal (n=4) and fecal (n=7)) compared to the commercial TGEV-PEDV multiplex RRT-PCR. The UMN TGEV-PEDV RRT-PCR assay had superior performance over the commercial TGEV-PEDV multiplex RRT-PCR assay. Accurate detection of PEDV and TGEV in clinical samples is important to
II. C. 1. PAPERS AND ABSTRACTS

minimize the spread of these two viruses. The role of the clinical diagnostic laboratories is to provide high sensitivity and specificity assay to help prevent and control pathogens and many assays must be evaluated before choosing the best assay to support the swine industry.
SNP ANALYSIS USED TO SELECT CONSERVED REGIONS FOR AN IMPROVED NEWCASTLE DISEASE VIRUS REAL-TIME RT-PCR TEST

David Suarez, Lauren Marbut
Southeast Poultry Research Laboratory, USDA-ARS, Athens, GA

*Newcastle disease virus* is a ribonucleic acid (RNA) virus with high sequence diversity that may cause a severe disease in susceptible poultry. The severe form of the disease is considered a foreign animal disease in the United States and in many other countries, and rapid detection is critical for successful eradication when disease outbreaks occur. Real-time polymerase chain reaction (RTPCR) reverse real time (rRT-PCR) has become the most commonly used test for screening clinical samples for the virus. Sequence mismatches of primers and probe to the circulating field strains has resulted in false negative tests or reduced sensitivity which can compromise our goal of rapid and early detection. With the rapid increase in the number of sequences of NDV available in public databases, it provides new opportunities for tests to be developed that are to the most highly conserved regions of the viral genome. A new approach for finding the best sites for primers and hydrolysis probes was developed using the single nucleotide polymorphism (SNP) analysis to calculate variability at every nucleotide of the genome and then use a boxcar average approach to identify the most conserved regions. A total of eight different regions that were highly conserved and were amenable to a rRT-PCR test were empirically tested to identify the most promising tests for additional study. Sensitivity, specificity, and end-point detection were considered after the most promising tests were optimized. Several promising tests were identified that could potentially replace or provide an alternative to the existing matrix rRT-PCR test used in the U.S. The SNP analysis approach can be used for any pathogen for molecular diagnostic testing.
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UPDATING PCR ASSAYS FOR INFLUENZA SUBTYPING

Mia Kim Torchetti¹, Janice C. Pedersen¹, Mary Lea Killian¹, Nichole L. Hines¹, David Suarez²

¹Diagnostic Virology Laboratory, USDA-APHIS-NVSL, Ames, IA; ²Southeast Poultry Research Laboratory, Athens, GA

The recent event of a low pathogenic avian influenza A(H7N9) causing significant morbidity and mortality in humans from China prompted national veterinary laboratories worldwide to ensure the ability to detect this emergent strain. Diversity long recognized in the H7 lineage has resulted in the use of assays which target viruses circulating by geographic region, thus while the Type A assay detected the virus of concern, the regionally specific H7 subtype assay did not. Rapid evaluation of available molecular assays was made possible thanks to the timely sequence data shared by the Chinese Authorities to the public database at the Global Initiative on Sharing All Influenza Data (GISAID, www.gisaid.org), but complete validation of assays can be a long process, especially when needed for use by multiple laboratories. The current H5 assay has also been under revision to include detection of distinct viruses from Mexico identified as the result of an interlaboratory collaboration for the harmonization of IAV diagnostics between Mexico, Canada, and U.S. In these cases, it is important to review testing algorithms, identify and implement interim actions, and keep stakeholders informed of progress and next steps. The National Animal Health Laboratory Network (NAHLN) provides the framework needed for such communication and has served as a “proving” ground for harmonizing approaches to methods comparison and validation efforts. The approach to validation, progress to date, and lessons learned towards improved transparency and communication for the H5 and H7 assays will be reviewed.
VARIANT STRAIN OF PORCINE EPIDEMIC DIARRHEA VIRUS CAUSED MILD HISTOLOGICAL LESIONS IN THE SMALL INTESTINES OF PIGLETS

Yan Zhang, Leyi Wang, Jeffrey R. Hayes, Beverly Byrum

Ohio Department of Agriculture, Animal Disease and Diagnostic Laboratory (ADDL), Reynoldsburg, OH

In January 2014, we detected a variant strain (OH851) of porcine epidemic diarrhea virus (PEDV) in samples from a swine farm in Ohio. Genome sequence comparison showed that there was a high nucleotide similarity in either the complete genome (99%) or the full-length spike (S) gene (97%) between variant PEDV and currently circulating PEDV strains from the U.S., whereas a low nucleotide identity (<= 89%) was observed in the first 1,170 nt of the S1 region between them. Importantly, the S1 domain of the OH851 strain is closely related (99% identical) to another PEDV strain (CH/ HBQX/10) reported in China, indicating at least two genotypes of PEDV circulate in the U.S. Histological changes of piglets infected with the variant strain of PEDV were observed in the small intestines (jejunum, ileum), including mild segmental to multifocal villous atrophy, villous fusion, and superficial enterocyte attenuation. Mild lymphoid depletion in 1/5 pigs was observed in colonic lymph nodes. These microscopic changes were much milder than anticipated for PEDV associated infection. No evidence of infection of virulent PEDV, rotaviruses, and Transmissible Gastroenteritis (TGE) virus. No colibacillosis, clostridial enteritis, coccidiosis or cryptosporidiosis was observed microscopically in any of the 44 intestinal sections examined. Further research is needed to monitor the evolution of the variant PEDV as well as virulent PEDV in U.S. swine populations.
2. Posters

A Serologic Survey of *Bovine Leukosis Virus* (BLV), *Bovine Viral Diarrhea Virus* (BVDV) and Johne’s in Oklahoma/Arkansas Beef Herds - Janisue C. Jones, Kristin M. Lenoir, Perla Encarnacion-Astudillo, Grant Rezabek.................................


Prevalence and Antibiotic Susceptibility Dynamics of Bacterial Isolates from Canine Skin Infections at a Purdue Veterinary Teaching Hospital (2004–2013) - Shankar Thangamani, Kenitra Hammac, Paulo Gomes................................. .

Three Decades of Terrestrial Rabies in Wyoming - Myrna M. Miller, Amy Boerger-Fields, Karl Musgrave, Kenneth Mills, Brant Schumaker....

Vaccinal Prevention of Reproductive Disease Due to *Bovine Viral Diarrhea Virus* – Benjamin Newcomer, Paul H. Walz, M. Daniel Givens, Alan Wilson.................................
A SEROLOGIC SURVEY OF BOVINE LEUKOSIS VIRUS (BLV), BOVINE VIRAL DIARRHEA VIRUS (BVDV) AND JOHNE’S IN OKLAHOMA/ARKANSAS BEEF HERDS

Janisue C. Jones, Kristin M. Lenoir, Perla Encarnacion-Astudillo, Grant Rezabek

Oklahoma Animal Disease Diagnostic Laboratory, Center for Veterinary Health Sciences, Oklahoma State University, Stillwater, OK

The Oklahoma Animal Disease Diagnostic Laboratory (OADDL) initiated an enzyme-linked immunosorbent assay (ELISA) panel in the Fall of 2013 to test for three low-morbidity bovine diseases. The program was designed to provide producers with a financial incentive to screen their herds and provide data for culling or retention of heifers. The ELISA panel consisted of *Bovine Viral Diarrhea Virus* (BVDV-antigen capture ELISA, IDEXX), *Bovine Leukosis Virus* (BLV-ELISA antibody, VMRD), and Johne’s disease (MAP-ELISA antibody, IDEXX). All 1,120 cattle sera tested in the program were from 26 beef herds in Central and Eastern Oklahoma and Western Arkansas. The testing showed the number of animals infected with bovine leucosis virus (BLV) is higher than the average of 17.1% found in our region in a NAHMS study from 1999. Overall 39.1% of animals tested positive for BLV with individual herds ranging from 1.2% to 100% positive. Twenty-five percent of herds tested had at least one animal that was positive for Johne’s, which is higher than the national estimated average of 8%; and 4.2% of the herds had at least one animal test positive for BVDV, which is slightly lower than the 8.8% found in a 2007-08 USDA study. The individual herd incidence varied, however, from 0%-1.7% for Johne’s and 0%-7.1% for BVDV. It is important that producers, veterinarians, and diagnostic laboratories work together to identify animals with chronic disease in order to implement management practices that improve production and profitability. This data is invaluable for decisions on culling or retention/expansion, especially during the ongoing drought conditions, and provides current antibody and antigen detection information for the region.
II. C. 2. POSTERS

DETERMINATION OF OPTIMAL IN VITRO DRUG RATIOS OF TRIMETHOPRIM/SULFAMETHOXAZOLE AND TRIMETHOPRIM/SULFADIAZINE AGAINST EQUINE PATHOGENS

Carmen Sadaka¹²³, Luca Guardabassi³, Theofanis Kanellos², Michael T. Sweeney¹, Jeffrey L. Watts¹

¹Zoetis Global Therapeutics Research, Kalamazoo, MI; ²Zoetis Inc., Paris, France; ³Department of Veterinary Disease, Biology, Section for Microbiology, University of Copenhagen, Denmark

Strangles is a highly contagious disease caused by *Streptococcus equi* that affects a horse’s lymph nodes in the upper respiratory tract. Combinations of trimethoprim and sulfonamides are commonly used for the treatment of strangles in horses. Currently, the interpretive criterion used for antimicrobial susceptibility testing of trimethoprim/sulfamethoxazole (TMP/SMX) with veterinary pathogens is based on human data. The purpose of this study was to develop minimum inhibitory concentration (MIC) data for TMP/SMX that supports the establishment of veterinary-specific breakpoints against equine strains of *S. equi*. Data was generated using the common veterinary combination TMP/sulfadiazine (SDZ) to determine if TMP/SMX can be used as the class agent for susceptibility testing. *In vitro* susceptibility studies were conducted to evaluate activity of various TMP/SMX and TMP/SDZ drug ratios against 59 equine pathogens isolated from clinical cases of strangles. MIC broth microdilution assays and disk diffusion assays were conducted in compliance with CLSI methods. Fractional inhibitory concentration (FIC) assays using the checkerboard technique were also conducted to determine optimal drug ratios for synergy. Overall SMX, SDZ and TMP exhibited poor activity against 22 isolates (MIC>2048 μg/ml), 25 isolates (MIC>2048 μg/ml) and 3 isolates (MIC>4096 μg/ml), respectively. Additionally, individual sulfonamides and the combination antimicrobials exhibited poor activity in strains where TMP lacked activity. Despite evidence of poor *in vitro* activity to individual sulfonamides, FIC indices indicated that synergy (FIC index ≤ 0.5) occurred at TMP-to-sulfonamide combination ratios ranging from 1:1 to 1:256. These results imply that lack of activity of TMP may be conditional for the poor activity of the combination antimicrobials and that the last step of the pathway in which dihydrofolate reductase is inhibited by TMP may be the limiting step. More research will be conducted to validate these observations. Since the pharmacologic behavior of drugs may be different between species, the clinical utility of TMP/SMX and TMP/SDZ for equine strangles could be improved by performing pharmacokinetic and efficacy studies at the new proposed ratios: 1:40; 1:80; 1:160 and 1:256.
II. C. USAHA/AAVLD PAPERS, ABSTRACTS AND POSTERS

PREVALENCE AND ANTIBIOTIC SUSCEPTIBILITY DYNAMICS OF BACTERIAL ISOLATES FROM CANINE SKIN INFECTIONS AT A PURDUE VETERINARY TEACHING HOSPITAL (2004–2013)

Shankar Thangamani¹, Kenitra Hammac²,¹, Paulo Gomes³

¹Department of Veterinary Comparative Pathobiology, Purdue University, West Lafayette, IN;
²Indiana Animal Disease Diagnostic Laboratory (ADDL), Purdue University College of Veterinary Medicine, West Lafayette, IN;
³Veterinary Clinical Science, Purdue University College of Veterinary Medicine, West Lafayette, IN

Skin disorders are the most common clinical presentation in dogs varying from acute to chronic, and often require life-long treatment. Microorganisms including yeast and bacteria are considered to be both predisposing and perpetuating factors. The selection of appropriate antimicrobial therapy can be significantly aided by knowledge of the most common bacterial isolates in a geographical area and their antibiotic susceptibility profiles. We designed a ten year retrospective study to include culture and susceptibility data from skin samples (swabs and scrapings) submitted to the Indiana Animal Disease Diagnostic Laboratory in 2004 through 2013 from Purdue’s Veterinary Teaching Hospital. The aims of this study are to identify and quantify the most frequently isolated bacteria from about 250 skin samples and their antibiotic susceptibility patterns in order to generate objective local data to aid veterinarians in their selection of an antibiotic for initial empirical therapy. Our data indicates that the most commonly isolated microorganisms are Staphylococcus pseudintermedius, Corynebacterium sp., Pseudomonas aeruginosa, Proteus mirabilis and Streptococcus sp. (both alpha and beta-hemolytic). The most commonly isolated bacterium from each year of the study was S. pseudintermedius which was present in more than 50% of the samples included in this study. We analyzed the antibiotic susceptibility profiles of the five most common bacterial species to identify changes over time, such as increasing resistance to certain classes of drugs. This retrospective study identifies consistencies and trends of change in canine skin infections which may result in improved empirical treatment.
THREE DECADES OF TERRESTRIAL RABIES IN WYOMING

Myrna M. Miller\textsuperscript{1,2}, Amy Boerger-Fields\textsuperscript{2}, Karl Musgrave\textsuperscript{3}, Kenneth Mills\textsuperscript{1,2}, Brant Schumaker\textsuperscript{1,2}

\textsuperscript{1}Department of Veterinary Sciences, University of Wyoming, Laramie, WY; \textsuperscript{2}Wyoming State Veterinary Laboratory, Laramie, WY; \textsuperscript{3}Wyoming Department of Health, Emory University, Cheyenne, WY

Rabies is a fatal encephalitis in humans, domestic and wild animals and is one of the oldest known deadly viral diseases. It is caused by a rhabdovirus of the genus Lyssavirus. There are two general rabies cycles; 1) terrestrial rabies, consisting of antigenic variants circulating in different species in distinct geographical regions, and 2) bat rabies that circulates in the bat population and occasional infects other mammals. In the United States, eight variants of terrestrial rabies occur in the reservoir species of coyote, fox, raccoon, or skunk. Geographic distribution of the variants is largely defined by the population dynamics of the reservoir host and the ecology of the habitat such as natural corridors and natural barriers to movement. Spillover into non-reservoir hosts does occur, but does not typically result in sustained transmission in the new species. Wyoming geography offers a unique opportunity to study the dynamics of rabies over time and spread into new areas. Wyoming is a headwaters state and incursions of terrestrial rabies into the state occurs along river drainages from surrounding areas with circulating virus. These river drainages provide the riparian habitat needed to support the reservoir host. We describe three decades of rabies in Wyoming from the initial case in 1984 and establishment of the north central skunk variant in northeastern part of the state. Subsequent years found spread of north central skunk rabies in the Big Horn Basin, and central parts of the state. Cases in the Colorado River drainage of south western Wyoming caused concerns of spread into this rabies-free river basin. However, skunk rabies failed to establish a continuing cycle in these areas, perhaps because of the lack of prevalent continuous skunk habitat. In addition, isolated incidents of rabies in unexpected places have occurred due to bat rabies virus, presumably due to skunk contact with infected bats. Animals species diagnosed with rabies in Wyoming include skunk, bats, cats, horses and cows, dogs, raccoons, fox and a squirrel. In 2011, the first incursion of south central rabies variant occurred from Colorado and in 2014 from Nebraska.
Bovine viral diarrhea virus (BVDV) is a common cause of reproductive inefficiency and failure in cattle. Reproductive disease due to BVDV infection has been recognized since the virus was first reported and remains a major concern on dairy farms, cow-calf ranches and breeding stock operations. The reproductive sequelae of BVDV infection depends largely on the immune status of the dam and the stage of gestation at which infection occurs; possible adverse outcomes of infection include poor conception rates, early embryonic death, abortion, congenital malformations and the creation of persistently infected (PI) animals. Such animals are critical to the propagation of the virus within populations and as such, are the focus of most control programs. Vaccination against BVDV has been practiced for several decades but there has been a recently renewed focus on providing fetal protection through vaccination. Consequently, the aim of this study was to evaluate the efficacy of BVDV vaccination to prevent reproductive disease by performing a quantitative synthesis of previously published studies. Relevant articles were found by performing a search of four relevant scientific databases (PubMed, CAB abstracts, Agricola and Web of Science) using the search term “BVDV vaccine” and by examining the reference lists of ten systematic reviews. Inclusion criteria for the meta-analysis mandated that the studies were controlled, primary studies that included necessary data for use in the meta-analysis, such as the number of pregnancies, abortions or fetal infection events in the treatment and control groups. Forty-seven studies in 42 separate manuscripts were identified that matched the inclusion criteria. One study was subsequently excluded from the analysis due to the inadvertent use of a vaccine containing a BVDV contaminant. Risk ratio effect sizes were used in random effects, weighted meta-analyses to assess the impact of BVDV vaccination on three outcomes: pregnancy risk, abortion risk, and risk of fetal infection. Within each outcome, sub-analyses were performed to evaluate the effect of modified live and inactivated or polyvalent and monovalent vaccines, homologous and heterologous or field challenge and vaccination using only bovine studies. The analysis demonstrated that the probability of fetal infection in vaccinated cattle is approximately one-seventh the risk in unvaccinated cattle exposed during gestation. Use of a polyvalent vaccine may further reduce the risk of fetal infection. The risk of abortion is reduced by more than 40% with vaccination (risk ratio = 0.597). Pregnancy risk was significantly improved in vaccinated animals (risk ratio = 1.05) subjected to field exposure relative to unvaccinated animals and was
not adversely affected by vaccination when viral challenge was delayed until animals were gestating. This meta-analysis provides quantitative support for the benefit of vaccination in the prevention of BVDV-associated reproductive disease.
II. D. USAHA Membership Meetings
Sponsor’s Welcome was provided by, Dr. Silke Birlenbach, Merial Ltd.

Treasurer’s Report
Annette Jones, Treasurer

The United States Animal Health Association (USAHA) continues to operate on a sound financial basis. While we finished the 2013-14 fiscal year at a net income loss of $56,163, of this amount, $35,000 reflects a budgeted investment from our reserve account to fund $25,000 to support the National Institute for Animal Agriculture (NIAA), USAHA Forum on Animal Disease Traceability held in 2013 and $10,000 for student grants to attend the 2013 annual meeting. The additional loss is primarily due to the unexpected inability of USDA to send staff to the annual meeting last year, which resulted in about $20,000 in lost revenue. Considering that the USAHA management team controls a $400,000 budget, they did another excellent job of managing revenue and costs throughout the year.

During fiscal year 2014, the Association earned $8,655 in investment income. The Association’s net worth on June 30, 2014 was $1,158,419. While USAHA continues the policy of maintaining two years’ expenses in reserve held in secure investments like certificates of deposits (CDs), based on last year’s Board action, we anticipate improved investment returns as reserve in excess of two years’ expense is now being invested in securities with higher anticipated returns then CD’s. The intent is to use this interest income to enhance member services.

While USAHA continues to maintain a healthy reserve, membership dues have not been adjusted for five years, and for the past two years, operating expenses have exceeded revenue. In order to keep revenue in-line with cost increases, the Executive Committee prudently passed a motion to increase individual member dues by $10 and organizational dues by $50 effective January 1, 2015. All 2015 dues paid before this date will be given a one-time discount for early payment and will be held at current rates.

The audit committee met Sunday October 19, 2014, reviewed the fiscal year 2014 Statement of Financial Position and found that all financial affairs of the Association are in order.

State of the Association
Stephen K. Crawford

“In our country are evangelists and zealots of many different political, economic and religious persuasions whose fanatical conviction is that all thought is divinely classified into two kinds—that which is their own and that
II. D. USAHA MEMBERSHIP MEETINGS

which is false and dangerous,” Robert H. Jackson, U.S. Supreme Court justice, 1941-1954.

USAHA is, in my opinion, designed and intended to avoid the sway of zealots, political interests and public opinion in developing policy recommendations, resolutions, and other positions. I know that opinions may vary regarding how much politics plays into USAHA discussions (just read some of the membership survey comments to see this). But I am not aware of any other organization with USAHA’s broad membership of regulators, researchers, and industry that has such a mechanism built into the purpose statement of its organizational bylaws in order to limit comment to areas of scientific consensus. Our members may not always agree but this structure means USAHA usually gets it right in the end. For these reasons, I believe USAHA is an organization uniquely positioned to avoid confirmation bias and advise regulatory entities about animal health and disease control, animal welfare, food safety and public health regulatory policy.

I believe USAHA is in very good shape. You have heard from the treasurer that we are on sound financial ground and are taking purposeful action with an eye on retaining that base of two years’ reserves while improving member services.

You should also be aware that president-elect Dr. Bruce King led 20 of your colleagues, supported by Ben and Kelly, and facilitated by John Huston, on a yearlong series of phone, email, and face-to-face meetings to lay out a future vision for USAHA. The result is the 2015-2020 Strategic Plan. You can find a draft of the Plan on the USAHA website or on the meeting app – information, general information… I want to spend a few minutes here today on highlights and offer a chance to come tomorrow at lunch time to hear a bit more.

The Plan begins with a simple but important mission statement: The USAHA develops and promotes sound animal health solutions for the public good. Our bylaws have and will continue to ground these solutions in science-based discussions.

The Plan includes five goals for the next half-decade:

- Broaden membership and increase engagement
- Optimize committee effectiveness
- Increase effectiveness of resolutions
- Increase awareness of role of USAHA and influence animal health policy for the public good
- Engage USAHA throughout the year, effective technology

The task force used your membership surveys and your annual meeting feedback to develop the plan. It is intended to be your plan, and to maximize its effect, and avoid participation fatigue; implementation will require participation from new faces as well as familiar ones to assure we use both our successful history and our best visionary resources. Most of the goals include an action step that involves small group analysis and recommendations to the executive committee (EC) for implementation, so I
ask and encourage you to participate. And to make sure the EC is doing your work, the Plan includes an annual review by the task force to assure we are staying on point.

We have been working to evolve USAHA’s year round presence, so in addition to the Strategic Plan, there has been plenty of other important work on your behalf this year:

- We entered a bold new world last year with the launch of our first meeting App. We had 51% uptake with limited introduction time. We hope to have provided an even better experience this year.
- Resolution 26 work group – request of Livestock ID committee, coordinate with National Institute for Animal Agriculture (NIAA) and other partners, USDA-APHIS-VS financial support – is well on its way to development of the requested solution.
- USAHA co-sponsored a trichomoniasis seminar with NIAA in April
- Some of you may have seen, I hope, trade publication coverage about USAHA over summer.
- The EC adjusted annual meeting (AM) registration this year to make more favorable for members
- And just this past week, the EC voted to recommend a dues increase for next year to be proposed to the Board of Directors (BOD) this week. You heard the background and details from Dr. Jones. $10 for individual members and $50 for organizations. It has been many years since the last one.

In closing, I must thank all of you who work on our behalf throughout the year, in particular Ben Richey and Kelly Janicek who support every member and manage just about anything we ask of them.

Report of the Committee on Nominations
David T. Marshall
Presented on behalf of David Meeker

The action of the Report of the Committee on Nominations will take place at 2:05 p.m. on October 22, 2014, during the Membership Meeting. The 2014-2015 Nominations are:

OFFICERS
PRESIDENT.............................. Bruce L. King, Salt Lake City, UT
PRESIDENT-ELECT....................... David D. Schmitt, Des Moines, IA
FIRST VICE-PRESIDENT............... Boyd H. Parr, Columbia, SC
SECOND VICE-PRESIDENT............. Barbara C. Determan, Early, IA
THIRD VICE-PRESIDENT............... Kristin M. Haas, Montpelier, VT
TREASURER............................. Annette M. Jones, Sacramento, CA
II. D. USAHA MEMBERSHIP MEETINGS

DISTRICT DELEGATES

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

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

- Nick Striegel, Animal Emergency Management
- Lisa Becton, Animal Health Surveillance & Information Systems
- Kevin Snekvik, Aquaculture
- Gail Golab, Animal Welfare
- Jim Logan, Brucellosis
- Mike Gilsdorf, Diagnostic Laboratory and Veterinary Workforce Development
- Don Hoenig, International Standards
- Elisabeth Patton, Johne's Disease
- Christine Hoang, Pharmaceuticals
- Sandi Norman, Public Health and Rabies

With no further business, the meeting was adjourned.
USAHA MEMBERSHIP MEETING
WEDNESDAY, OCTOBER 22, 2014
Stephen K. Crawford, Presiding

The Second Membership Meeting was called to order by Dr. Stephen Crawford, President.

Report of the Action of the Committee on Nominations
Bret D. Marsh
On behalf of David Meeker

OFFICERS
PRESIDENT................................. Bruce L. King, Salt Lake City, UT
PRESIDENT-ELECT............................. David D. Schmitt, Des Moines, IA
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DISTRICT DELEGATES
NORTHEAST.............................. Spangler “Buzz” Klopp, DE; Bruce Akey, NY
NORTH CENTRAL............................. Louis Neuder, MI
SOUTH................................. L. “Gene” Lollis, FL; A. Gregario Rosales, AL
WEST............................................. Bill Sauble, NM; H. M. Richards, III, HI

Passing the Presidential Gavel
Stephen Crawford

Immediate Past President Stephen Crawford (l) presents incoming President Bruce King with his president’s gavel.
II. D. USAHA MEMBERSHIP MEETINGS

President’s Address
Bruce L. King

With a very humble approach, I accept the opportunity to serve as the President of the USAHA. Those who have gone before have placed this organization on a very firm foundation in which to launch from. Dr. Stephen Crawford has been an exceptional leader and is a light upon a hill for those such as I to follow. Under his leadership, a new strategic plan for USAHA was developed and will act as guide for years to come. The plan will give very clear direction in allowing us as an organization to continue to provide a national venue for stakeholders to identify those most effective methods to protect and improve animal health and welfare, and public health. The new strategic plan gives very clear direction regarding membership, committee effectiveness, tools for resolutions, the awareness of USAHA’s role to key stakeholders, and addressed technology.

I look forward to this coming year and the opportunity to serve.

Recognition of Immediate Past President

Bruce King, acting on behalf of David Meeker, presents Stephen Crawford with the Past President’s plaque, recognizing him for his dedicated leadership and service to USAHA.

Executive Director’s Report
Benjamin D. Richey

As always, it is truly a pleasure to stand before this body. The work of each of you makes a difference in the ability to feed the world. I know I say it every year, but it is an honor to work for such a fine group of individuals.
It has been a long and tiring week and a half for us, but I have heard several good comments about Kansas City, and we’ve enjoyed having you in our back yard here, since the office is only an hour north of here.

I look forward to receiving your feedback on this location through the survey that will be available through the app and online after the meeting.

I am extremely thankful for all our sponsors this year, who are crucial to making all of this happen. As you see them, please thank them.

Attendance is very strong this year. Estimates are around 1,250 for all attendees, proving again the central location is easier for folks to attend.

I have to give my thanks to Executive Committee, no matter the year, your officers represent the finest in our industries, with unparalleled commitment. Congratulations to you, Dr. Crawford, on the accomplishments under your leadership. It has been my pleasure to work with you. Additionally, I am looking forward to the coming year with Dr. King, and welcoming Dr. Haas.

We always appreciate the local support, both from the state of Missouri and K-State University for providing staff for us. Dr. Hickam and her staff have been great hosts for us this year. Maybe you’ll have us back in another four years.

Prior to the meeting, we’ve had our challenges this year, but this could not happen without Kelly’s hard work, and of course Linda’s preparations, though she had more important matters this year, and our partners at AAVLD for helping to pick up where we needed. We have definitely missed having Linda here with us this year, so keep her in your thoughts and prayers.

Kim Sprout has been fantastic again with managing our resolutions and reports, and filling in wherever needed. We are grateful for her time here this week.

I am excited about the upcoming strategic plan, and as Steve has mentioned we’ll be relying on you all as members to help form that moving forward. So I hope you’ll be in touch with me as those opportunities are forthcoming very soon.

We’ll begin working with the Northeast for Providence, so I look forward to seeing you there next year.

If you need anything in the meantime, we’re always ready to help however we can.
II. D. USAHA MEMBERSHIP MEETINGS

Report of the Committee on Nominations and Resolutions*
Bret D. Marsh
Presented on behalf of David Meeker

The Report of the Committee on Resolutions is approved by consent calendar. Chair Marsh reported a total of 32 resolutions submitted by Committees for 2014. Marsh read through each resolution as reviewed by the Committee. The following resolutions were recommended to be combined by the Committee:

- 4, 12, and 24
- 6 and 11
- 16 and 23

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 4 combined with 12 and 24; Approved as Amended
- Resolution 5, Not Approved
- Resolution 7, Approved as Amended. AVMA entered an abstention.
- Resolution 9, Approved
- Resolution 10, Approved as Amended
- Resolution 14, Approved
- Resolution 17, Approved
- Resolution 20, Not Approved
- Resolution 27, Not Approved
- Resolution 31, Approved

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

With no further business, the Membership Meeting was adjourned.

*The detailed 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
Co-Chairs: Nick Striegel, CO
Heather Simmons, TX

John Adams, VA; Bruce Akey, TX; Kelli Almes, KS; Gary Anderson, KS; Joan Arnoldi, WI; Lyndon Badcoe, WA; Tom Baker, ON; Deanna Baldwin, MD; Karen Beck, NC; Tammy Beckham, TX; Lisa Becton, IA; Melissa Berquist, TX; Danelle Bickett-Weddle, IA; Patricia Blanchard, CA; Richard Breitmeyer, CA; Becky Brewer-Walker, AR; Gary Brickler, CA; Charlie Broaddus, VA; William Brown, KS; Heather C. F. Case, IL; Nancy Chapman, MD; Gregory Christy, FL; Neville Clarke, TX; Matt Cochrman, TX; Leslie Cole, OK; Dustin Cox, NM; Stephen Crawford, NH; Tarrie Crnic, KS; Glenda Davis, AZ; Ignacio dela Cruz, MP; Susan Dixon, IA; Leah Dorman, OH; Brandon Doss, AR; Cheryl Eia, IL; Brigid Elchos, MS; Dee Ellis, TX; Larry Elsken, IA; Francois Elvinger, VA; Betsy Flores, VA; Rose Foster, MO; W. Kent Fowler, CA; Mallory Gaines, DC; Tam Garland, TX; Cyril Gay, MD; Robert Gerlach, AK; Michael Gilsdorf, MD; Linda Glaser, MN; Patricia Godwin, KY; Sue Goetz, WI; Timothy Goldsmith, MN; Alicia Gorczyca-Southerland, OK; Larry Granger, CO; Kristin Haas, VT; Rod Hall, OK; Timothy Hanosh, NM; Charles Hatcher, TN; Greg Hawkins, TX; Carl Heckendorf, CO; Julie Helm, SC; Kristi Henderson, IL; Jan Hershpenhouse, CA; Linda Hickam, MO; Rick Hill, IA; Donald Hoenig, ME; Guy Hohenhaus, MD; Lindsey Holmstrom, TX; Floyd Horn, MD; Jesse Hostetter, IA; Dennis Hughes, NE; Holly Hughes-Garza, TX; Pamela Hullinger, CA; David Hunter, MT; Carla Huston, MS; Annette Jones, CA; Karen Jordan, NC; Subhashinie Kariyawasam, PA; Paul Kohrs, WA; Darlene Konkle, WI; Charlotte Krugler, SC; Michael Langford, NY; T.R Lansford, TX; Elizabeth Lautner, IA; Kerry Leedom Larson, IA; Randall Levings, IA; Tsang Long Lin, IN; Mary Lis, CT; Eric Liska, MT; Frank Liu, MN; Francine Lord, ON; Kevin Maher, IA; Barbara Martin, IA; Sarah Mason, NC; Chuck Massengill, MO; Paul McGraw, WI; David Meeker, VA; Shelley Mehlenbacher, VT; Jessica Meisinger, VA; Samia Metwally, NY; Gay Miller, IL; Mendel Miller, SD; Janice Mogan, IA; Alfred Montgomery, DC; Lee Myers, GA; Yvonne Nadler, IL; Sherrie Nash, MT; Cheryl Nelson, KY; Sandra Norman, IN; Dustin Oedekoven, SD; Kenneth Olson, IL; Claudia Osorio, MD; Stephanie Ostrowski, AL; Kristy Pabilonia, CO; Elizabeth Parker, TX; Roger Parker, TX; William Parker, GA; Boyd Parr, SC; Virginia Pierce, MD; Jewell Plumley, WV; Jeanne Rankin, MT; Tom Ray, NC; Renate Reimschuessel, MD; M. Gatz Riddell, Jr., AL; Paul Rodgers, WV; Keith Roehr, CO; James Roth, IA; John Rowden, CA; Mo Salman, CO; John Sanders, WV; A. David Scarfe, IL; Joni Scheftele, MN; Mark Shearer, IA; Gary Sherman, DC; Heather Simmons, TX; Kathryn Simmons, DC; Marilyn Simunich, ID; David Smith, NY; Julie Smith, VT; Tom Smylie, ON; Harry Snelson, NC; Diane Stacy, LA; Mike Starkey, MN; 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; Liz Wagstrom, DC;
The Committee met on Saturday, October 18, 2014, at the Westin Hotel, Kansas City, Missouri, from 8:00 a.m. to 1:30 p.m. There were 68 members and 66 guests present. At the beginning of the meeting, the mission statement was reviewed along with the USDA-APHIS-VS’s response to the 2013 USAHA Resolution #2, *National FMD Preparedness Working Group*. Members and guests were referred to the USAHA website to view the responses to all of the 2013 resolutions. Twelve presentations were heard, two of which were time-specific papers.

**Time-Specific Papers:**

- Dr. James Roth, Center for Food Security and Public Health, Iowa State University presented a time-specific paper on the FMD Vaccine Surge Capacity for Emergency Use in the United States. The paper, in its entirety, is included at the end of this report.
- Dr. Dan Grear, USDA-APHIS-VS-CEAH presented a time-specific paper on The Impact of Movements and Animal Densities on Continental Scale Cattle Disease Outbreaks in the U.S. The paper, in its entirety, is included at the end of this report.

**Presentations**

**USDA-APHIS-VS Emergency Preparedness and Response**

Jon Zack, USDA–APHIS, Veterinary Services (VS), National Center for Animal Health Emergency Management (NCAHEM)

Dr. Zack gave an overview of the animal emergency response and preparedness planning that occurred over the last year and laid out the goals and objectives for the overall emergency preparedness program.

**USDA–APHIS, Veterinary Services Training and Exercise Planning**

Lee Myers, USDA-APHIS-VS, Emergency Preparedness and Response Training/Exercise Initiative

Dr. Myers provided an update on the APHIS-VS Emergency Preparedness and Response Training/Exercise (T&E) Initiative. Much progress has been made since the initiative was first proposed during the 2012 United States Animal Health Association meeting.

Myers reviewed the timeline of developments over the last two years and emphasized the approval and implementation of the *USDA-APHIS-VS Emergency Preparedness and Response Training/Exercise Strategy and Plan Fiscal Year 2015 – 17 (VS TEP)*. The restructured VS T&E team developed the plan during its annual T&E planning workshop in April 2014. The VS TEP provides a forum and process to build the VS-wide T&E strategy and plan in collaboration with external stakeholders and T&E subject
matter experts. The plan also provides the roadmap to enhance emergency response capabilities, and identifies T&E priorities and objectives that support the VS emergency preparedness strategy. The plan outlines a detailed, multi-year schedule of T&E events linked to each priority and objective, adding practical value.

The VS TEP clearly supports the SPRS Mission – to apply competencies of our highly trained workforce to prepare and practice animal health and all-hazard response plans – and the SPRS Goal – to strengthen and integrate preparedness and response services by conducting comprehensive response training and exercises. The APHIS-VS Professional Development Staff is an integral component of the initiative and works closely with VS management to ensure that emergency preparedness and response education and training needs are met, in partnership with APHIS.

Myers reviewed the most frequent emergency preparedness and response training topics from the FY14 survey to VS personnel and external stakeholders. The most valuable and requested training by far was for the Incident Command System, followed by a distant second of biosecurity/personal protective equipment; communications; epidemiology/outbreak investigations; sampling; and specific diseases. The survey results and those from future surveys will be considered by the VS T&E team for planning purposes. The SPRS leadership recognizes significant training challenges that should be addressed, including the proper alignment of T&Es with capability gaps, application and use of learned skills, and ways to help responders take advantage of the many training materials already available.

The VS T&E initiative is a work in progress and is taking a progressive approach to build capabilities. The initial focus is on the VS mission-critical responsibility to prepare for and respond to foreign animal diseases/emerging disease incidents (FAD/EDI). It will take time to establish a track record of success beginning with simple, achievable events.

The VS T&E includes three overarching priorities.

1. Formalize the emergency preparedness and response T&E initiative within the VS reorganization.
2. Train VS and external stakeholder emergency responders.
3. Exercise VS’ and external stakeholder emergency responders’ capabilities to prepare for and respond to FAD/EDI.

The following 12 VS TEP objectives are aligned with each T&E priority.

1.1. Identify the VS T&E strategy, priorities, objectives, and resources for the next three years.
1.2. Collect T&E feedback and maintain data.
2.1. Collaborate with USDA-APHIS Plant Protection & Quarantine (PPQ) to raise awareness of locally available ICS training.
2.2. Identify training needs, develop training materials, and deliver training for FAD/EDI preparedness and response.
2.3. Promote and support FAD/EDI response training already provided by VS PDS.
2.4. Develop one health core competency capabilities.
2.5. Develop and deliver risk communication training.
3.1. Conduct discussion-based exercises to validate emergency preparedness and response plans and capabilities.
3.2. Conduct a series of exercise drills to test specific operational procedures and functions.
3.3. Participate and engage in T&Es sponsored by or in collaboration with external stakeholder emergency responders that support the VS T&E strategy.
3.4. Adopt a process for VS T&E improvement planning.
3.5. Explore new technologies and processes.

There are multiple events in alignment and support of each VS TEP objective. Events may be specific tasks or actions, training initiatives, or discussion-based or operations-based exercises. Working groups are formed for each event and are open to VS T&E team members, subject matter experts, and other personnel impacted by the event. Groups meet regularly, primarily through virtual means, throughout the year to continue progress. Following is the list of VS TEP events for the Federal fiscal year 2015, which includes 16 training events and 12 exercise events.

All events engage both VS and external emergency response stakeholders.

1.1.1. Establish and institutionalize a VS T&E program, including necessary resources, within the VS reorganization.
1.1.2. VS T&E team conduct a VS T&E workshop each year.
1.1.3. Publish a multi-year VS TEP each year.
1.1.4. Implement the updated VS TEP beginning October 1 of each year.

1.2.1. Prior to the workshop each year, request feedback and input from all VS units and external stakeholder emergency responders on the VS T&E priorities, objectives, and events for consideration in the VS TEP.
1.2.2. Develop and implement a process to catalog VS T&E events and appropriate external T&E events, and have the information accessible to VS personnel and external stakeholder emergency responders.

2.1.1. Distribute the USDA APHIS PPQ list of available ICS courses to emergency responders on a quarterly basis.
2.2.1. Reach out to VS emergency responders and raise awareness about the VS TEP.
2.2.2. Conduct an FAD diagnostician swine euthanasia, personal protective equipment, necropsy and sampling wet laboratory. (FY15 VS micro-grant)
2.2.3. PDS staff promotes available training for working with law enforcement and border patrol.
2.2.4. ICS position-specific training: Kifco poultry foam unit training for emergency responders responsible for poultry depopulation.
REPORT OF THE COMMITTEE

2.2.5. PDS staff market training opportunities to emergency responders on a quarterly basis.

2.3.1. Develop new training for Secure Food Supply plans.

2.3.2. Develop new training for VS foot-and-mouth disease vaccination policy and contingency planning.

2.3.3. ICS position-specific training: Captive bolt training for emergency responders responsible for depopulation.

2.3.5. Quarterly FAD/EDI continued education distance training, e.g., disease refreshers, including tick-borne FADs, novel diagnostic technologies, and screwworm response.

2.3.6. Emergency response support roles, e.g. biosecurity and safety.

2.4.1. Develop training materials on one health core competencies and integrate them into future training events.

2.5.1. ICS position-specific training for Incident Commanders and Public Information Officers: Develop and deliver an annual risk communication course focused on an FAD/EDI response.

3.1.1. Livestock market emergency response plan template and workshop. (FY14-15 VS micro-grant)


3.1.3. Two-day national workshop for incident management teams to build draft SOPs for transfer of incident command.

3.1.4. Two-day national workshop for federal IMTs, and state and regional animal health partners to review processes, identify gaps, and develop SOPs that will expedite issuance of SFS permits.

3.1.5. One-day workshop at APHIS headquarters to develop SOPs to recall and mobilize personnel assigned to the APHIS Emergency Operation Center for an FAD/EDI.

3.2.1. Drill in each VS SPRS District (6 total) to validate procedures for the investigation of potential FAD/EDIs and Emergency Management Response System 2.

3.3.1. Multi-State Partnership for Security in Agriculture and VS two-day, face-to-face workshop to build plans and procedures for area command and resource management during a multi-state FAD outbreak.

3.3.5. VS personnel participate in external stakeholder exercises.

3.4.1. Develop and implement an effective corrective action program to ensure that improvement plans from exercises and emergency incidents are implemented; corrective actions tracked to completion; and tangible preparedness improvements are documented, distributed, and implemented.

3.5.1. Assess new technologies and processes that can support virtual exercise design/development, conduct, evaluation, and improvement planning.

The complete VS TEP can be downloaded from the APHIS-VS website link.
VS recognizes the wisdom in developing a T&E strategy and identifying program-wide T&E priorities to assure the emergency preparedness and response mission will continue to be achieved. This process is particularly important in light of the VS reorganization and recent reduction in agency resources. Implementing the VS emergency preparedness and response strategy will prepare through training and exercises for a high-consequence FAD/EDI and/or pest response requiring emergency responders for multiple rotations.

Emergency Management Response System (EMRS) Update
Fred Bourgeois, USDA-APHIS-VS-SPRS, National Preparedness and Incident Coordination Center (NPIC)

Dr. Bourgeois, provided the update from the USDA-APHIS, Surveillance, Preparedness & Response Services (SPRS), National Preparedness & Incident Coordination Center EMRS Team. Bourgeois focused his comments on the Emergency Management Response System (EMRS2) application. Bourgeois explained that EMRS2 was built on the Microsoft Customer Relationship Management (CRM) Dynamics platform as a custom eXtended Relationship Management (XRM) in-house development project during the past several years and was put into production in November of 2013. The legacy EMRS1 data was migrated to the new system and EMRS1 was decommissioned. EMRS2 has a number of custom entities for managing premises and the related animals and activities for foreign animal disease (FAD) investigations; and other disease incidents such as the premises, animals, animal groups, structure entities for managing the basic information as well as the investigation entity for managing activities related to an investigation. During investigations he explained there are a wide variety of activities that can be tracked including examinations of animals or groups of animals and the subsequent sampling and submission of samples to diagnostic laboratories. Currently the system is being used extensively for the swine enteric coronavirus diseases (SECD) incident in swine including sending electronic laboratory results from the National Animal Health Laboratory Network (NAHLN) Laboratories to EMRS2. The tracing and traceability functions are quite extensive and the Cattle Health Program has requested that all tracing activity after October 1, 2014 be entered into EMRS2. Bourgeois then participated in a question and answer (Q&A) session with other members of the NPIC staff.

Responding to PEDv – Lessons Learned
Paul Thomas, AMVC Management Services

Porcine epidemic diarrhea virus (PEDv) was discovered in the United States for the first time in May 2013. Since its arrival, PEDV has spread quickly across the U.S. causing severe losses of piglets on sow farms and performance losses in grow-finish production. The response to PEDv varies
from farm to farm, often incorporates both proven methods used to control other diseases and new methods to address PEDv-specific challenges, and is constantly evolving as experience and research provide veterinarians with new information and tools. This summary serves to address a few of the practical lessons that have been learned while working to prevent and control PEDv on sow farms within the Audubon-Manning Veterinary Clinic (AMVC) system.

The current response at AMVC when a farm becomes infected with PEDv is a three-part process involving removal of susceptible piglets from the farm, homogenizing the disease and immune status of all remaining animals, and elimination of the virus from the farm. Mortality among nursing piglets that become infected with PEDv is near 100% in naïve populations. To reduce losses, all piglets ten days of age or older are weaned immediately following diagnosis of PEDV on the farm. Following this early “wean down,” replacement gilts are brought into the farm and the entire farm is exposed to PEDv via oral immunization with intestinal contents from acutely affected piglets. Oral immunization should be performed until every adult animal has displayed clinical signs of PEDv infection (diarrhea, lethargy, anorexia). Once all adults have been properly exposed to PEDv, additional exposure should be halted and elimination processes begin. Elimination of PEDv from the farm is accomplished by cleaning and disinfecting facilities to remove and inactivate PEDv in the environment and by removing sources of new/ongoing virus replication from the farm. All facilities must be thoroughly washed and disinfected not once, but continuously, to remove all PEDv from the farm as sows continue to shed in the weeks post-infection. Until immunity can be conferred to piglets through the dam’s milk, all piglets will continue to become infected, shed huge amounts of virus into the environment, and die. For this reason, all piglets should be humanely euthanized at birth for a period of three to four weeks following immunization of the herd. In the weeks and months following the resolution of normal health, cleanliness on the farm is crucial to prevent the movement of PEDv and re-infection of susceptible animals while other animals in the population are likely still shedding.

To minimize immediate and ongoing losses from PEDv, it is critical to have a response plan that is clearly communicated to farm personnel and ready to be implemented immediately. The first step of an outbreak response is to remove susceptible piglets from the farm. By responding rapidly, we maximize the number of animals that can be removed from the farm prior to becoming infected with and dying from PEDv. A rapid response requires having trailers and transporters ready to move pigs in a matter of hours. It also requires having a facility ready to receive these animals and specialized diets to accommodate the young age and nutritional needs of the group. Figure 1 illustrates the differences in PEDV-related losses at two different farms.
During a PEDv outbreak and for several weeks or months following an outbreak, cleanliness on the farm is critical. Apart from proper facility washing and disinfection as described above, other practices should be implemented to stop virus movement between animals. Most of these steps are targeted at maximizing farrowing room cleanliness because newborn piglets are the most susceptible animals on the farm. Practices include inspection of farrowing creates following power washing, washing sows as they are moved to the farrowing rooms, never stepping in farrowing crates, and eliminating all movement of piglets between litters. Boot wash/disinfection and hand wash stations should be set up in farrowing, gloves should be changed between litters and litters should be processed at 24 hours of age – prior to the shedding of any PEDv. Figure 2 illustrates the impact of cleanliness on ongoing piglet losses at two farms.
Figure 2: Effect of farm cleanliness on ongoing piglet losses. Farm C implemented strict cleanliness practices, while Farm D struggled with cleanliness procedures, resulting in prolonged increased piglet mortality.

This summary has only touched on a few of the key concepts to keep in mind when working with sow farms to overcome PEDv. By no means is it a complete list, nor could a complete list be created because each farm will have its own challenges to identify and learn from. What’s important is to evaluate the processes that are in place on the farm to identify areas of greatest risk and find the points where changes can be made to mitigate these risks. In fact, that is just what the included figures represent – early cases that we learned from and used to prevent future losses at other farms.

Proactive Risk Assessment to Support Managed Movement of Livestock and Poultry During a Disease Outbreak

Timothy Goldsmith, University of Minnesota, Center for Animal Health and Food Safety

The movement of live animals during a Highly Contagious Animal Disease event such as with a Foreign Animal Disease (FAD) or and Emerging Disease Incident (EDI) carries significant risk for potential disease spread. Conversely, movement restrictions also carry risks including the potential negative effect on continuity of business for un-infected livestock and poultry operations and processing facilities within the control and surveillance zones. Historical outbreaks have demonstrated that the movement of livestock and poultry without adequate mitigations can contribute to disease spread, while not allowing movement of uninfected animals can result in unintended negative consequences to the animals, producers and affiliated industries.

Proactive Risk Assessments are being developed as part of the Secure Food Supply plans to address the need for science and risk based tools to facilitate managed movement of non-infected animals and non-contaminated animal products from uninfected premises in an FAD outbreak. The goal is to facilitate normal agriculture and food industry business operations, while
simultaneously mitigating the risk of disease spread from the managed movement.

Proactive Risk Assessments are developed using a public-private partnership approach that involves working groups comprised of industry, state and federal regulatory and academic members. These working groups provide input, data and subject matter expertise into the evaluation process.

The proactive risk assessments include detailed characterization of industry operations and the associated movement; hazard characterization related to specific disease; identification of risk pathways; along with a combination of information sources that include modeling, literature review and expert opinion to evaluate the likelihood of transmission for the risk pathways. Qualitative as well as quantitative risk assessment approaches are employed, with quantitative models developed when appropriate data exists and qualitative approaches used to evaluate pathways with limited quantitative data.

Initial proactive assessments focused on the movement of commodities and utilized an assumption of "infected but undetected" source premises as a conservative approach, as this would be the highest risk situation assuming that movement from known infected premises would not be permitted and truly uninfected premises do not have the causative agent present. As this approach is applied to movement of livestock there are some additional complexities as some of the simplified assumptions used with commodity assessments are not applicable. For the movement of livestock or poultry the likelihood of infection as well as the likelihood of being undetected needs to be assessed. This risk based approach is designed to be a transparent process which incorporates all the applicable production, regulatory and mitigation practices to access the resulting risk to guide risk managers during an outbreak situation.

Outcomes and tools produced through the proactive risk assessment process include the evaluation and/or development of existing mitigation measures that apply to the livestock movement or commodity in question. These include surveillance requirements and options, biosecurity guidelines, cleaning and disinfection procedures, Good Manufacturing Practices and existing regulations. Ultimately the process facilitates development of permitting guidance for use by risk managers in decision making during an outbreak and for preparedness planning prior to an outbreak. Currently, proactive risk assessments for the movement of livestock and poultry are being developed as part of the Secure Broiler Supply, Secure Turkey Supply and Secure Pork Supply plans with anticipated work in the Secure Egg Supply and Secure Milk Supply plans forthcoming.

AgCONNECT™ and its Role in Enhanced Passive Surveillance (EPS)

John Korslund, Science and Technology Directorate, Department of Homeland Security

AgCONNECT™ is a suite of data analysis and integration tools that support multiple functions of animal health emergency preparedness and
response. These tools have the capability to integrate data from disparate data sources into a single, easy-to-use, real-time common operating picture for data analysis and visualization. Additionally, they can be customized to meet the individual needs of the user/stakeholder.

The biosurveillance tools of AgCONNECT include mobile applications for field data entry and a web-based Analyst Workstation (AWS) for data analysis and visualization. These tools support an integrated national animal disease surveillance program capable of real-time animal health status reporting from multiple sources to provide early indicators of abnormal animal health events. The mobile applications are available for use on multiple devices and platforms and serve as an interface for veterinarians and inspectors to enter clinical animal health data from livestock and poultry premises, feedlots, and markets. Information from the mobile apps are transferred to the AWS, allowing epidemiologists to aggregate real-time data through the use of visual, geospatial, and temporal analysis tools. The mobile applications also provide valuable information back to practitioners regarding other syndromic reports in their state, providing access to a unique information source to aid in animal diagnosis and treatment. It is anticipated that the program will be rolled-out to at least 15 states and into all major livestock and wildlife industries by the end of the current pilot project.

AgCONNECT also includes a business continuity function for use by the livestock industries, state animal health officials, and emergency responders to maintain commerce during a high-consequence animal disease outbreak. This tool allows for the secure, real-time sharing of needed production and movement data, including the Secure Food Supply Plans. Key pieces of data (such as premises locations, livestock census information, disease surveillance results and animal movements) are collected and can be aggregated and visualized for analysis and situational awareness through the AgCONNECT system. Additionally, key partnerships and agreements are being secured prior to an event in order to ensure seamless data sharing and informed decision making.

**AgCONNECT™ : Supporting Pork Industry Operations During and Animal Disease Outbreak**

Patrick Webb, National Pork Board

The U.S. pork industry continues to work cooperatively with state and federal animal health agencies/departments to improve the infrastructure for emergency preparedness and business continuity. Central to this effort is the incorporation of a nationally standardized premises identification number (PIN) into current industry business practices. This tool offers the ability to link premises, animal movement and diagnostic data so that it can be securely viewed and analyzed by animal health authorities to help guide appropriate action.

To support business continuity during a foreign animal disease (FAD) outbreak, rapid sharing of data between producers and government is critical. To help demonstrate this capability, the National Pork Board has
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partnered with the Institute for Infectious Animal Diseases to begin a pilot project using AgCONNECT, an internet-based tool to help maintain business continuity and perform risk management during a FAD outbreak.

Pilot project participants included Iowa State University’s Veterinary Diagnostic Laboratory, Iowa State University’s Center for Food Security and Public Health, an Iowa-based pork production system and the Iowa Department of Agriculture and Land Stewardship. The project successfully demonstrated the ability to securely share data associated with premises identification numbers for analysis and decision-making. In the case of a FAD outbreak, this information could be used to support state and federal animal health officials in making near real-time decisions regarding risk, swine movements and disease status that would help a production system maintain business continuity.

Washington State Mudslide Response
Minden Buswell, Washington State Department of Agriculture

On March 22, 2014, a massive landslide occurred four miles east of Oso, Washington that engulfed the neighborhood of Steelhead Haven, resulting in 43 human deaths. County and Federal Emergency Management Agency (FEMA) Canine Search Teams for Human Remains Detection (CST-HRD) were deployed to recover human remains. On April 4, 2014, the Washington State Reserve Veterinary Corps (RVC) was deployed to provide veterinary care for the canines due to the hostile landslide environment.

An analysis of canine medical records was completed and a formal after action report/improvement plan was created to assess the Washington State RVC performance. All areas for improvement were derived from the following three evaluations: 1.) SR 530 Slide - RVC After Action Meeting held on June 30, 2014, 2.) SR 530 Slide – RVC After Action Survey, and 3.) Washington RVC – Responder Partners Survey.

A total of 52 employees and volunteers responded to this 19-day mission. Thirty-two canines were seen by the RVC with a total of 133 exams. The most represented canine breeds were Labrador Retrievers (14) and German Shepherds (8). The most common ages were between 4-6 years. Common injuries/medical events include: paw pad abrasions (23), worn pads (16), pad splits (11), subjective dehydration (10), dietary indiscretion (8), and weight loss (5). Areas for improvement in future deployments include: continued training in Incident Command System (ICS), incident safety, Hazardous Materials (HAZMAT), situational awareness, animal behavior, canine search and rescue, and incident stress management; development of a more robust small animal cache of supplies/equipment; and improve efficiency in the volunteer call-down system.

The Washington State RVC was successful in providing appropriate and satisfactory veterinary care for the CST-HRD canines. This mission supported the overall incident objective of recovering the 43 victims lost in the landslide. Areas for improvement were identified in order to more
efficiently and effectively respond in the future. Upon demobilization of the RVC, 41/43 victims were identified and as of July 22, 2014 all 43 victims were located and identified.

**Training Tool Framework for Animal Emergency Responders**
Amy Kircher, National Center for Food Protection and Defense

The United States food and agriculture systems are vulnerable. Disease, pests, or poisonous agents that occur naturally, are unintentionally introduced, or are intentionally delivered by an act of terrorism are all possible attacks to our food supply. Because these systems are extensive, open, interconnected, diverse, and complex in their structure, they are potential targets for terrorist attacks. An attack against these systems could have catastrophic health and economic effects. Within the Department of Homeland Security (DHS) and more broadly across the Federal Interagency, greater emphasis is needed to enhance common understanding and agreement on requirements and capabilities expected in the area of agriculture and food defense.

Animal agriculture stakeholders ranging from federal government officials to primary producers in the food industry all need emergency management competencies that align to serve the national preparedness system. High quality training is needed to prepare for, prevent, mitigate, respond to, and recover from an emergency in the animal agriculture sector, and individuals need an intuitive way to navigate training resources.

In collaboration with Department of Homeland Security Office of Health Affairs (OHA) Food, Agriculture and Veterinary Defense Branch (FAVD Branch), the National Center for Food Protection and Defense (NCFPD) is creating a comprehensive training framework for animal agriculture emergency responders. The purpose of this interactive online framework is to recommend training opportunities for every emergency responder in an Incident Command System so they may be prepared to complete the tasks needed for efficient response during an animal agriculture emergency. The training framework will serve the vision of the national preparedness system by guiding the development of a skilled cadre of emergency responders, and it will offer a framework for an individual to plot out career development opportunities in emergency response through high quality, standardized training.

**Food Agriculture and Veterinary Response Exercise (FAVRE) Workshop**
Marvin Meinders, Office of Health Affairs, Department of Homeland Security

The purpose of the FAVRE Workshop was to assess Incident Management and Response to agro-terrorism incidents across all levels of government and private sector as well as to facilitate participants’ identification of Federal resources for a FMD response. In addition, the workshop was to address the DHS Secretary’s Counterterrorism Advisory Board (CTAB) FMD Table Top Exercise (TTX) After-Action Report findings.
During the weeks leading up to the workshop, training was provided by webinars on tools available to support disease outbreak responses. The webinar topics included FAD PReP, Emergency Management Response System (EMRS 2), AgConnect Emergency Response Support System (ERSS), and the North Carolina and California Response Playbooks.

The actual workshop was hosted by FEMA Region VII on December 11-12, 2013 in Kansas City, Missouri and attended by approximately 160 people from Federal, state and local agencies. Many strengths and areas for improvements were identified during the workshop. For more detail on the workshop findings, please see the U.S. Department of Homeland Security Food, Agriculture and Veterinary Response Exercise FEMA Region VII Workshop After-Action Report/Improvement Plan, February 28, 2014.

Additional benefits of the exercise were its use in the refinement of the Region VII Food and Agricultural annex to their All Hazards Plan. It also brought together all levels of responders from government to producers and helped FEMA develop a regional response approach.

Next Steps - If interested in conducting a FAVRE TTX in your region, request should be made to your FEMA region authority.

**Committee Business**

Two resolutions submitted by committee members were adopted through motions made, seconded, and passed by voice vote.

Resolution #1 – Veterinary License Reciprocity in Emergencies
Resolution #2 - Radiological Incident Response and Resources

The meeting was adjourned at approximately 1:30 p.m.
Foot-and-mouth disease (FMD) presents the greatest economic threat to U.S. animal agriculture and is viewed as the most important transboundary animal disease in the world. An outbreak of FMD in the U.S. would have a devastating impact on the U.S. economy extending far beyond animal agriculture. The structure of modern animal agriculture in the U.S., including extremely large herds and extensive intra- and inter-state movement of animals and animal products will make it nearly impossible to control an FMD outbreak in livestock dense areas without the rapid use of tens of millions of doses of FMD vaccine.

The amount of antigen in the North American FMD Vaccine Bank is based on the old model of stamping out and limited vaccine use to control FMD. The strategy for FMD control has changed due to changes in animal agriculture and the public acceptance of stamping out. The current plan for FMD control depends much more heavily on vaccination. The amount of vaccine antigen concentrate in the North American Foot-and-mouth Disease Vaccine Bank is far below what would be needed to provide vaccine for a single livestock dense state. It would take many months to produce/obtain the volume of vaccine needed. Without sufficient vaccine to aid in the response, FMD could rapidly spread across the U.S., resulting in the destruction and disposal of potentially millions of animals, and become an endemic disease in livestock with spread potentially facilitated by deer, feral swine or other free-living animals. It would then require a much more extensive control program and could take many years to eradicate.

Agriculture is critical infrastructure in the U.S. and cash receipts for livestock and poultry often exceed $150 billion per year. Therefore, it is urgent to develop a plan to ensure that adequate supplies of FMD vaccine with multiple strains of FMD virus are rapidly available in the event of an accidental or intentional introduction of FMD virus into the U.S. The white paper (found at www.cfsph.iastate.edu/pdf/fmd-vaccine-surge-capacity-for-emergency-use-in-the-U.S.) is part of an effort by the private sector stakeholder community to work with the Secretaries of Agriculture and Homeland Security as directed in Homeland Security Presidential Directive 9 (HSPD 9) to develop a National Veterinary Stockpile (NVS) with sufficient quantities of FMD vaccine to protect U.S. agriculture, food systems, and the economy.

Summary of Potential Solutions to Provide Adequate FMD Vaccine to Control a Type 3 or Larger Outbreak of FMD in the U.S.:
1.) A combination of approaches can be used to assure surge capacity for FMD vaccines.
a. Immediate Availability: Finished vaccine held in vendor-managed-inventory and ready for shipment within 24 hours.
   • Enter into vendor-managed-inventory contracts with international manufacturers of FMD vaccines, for rapid delivery of multiple strains of finished vaccines into the U.S. All FMD vaccines that are licensed or permitted by USDA, Center for Veterinary Biologics (CVB) for use in the U.S. and all FMD vaccines produced in the original E.U. member states (Maastricht Treaty; member states prior to 1994) that have either previously obtained European Medicines Agency (EMA) Committee for Medicinal Products for Veterinary Use (CVMP) marketing authorization at the national level in one or more original E.U. member states, or single marketing authorization using the multi-strain dossier approach for use across all E.U. Member States could be considered to be safe and effective and pre-approved for emergency use in the U.S. Contracts should be developed to provide enough vaccine to supply the U.S. until vaccine antigen concentrate (VAC) from the NVS is formulated into vaccine and available.

b. Short-Term Availability: Vaccine antigen concentrate (VAC) held in vendor-managed-inventory ready to be formulated into finished vaccine and shipped to the U.S.
   • Stockpile multiple strains of VAC in the National Veterinary Stockpile (NVS). Enough VAC should be available for the period between depletion of the finished vaccine and availability of large amounts of vaccine available from production initiated at the beginning of the outbreak. The VAC should be held and managed by the manufacturer and the contract should support a rotating inventory (formulating the VAC into finished vaccine for sale and replacing it on a regular basis).

c. Long-Term Availability: Vaccine production initiated at the beginning of the outbreak for the specific outbreak strain(s) of FMD virus.
   • Enter into contracts with international manufacturers of FMD vaccines for surge capacity production of commercially available USDA licensed/permitted or approved E.U. licensed FMD vaccines.
   • Seek USDA licensure of new technology FMD vaccines that could be safely manufactured in the U.S. and which are based on a platform that allows various capsid serotypes/topotypes to be inserted into the vaccine. These would then be candidates for vendor-managed inventory of finished vaccine and of VAC. Ensure that U.S. manufacturers have the surge capacity to rapidly produce finished vaccine at the beginning of an outbreak.

2.) Ensure that all FMD vaccines used are capable of detecting infections in vaccinated animals (DIVA compatible), unless animals are intended for slaughter. Ensure that sufficient reagents and/or finished kits for DIVA testing will be available for the recovery phase of the FMD outbreak and sufficient NAHLN laboratories have been equipped, trained and proficiency tested to conduct this assay.
3) Develop and adopt available technologies and scalable information
technologies for identifying and tracking all vaccinated animals and
diagnostic testing results.
4) Develop interferon or other antiviral biotherapeutic products for inducing
rapid and medium term resistance (1 day to 14 days) to FMD infection (a
long-term goal).
5) Form a standing advisory committee with expertise in FMD vaccines,
production agriculture, economics, and emergency response to make
recommendations on optimal use of vaccine as the outbreak unfolds.
6) Secure funds to enable the surge capacity need for FMD vaccines
mandated in HSPD 9 to be met (estimated at $150 million/year for five years
to help protect a $150 billion dollars a year (cash receipts) animal industry.
7) Convene a stakeholder community working group of experts capable of
evaluating existing and new technology FMD vaccines under development to
determine the technologies which can best meet the needs for emergency
response vaccination in the U.S. The working group could enter into
confidentiality agreements with biologics companies in order to have access
to confidential business information which can inform the recommendations
for incorporating existing and new vaccines into the surge capacity plan.
8) Conduct research into alternative delivery methods for vaccines which
have been shown in cattle and swine to significantly reduce the antigenic
mass required in each dose of vaccine, thus enabling existing or future VAC
to be formulated into significantly more doses of vaccine.

The stakeholder community should form a working group to develop
recommendations to be presented to the U.S. government for meeting the
surge capacity needs for FMD vaccine mandated in HSPD 9.

As part of this effort, Department of Homeland Security (DHS), Science
and Technology (S&T) should conduct a classified Biological Threat Risk
Assessment (BTRA) in collaboration with the USDA (APHIS and ARS), the
Department of Commerce, and the Office of National Intelligence. The BTRA
should include the size and economic scope of the livestock industry at risk;
the potential sources of virulent FMD virus; the potential routes of incursion
into the U.S. (both from natural and intentional introduction); the potential
Foreign Terrorist Organizations (FTOs) with capability and interest to utilize
FMD virus; an assessment of the ease of obtaining, transporting, and
delivering virulent FMD virus; and the impact to the U.S. economy of an FMD
outbreak in the U.S. (whether it be natural or intentional).
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THE IMPACT OF MOVEMENTS AND ANIMAL DENSITIES ON CONTINENTAL SCALE CATTLE DISEASE OUTBREAKS IN THE U.S.

Michael G. Buhnerkempe\textsuperscript{a}, Michael J. Tildesley\textsuperscript{b}, Tom Lindström\textsuperscript{c}, Daniel A. Grear\textsuperscript{d}, Katie Portacci\textsuperscript{d}, Ryan S. Miller\textsuperscript{d}, Jason E. Lombard\textsuperscript{d}, Marleen Werkman\textsuperscript{b}, Matt J. Keeling\textsuperscript{b}, Uno Wennergren\textsuperscript{c}, Colleen T. Webb\textsuperscript{a}

\textsuperscript{a}Colorado State University
\textsuperscript{b}University of Warwick, Coventry
\textsuperscript{c}Linköping University, Sweden.
\textsuperscript{d}USDA-APHIS, Centers for Epidemiology and Animal Health

Large-scale geographic predictions of disease spread are rare. European livestock disease models are data-rich case studies but are limited to relatively small, country-specific scales. Generalizing to larger systems, such as the United States, is difficult with insufficient spatial resolution and alignment among data sets to capture inherently complex contact networks of infectious livestock. Predictive models of large-scale disease outcomes in the United States’ cattle industry has been hampered by a large system size, complexity, and the absence of suitable livestock movement data. Here, a unique database of U.S. cattle shipments allows estimation of synthetic movement networks that inform a near-continental scale predictive model of a potential fast-spreading foreign animal disease (FAD) epidemic in U.S. cattle. The largest epidemics may affect over one-third of the U.S. and 120,000 cattle premises, but cattle movement restrictions from infected counties, as opposed to national movement moratoriums, are predicted to effectively contain outbreaks. Slow detection or weak compliance may necessitate more severe state-level bans for similar control. Despite high uncertainty in FAD transmission parameters for the U.S., the parsimonious model structure allows for extensive sensitivity analysis for disease spread and suggests the geographic and movement control conclusions are robust to disease spread uncertainty. Such results highlight the role of large-scale predictive models in emergency preparedness, particularly for systems lacking comprehensive movement and outbreak data, and the need to rapidly implement multi-scale contingency plans during a potential U.S. outbreak.

Sara Ahola, CO; Bruce Akey, TX; Debbie Barr, ON; Karen Beck, NC; Lisa Becton, IA; Charlie Broaddus, VA; Dwight Bruno, NY; Stan Bruntz, CO; Craig Carter, KY; Mal Cartwright, AB; Nancy Chapman, MD; Neville Clarke, TX; Marie Culhane, MN; Anita Edmondson, CA; François Elvinger, VA; Tam Garland, TX; Joseph Garvin, VA; Sue Goetz, WI; Xingnian Gu, AUS; Kristin Haas, VT; Pat Halbur, IA, Neil Hammerschmidt, MD; Charles Hatcher, TN; Kristi Henderson, IL; Ashley Hill, CA; John Huntley, WA; Zaheer Iqbal, AB; Brady James, TX; Annette Jones, CA; Jamie Jonker, VA; Ellen Kasari, CO; Diane Kitchen, FL; John Korslund, MD, Elizabeth Lautner, IA; Donald Lein, NY; Anne Lichtenwalner, ME; Francine Lord, ON; Janet Maass, CO; Rodger Main, IA; Stu Marsh, AZ; Michael Martin, SC; Patrick McDonough, NY; Shelley Mehltenbacher, VT; Kate Mueller, IA, Danielle Nelson, WA, Roger Parker, TX; John Picanso, MD; Tom Ray, NC; Craig Rowles, IA, Emi Saito, OR; Mo Salman, CO; A. David Scarfe, IL; Irene Schiller, CHE; Stacey Schwabenlander, MN; Dan Sheesley, DC; Marilyn Simunich, ID; David Smith, NY; Patricia Stonger, WI; Jessie Trujillo, IA; Victor Velez, CA; Steve Weber, CO; Nora Wineland, MO.

The Committee met on October 19, 2014 at the Sheraton Hotel in Kansas City, Missouri from 3:00 to 5:45 p.m. There were 21 members and 25 non-members present. Introductions were made and housekeeping items were addressed.

National List of Reportable Animal Diseases: An update on the cooperative implementation of the NLRAD; An update on the regulatory process to establish and maintain the NLRAD and associated reporting requirements; and items to consider for draft resolutions regarding NLRAD

Stanley Bruntz, Centers for Epidemiology and Animal Health, USDA-APHIS-VS

Dr. Bruntz, gave an update on the proposal for a United States National List of Reportable Animal Diseases (NLRAD) and on the NLRAD - National Animal Health Reporting System (NAHRS). A formal announcement through GovDelivery has been sent out requesting review and input on the following documents: Proposal for a U.S. National List of Reportable Animal Diseases (NLRAD) concept paper (found at: http://www.aphis.usda.gov/animal_health/downloads/nlrad_concept_paper.pdf) and the USDA-VS Framework for Response to Emerging Animal Diseases in the United States. A U.S. NLRAD will be a uniform, science- and policy-based, nationally supported standardized list of animal diseases. It will provide the basis for consistent reporting with uniform case findings and reporting criteria. The U.S. NLRAD will include both notifiable and monitored
diseases. Notifiable diseases are high priority diseases that must be reported by anyone who identifies occurrence of the disease. Monitored diseases occurrence is routinely tracked and data reported to the federal government through State Animal Health Officials (SAHO’s). Support for a U.S. NLRAD has been expressed through multiple animal health organizations, including through AAVLD, USAHA, and National Assembly of State Animal Health Officials (NASAHO) resolutions. A U.S. NLRAD will be initially implemented through Federal-State cooperation and eventually formalized through Federal regulatory action.

The NLRAD-NAHRS functions under the auspice of the joint USAHA/AAVLD Animal Health Surveillance and Information Systems Committee. The USAHA/AAVLD NLRAD-NAHRS Steering Committee includes representatives from the AAVLD, USAHA, USDA-APHIS-Veterinary Services (VS), SAHO’s, and experts representing major commodity groups. The NLRAD-NAHRS Steering Committee provides input to NLRAD-NAHRS on the U.S. NLRAD; NLRAD-NAHRS general operation; and direction of the NLRAD-NAHRS to meet the needs of animal health personnel. Bruntz presented activities and issues related to the NLRAD-NAHRS including implementation of a U.S. NLRAD; updates to the NLRAD-NAHRS Web Reporting Tool; and adapting VS representation on the NLRAD-NAHRS Steering Committee due to VS’s reorganization and other changes.

There was brief discussion on the inclusion of vectors and toxins being included in the NLRAD.

eCVI Developments
Sara Ahola, Colorado Department of Agriculture and Mike McGrath, Trace First

The process of the eCVI was created and posted earlier via another presentation. The Extensible Markup Language (XML) Schema was presented. Questions posed were whether this communication needs to continue, how to report / do eCVI for reportable diseases (such as vesicular stomatitis virus [VSV] in horses) for different databases (Emergency Management Response Services [EMRS] vs. State). There was discussion on the proprietary information included in eCVI that could have legal implications also where to store the data (security of routers vs. clouds). There was discussion on the need for open standards and not pandering to any one vendor’s needs and also taking in consideration the different industry or species needs for eCVI. For example, the swine industry will be investing in better surveillance and emergency reporting systems.

Taking Premise IDs From the Farm to the Lab – Lessons Learned, Nuts and Bolts of PIN Utility
Kate Mueller, Iowa State University

Information from diagnostic laboratories, particularly on emerging diseases or reportable diseases, needs to be easily recorded and shared for accurate disease epidemiology to be determined. Adoption of the Premises
Identification Number (PIN) as a means to record animal location was done in an attempt to do this. PINs are sensitive and contain important information. They are created barcodes with PINs on them that can be affixed to forms. The details of the barcodes were presented. The current use of PINs is approximately 50% on all swine submissions to the Iowa State University (ISU), Veterinary Diagnostic Laboratory (VDL) (as high as 70% when the submission is dealing with a reportable disease). There was brief discussion on location IDs (LIDS) and state issued numbers for other species. Traceability documents are available from USDA on the difference of LIDS vs PINs. The next step is not just a PIN on the submission, but add the sample ID/Barcode also needs to be standardized.

Update on National Animal Health Monitoring System (NAHMS) - Current and Future Activities
Bruce Wagner, Centers for Epidemiology and Animal Health, USDA-APHIS-VS
Swine 2012 and Poultry 2013 NAHMS reports are completed and under review. Equine 2015 NAHMS report is in progress. The Confidential Information Act was in place during the collection of the Poultry 2013 report and allowed USDA to collect data, yet support the poultry industry, yet also meet the FDA requirements for data/reporting. In addition to the larger reports (previously listed) NAHMS also does ongoing monitoring using systems that already have herd data, for example Dairy Herd Information Association (DHIA) enrollment for dairy herds and somatic cell count (SCC) from Federal Milk Orders. Both are value added activities that support animal agriculture. NAHMS also is capable of doing Epidemiologic Investigations and gets Office of Management and Budget (OMB) approval for emergency epidemiologic investigations. Recent examples include *equine herpes virus* (EHV) in Utah, porcine epidemic diarrhea virus (PEDV) in swine in USA, and porcine delta coronavirus (PDCoV) in swine in the USA. Data collected is confidential. Economic and epidemiological modeling for various diseases and antimicrobial resistance studies are also done by NAHMS (more specifically done by the Monitoring and Modeling Center (M&M Center)).
Many new projects will be initiated in future years for equine, swine, layers, dairy, bison, cervids, catfish, cattle stocker, and modeling of vaccination and zoning.
There was a brief discussion on the results of epidemiologic investigations of PEDV in Minnesota and different disease spread models that incorporate the study of animal movements.

Enhanced Passive Surveillance Pilot Projects – an Introduction and Status Update
Lindsey Holmstrom, Institute for Infectious Animal Diseases
AgCONNECT™, developed by Institute for Infectious Animal Diseases (IIAD), is a data capture system and includes a biosurveillance piece that
incorporates specimen collection data, laboratory testing and results, and reporting for all species. Early disease detection is the goal. Early warning information would go out to all stakeholders more quickly. One of the two tools of enhanced passive surveillance (EPS) includes a method to enter data from the field via mobile applications.

**Committee Business**

Nominations for a USAHA vice chair were solicited. Sara Ahola, Colorado, was nominated for the position.

There were no resolutions from 2013. The Subcommittee on Information Standards report is included as an addendum.

There was discussion on the processing and submission of samples to the veterinary diagnostic laboratory in response to an animal disease emergency situation. This would be complimentary to the use of personal identification numbers (PINs) or location identifications (LIDs) (known as primary identifiers) on laboratory submissions in that not only are the premises/locations from which the samples originated are correctly identified but now also the samples themselves submitted to the laboratory under said PINs/LIDs would be identified (by barcode or similar (known as secondary identifiers). This would reduce turnaround of results. It was agreed that the Subcommittee of Information Standards be reactivated and redeployed and members will be asked to participate on this task of sample labeling and information standards for sample labels. This reformation of the Subcommittee will be done following the meeting.
The Subcommittee published a "Draft Standard for Trial Use" in order for partners to test the standard on the USAHA website. The release of this draft was unanimously reported by the members via email vote in June. Producers and consumers of electronic CVIs have been able to test their program against the schema and ensure that they can either produce or consume the data accordingly. The Subcommittee’s next step will be to take input from the testing and integrate any significant needed changes into the schema. The Subcommittee could then officially publish the standard as a final first release. After that, the Information Standards would be continued to be shared as a standard that is recommended for producers/consumers of eCVIs to follow to facilitate the transfer of information, but it will not be a requirement.

This has been a great collective work of Committee members which included private industry, state and local government, and academia.
REPORT OF THE COMMITTEE ON ANIMAL WELFARE
Chair: Gail Golab, IL
Vice Chair: Belinda Thompson, NY

Bobby Acord, NC; Wilbur Amand, PA; Joan Arnoldi, WI; Chris Ashworth, AR; James Averill, MI; George Badley, AR; Deanna Baldwin, MD; Bill Barton, ID; Paul Brennan, IN; Gary Brickler, CA; William Brown, KS; Tom Burkgren, IA; Beth Carlson, ND; Meredith Clancy, NY; Leslie Cole, OK; Stephen Crawford, NH; Glenda Davis, AZ; Ria de Grassi, CA; Ron DeHaven, IL; Leah Dorman, OH; Mark Drew, ID; Brigid Elchos, MS; Dee Ellis, TX; J Amelita Facchiano, TX; Kathy Finnerty, MA; Betsy Flores, VA; Katherine Flynn, CA; W. Kent Fowler, CA; Nancy Frank, MI; Mallory Gaines, DC; Julie Gard, AL; Robert Gerlach, AK; Eric Gingerich, IN; Chester Gipson, MD; Gail Golab, IL; Eric Gonder, NC; Chelsea Good, MO; James Grimm, TX; Paul Grosdidier, KS; Kristin Haas, VT; Thomas Hagerty, MN; Thomas Hairgrove, TX; Rod Hall, OK; Steven Halstead, MI; William Hare, MI; Charles Hatcher, TN; Bill Hawks, DC; Carl Heckendorf, CO; Julie Helm, SC; Linda Hickam, MO; Robert Hilsenroth, FL; Sam Hines, MI; Heather Hirst, DE; Donald Hoenig, ME; 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; Michael Kopp, IN; Daniel Kovitch, VA; Eileen Kuhlmann, MN; Mary Lis, CT; Pat Long, NE; Travis Lowe, KS; Mary Luedeker, TX; Janet Maass, CO; Bret Marsh, IN; David Marshall, NC; Chuck Massengill, MO; David Meeker, VA; Antone Mickelson, WA; L Devon Miller, IN; Mendel Miller, SD; Julie Napier, NE; Sherrie Niekamp, IA; Sandra Norman, IN; Dustin Oedekoven, SD; Elizabeth Parker, TX; Boyd Parr, SC; Kris Petrin, MN; William Pittenger, MO; Jewell Plumley, WV; John Ragan, MD; Herbert Richards, HI; M. Gatz Riddell, Jr., AL; Keith Roehr, CO; Bill Sauble, NM; Travis Schaal, IA; Shawn Schafer, OH; David Schmitt, IA; Dennis Schmitt, MO; Stacey Schwabenlander, MN; Andy Schwartz, TX; Kathryn Simmons, DC; David Smith, NY; Harry Snelson, NC; Diane Stacy, LA; Philip Stayer, MS; Bruce Stewart-Brown, MD; Matthew Stone, NZ; 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; Tracy Tomascik, TX; Alberto Torres, AR; Bob Tully, KS; Charles Vail, CO; Liz Wagstrom, DC; Jennifer Walker, TX; Patrick Webb, IA; Gary Weber, MD; Ellen Wiedner, FL; Brad Williams, TX; Ellen Mary Wilson, NM; Josh Winegarner, TX; Nora Wineland, MO; Richard Winters, Jr., TX; Cindy Wolf, MN; Ernest Zirkle, NJ.

The Committee met on October 22, 2014 at the Sheraton Hotel in Kansas City, Missouri, from 8:00 a.m. until 11:45 a.m. There were 77 attendees, including 50 members and 27 guests. After the Chair called the meeting to order, the final agenda was approved, actions on resolutions submitted in 2013 were reviewed, activity during the past year was summarized, and operational procedures were reviewed. Members were
referred to the website to review other 2013 resolutions and responses. The Chair introduced the first speaker for the session.

Presentations

An Introduction to Veterinary Forensics
Martha Smith-Blackmore, Animal Rescue League of Boston

Societal impacts of, and relationships between, animal cruelty and neglect were reviewed, and animals were recognized as sentinels for people at risk. What contributes to careful and successful identification and resolution of cases was described, and the importance of veterinary contributions was recognized. Basic information about forensic assessments, evidentiary requirements, and veterinarians as expert witness was provided. Included in forensic assessment was discussion of body condition scoring, the importance of documentation and chain of evidence, and the increasing importance of DNA and other laboratory testing in successful prosecution of cases.

Beyond Reasonable Doubt: An Equine Humane Case Review from the Corral to the Court
Grant Miller, Sonoma County CHANGE Program

An overview of the basics of an animal law enforcement investigation was presented, including terminology and the common legal process for criminal animal cases. An equine humane case was used as an example, starting at the onset of the investigation (corral) and finishing with the legal outcome (court). While an equine case was described, the information presented was broadly applicable across species. Attendees were cautioned about state-to-state variability, as well as commonalities.

Personality Typologies of Animal Hoarding Disorder
Martha Smith-Blackmore, Animal Rescue League of Boston

Several animal hoarding cases were described in the context of three described categories of personality types of hoarders. The speaker emphasized that understanding people who hoard animals can help professionals involved in interventions better grasp why changing behavior or improving circumstances can be so difficult.

Committee Business

The business meeting followed the last presentation and the presence of a quorum was confirmed. No recommendations or resolutions were proposed by the Committee.
The Committee met on October 19, 2014 at the Sheraton Hotel in Kansas City, Missouri, from 12:30 to 4:00 p.m. There were 13 members and 12 guests present.

Presentations and Reports

Update from the Office of Aquaculture, National Oceanic and Atmospheric Administration (NOAA)
Kevin Amos, National Oceanic and Atmospheric Administration (NOAA)
Gulf of Mexico Fishery Management Plan (FMP) for Aquaculture

NOAA has published the proposed rule to implement the Fishery Management Plan (FMP) for Regulating Offshore Aquaculture in the Gulf of Mexico. The proposed rule was published on August 28 and the comment period on the on the FMP ends on October 27, 2014. The FMP process is authorized via the Magnuson-Stevens Fishery Conservation and Management Act. This FMP applies to offshore waters (aka Exclusive Economic Zone (EEZ) – 3 to 200 miles offshore) in the Gulf of Mexico region. It applies only to species that are currently managed via FMP’s in the Gulf. NOAA looks forward to receiving comments from the committee. The rule and online commenting can be found at:

First Commercial Offshore Aquaculture Site Approved in California

The Catalina Sea Ranch has obtained the necessary permits to operate a mussel farm off the coast of California on the San Pedro shelf. The farm, which is permitted for 100 acres, plans to stock long lines with mussels in the coming year and hopes in the future to raise other species such as scallops and sea cucumbers. This is the many years of collaborative work between NOAA and other regulating federal and state agencies.

Improving Access to Sites for Marine Aquaculture
In the same vein, the Office of Aquaculture continues to work with other NOAA offices, Army Corps of Engineers, industry, the restoration community, and state and tribal partners to improve access to sites for marine aquaculture.

Dr. Amos also reported on some pending publications authored/co-authored by Office of Aquaculture which may be of interest to the committee as well as others in industry as well as the fish health community. These articles entitled, “Environmental Performance of Marine Net pen Aquaculture in the United States” and “U.S. Response to a Report of Infectious Salmon Anemia Virus in Western North America” will be published in the American Fisheries Society’s magazine, Fisheries.

Amos also spoke about the Best Management Practices (BMPs) for Fish Farms in the Caribbean which was in response to concerns by the Coral Reef Task Force on aquaculture impacts in Caribbean waters. NOAA worked with industry and non-governmental organizations (NGOs) to develop BMPs for marine cage culture in the U.S. Caribbean. More details and access to the report are available at http://www.nmfs.noaa.gov/aquaculture/index.htm

NOAA continues to work with its partners in the United States Department of Agriculture (USDA) and U.S. Fish and Wildlife Service (USFWS) to implement the National Aquatic Animal Health Plan (NAAHP). Currently, the three agencies are collaborating on developing an updated, contemporary implementation strategy that will outline deliverables, dates of delivery and projected costs. He also reported that the interagency memorandum of understanding (MOU) about the shared aquatic animal health responsibilities is being update/revised and is currently being reviewed this MOU is being reviewed by USDA.

U.S. Department of Agriculture, Animal and Plant Inspection Service: Aquaculture Update

Lynn Creekmore, U.S. Department of Agriculture, Animal and Plant Inspection Service

Dr. Creekmore reported on USDA-Veterinary Services Aquaculture Business Plan. This is a five year business plan that outlines priorities, objectives and strategies for aquaculture as being done for each of the other six animal commodity groups. (http://www.aphis.usda.gov/animal_health/downloads/vsbp/5_year_business_plan_aquaculture.pdf)

The plan encompasses disease programs, one health, emergency preparedness, comprehensive surveillance and other emerging issues. It will be used to prioritize congressional appropriations and will be reviewed and update annually. Comments about the March 2015 update can be submitted at to VS.SPRS.Feedback@aphis.usda.gov by November 1, 2014.

Dr. Creekmore also spoke about the Viral Hemorrhagic Septicemia (VHS) Federal Order that was rescinded on June 2, 2014. This decision was based on their risk assessment that concluded that there would not be an
increase risk in the spread VHS by removal of the federal order as long as state regulations were kept in place.

She gave an update on the efforts of the National Aquaculture Association (NAA) and APHIS Veterinary Services who are collaborating to draft a Commercial Aquaculture Health Code. This is a non-regulatory approach initiated by representatives from the NAA and is consistent with APHIS initiatives to utilize non-regulatory approaches when appropriate to address animal health issues. This “Code" uses the approach of the OIE Code of Aquatic Animal Health and seeks to clarify and interpret components (e.g. biosecurity, disease investigation and reporting, surveillance, and zoning) most relevant to U.S. commercial aquaculture. It is hoped that this “Code" will help better position commercial producers in the trade markets, domestic and international, and help the commercial aquaculture industry demonstrate adherence to sound practices for aquatic animal health.

She also reported on the Canadian Fish Import Regulations. APHIS and Canadian Food Inspection Agency (CFIA) have reached an agreement on a new export program to facilitate trade in fish intended for food service, retail sales, and further processing for human consumption. Shipments from registered facilities will be accompanied by “Statement from Exporter", but not a health certificate endorsed by APHIS. For registered status, facilities need to be inspected by an APHIS veterinary medical officer at least once a year and also maintain standard operating procedures. There are currently six facilities which are in Maine and North Carolina. This program will provide an alternative shipping option providing a rapid turn-around for exporters. Further discussions continue with CFIA on protocols for live animals or germplasm intended for research purposes or culture and ornamental fish trans-shippers.

Dr. Creekmore also corroborated Kevin Amos’s report about the MOU between the three different agencies.

The Module 14 (Evaluation of Aquatic Animals for Detection of Reportable Diseases and Pathogens) for the National Veterinary Accreditation Program (NVAP) is available. USDA-APHIS-Veterinary Services has also obligated funds to update the two existing NVAP modules and creating a new aquaculture module in FY15.

She next provided an update on the Infectious Salmon Anemia (ISA) surveillance program in the Pacific Northwest brought about by the unconfirmed report of ISA in sockeye salmon. Although the CFIA investigated and found no ISAV and notified and coordinated with USDA, the U.S. congress requested additional information. State, tribal, federal and industry have worked together. The testing of wild Pacific salmon from three regions in Washington and four regions in Alaska have been negative for the first year’s samples and the second year’s sample testing is underway. Likewise, testing of farmed salmon from Washington for the virus for first and second years’ samples are negative thus far.

Veterinary Services Grass Roots Initiative funded an expert panel to address disease related impediments to eastern U.S. shellfish commerce.
There are plans to look also for problems for southern U.S. shellfish commerce.

Dr. Creekmore reported that training of the USDA’s aquaculture liaisons took place in Arkansas (University of Arkansas- Pine Bluff) this year and that the advertisement for the Aquatic Animal Health Program Manager closed on Oct 17.

American Fisheries Society Fish Health Section Blue Book Now Open Access Online
Kevin Snekvik, Washington State University

Dr. Snekvik reported that all sections of the American Fisheries Society – Fish Health Section’s Blue Book is now open access to all online. It is hoped that this will allow the Blue Book to be utilized more by the fish health community. The various chapters will be updated periodically and it is planned to have the chapter update date placed in the table of contents for a year; the chapter update date will also be at the bottom of the page of each chapter.

Updates from the United States Fish and Wildlife Service
Joel Bader, U.S. Fish and Wildlife Service (USFWS)

The USFWS Division Fisheries and Aquatic Resource Conservation (FARC) has been renamed Fish and Aquatic Conservation (FAC). David Hoskins has been named Assistant Director of FAC. Aquatic Animal Health and Aquaculture program has now been incorporated into a new branch called the Branch of Hatchery Operations and Applied Science (BHOAS), in which Kari Duncan is the Branch Chief and Joel Bader it’s National Coordinator. The FWS Headquarters will be moving from the Ballston area in Arlington, Virginia to Falls Church, Virginia.

Dr. Bader provided information on FWS budget for fish health. The President's FY15 Budget included an increase for National Fish Hatchery Operations. However, congress passed a Continuing Resolution through December 11, 2014, which includes a rescission of 0.05%. Thus there is uncertainty about FY2015 budget beyond December 1. This budget will affect hatcheries, Fish Health Centers (FHCs), and Fish Technology Centers (FTCs). With regards to the Aquatic Animal Drug Approval Partnership (AADAP) program, it has been able to withstand decreases in base funding last year (FY14) and plans to offset further decreases (in FY15) with increased Investigational New Animal Drug (INAD) fees and external funding from FDA (among other sources). These HQ office budgets will likely continue at reduced funding levels for FY15 which will likely continue to effect invitational travel, grants, information technology, databases and special projects.

Bader also confirmed that the MOU between the three federal agencies, NOAA, USFWS and USDA, has been drafted and is under review.

Bader provided additional information on the Infectious Salmon Anemia Virus (ISAV) Surveillance in the Pacific Northwest. He reported that this
AQUACULTURE

project is entering the third and final year. Wild salmon samples will continue to be collected and processed. Thus far there are no positive samples. This work was in conjunction with the States of Alaska and Washington, Northwest Indian Fisheries Commission, NOAA and USDA-APHIS.

Baker reported on the efforts to modernize the Title 50 portion 15.13 Salmonid Fish Import (Health) Regulations of the Lacey Act. Suggested changes have been made by the team made up of Fisheries Biologists from all the Fish Health Centers working under the direction of Headquarters. The team is working with the Lacey Tiger Team Chair to brief senior management. No date has been set to complete the overall task of modernizing the language in the Lacy Act, but Title 50, part 15.13 portions has been drafted. It is unlikely that Title 50, part 15.13 portions will move forward until a decision on the overall Act is reached. Partners and industry can expect to be consulted and allowed to comment on changes at a future.

Bader reported on FWS working with NOAA and USD-APHIS negotiations with Canadian Food Inspection Agency (CFIA) with regards to the development of health certificates for wild-harvested seafood products going to Canada. The FWS is implementing an agreement with the Canadians to continue the Title 50 program through December 31, 2014. After that CFIA veterinarians will be the only people the FWS will accept endorsements from Canada and the CFIA will use their own forms, which the FWS will accept as being equivalent to FWS forms.

The FWS has received several letters from United States Animal Health Association (USAHA)/American Association of Veterinary Laboratory Diagnosticians (AAVLD) member laboratories requesting consideration of issuing blanket permits and fees for the movement of diagnostic samples for outside the USA laboratories. We have requested that the USAHA/AAVLD issue a statement (as a letter) to us as to what you want as a group and we will respond to such a jointly issued letter. If it is an issue for USAHA/AAVLD we will consider it.

Aquatic Pathogen Testing in NAHLN Laboratories
Christina M. Loiacono, USDA-APHIS, Veterinary Services (VS)

Christina provided the update on the inclusion of aquatic pathogen testing in National Animal Health Laboratory Network Laboratories (NAHLN). This included providing the Background

1. Three phases of implementation:

   a. Phase 1

   NAHLN Methods Technical Working Group (MTWG) will review and approve the standard operating procedures (SOPs) for infectious salmon anemia virus (ISA) and viral hemorrhagic septicemia virus (VHSV) testing. Existing NAHLN laboratories will be invited to participate in Phase 1 by including ISA and VHS in their NAHLN testing capabilities, taking part in proficiency testing and reporting results as indicated in the SOPs.
b. **Phase 2**

The Animal and Plant Health Inspection Service (APHIS) Aquatic Animal Health Program along with NAHLN will invite other Federal and State non-NAHLN laboratories (e.g., U.S. Fish and Wildlife Service (FWS) Fish Health Laboratories) and private aquatic animal health testing laboratories to consider applying for NAHLN approval and test for the approved aquatic diseases using standardized requirements.

c. **Phase 3**

Aquatic animal pathogens identified by the Aquatic Animal Health Program in consultation with the Subcommittee on Aquatic Animal Health (SAAH), National Import Export Services (NIES), and NVSL will be added to the NAHLN disease testing list. The NAHLN Coordinating Council will evaluate and approve these prior to being added to the aquatic animal pathogen group within the NAHLN scope. The NAHLN *Methods Technical Working Group* (MTWG) will review the associated SOPs.

2. **NAHLN Laboratory Qualification Checklist For Membership of a Veterinary Diagnostic Laboratory**

   a. Annual renewal
   b. Agree to meet requirements of the NAHLN
      i. Quality Management
      ii. Foreign Animal Disease (FAD) Assays and Investigations
      iii. Sample Handling
      iv. Communication and Reporting
      v. Administrative and Financial Requirements
   c. Request any changes to disease/agent approvals
   d. Signatures needed from State (State Animal Health Officials, etc.) and Federal Representative (District Directors or Assistant District Directors)

**Progress on Phase 1**

1. NAHLN Methods Technical Working Group (MTWG) in the process of reviewing and approving the SOPs for ISAV and VHSV testing. Request to review SOPs went to MTWG and ad hoc reviewers in January 2014. SOP comments from MTWG back to NVSL reference laboratory (Diagnostic Virology Laboratory (DVL)) January 21, 2014.

   SOP comments received by Ad hoc reviewers March 2014. Addressing changes and routing documents through Quality management review. Finalized documents will be provided to NAHLN laboratories through the portal.

2. Existing NAHLN laboratories have been invited to participate in Phase 1 by including ISA and VHS in their NAHLN testing capabilities. A letter of opportunity notification to add ISAV and VHSV was sent to laboratory
directors December 4, 2013. NAHLN check list (where they indicate an interest) sent to laboratories in February 2014. Fourteen laboratories indicated interest and were approved by the NVSL reference laboratory and program staff.

3. Existing NAHLN laboratories are taking part in proficiency testing (PT) and reporting results as indicated in the SOPs. They are working with NAHLN for PT registration through the NAHLN Portal. Identified need for laboratories to hold permits for shipping VHSV virus isolation PTs and this is being worked on between NAHLN and laboratories. The DVL is generating new proficiency panels.

4. Need to reiterate to laboratories that Aquatic disease testing under the NAHLN scope will be provided by the laboratories under appropriate fee for service. Funding from USDA to support this testing will not be provided.

5. ISO 17043 accreditation required the development and routing of the Proficiency Test Plan for Aquatic Pathogens through quality management.

Progress on Phase 2
This is pending NAHLN restructure.
When restructure is complete, the APHIS Aquatic Animal Health Program along with NAHLN will invite other Federal and State non-NAHLN laboratories (e.g., U.S. FWS Fish Health Laboratories) and private aquatic animal health test laboratories to consider applying for NAHLN approval and test for the approved aquatic diseases using standardized requirements.

NAHLN restructure discussed:
Laboratory levels

- **Level 1**
  - Large testing capacity
  - Fully accredited
  - BSL3 facilitates
  - LIMS/messaging
  - Trainers
  - Test development and validation

- **Level 2**
  - Similar, but reduced capacity
  - Provisionally accredited
  - *No bio-safety level* (BSL) requirements

- **Level 3**
  - Surveillance testing

- **Affiliate Laboratories**
  - Publically funded that occasionally performs NAHLN related-testing

- **Private Laboratories**
  - Specific, needed capability to perform testing
  - Relationship with NAHLN laboratory and SAHO
  - Written, approved plan to avoid conflicts of interest
The Future of Aquatic Pathogen Testing in NAHLN Laboratories
Phase 3
- Including more aquatic animal pathogens
- Discuss the need for laboratories to test for export as well as surveillance

Committee Business
In response to the concern over two bills (S.1153 & H.R.996) introduced by the 2014 Congress, a resolution was brought before the committee. After discussion, the resolution passed.

The Committee also discussed the change in leadership as Dr. Kevin Snekvik will be stepping down after serving the maximum number of terms. It was decided that Lester Khoo, the vice chair will shift his representation to AAVLD to increase the number of possible vice-chair nominees since AAVLD requires it’s representative to be from an AAVLD or International Organization for Standardization (ISO) accredited laboratory. It was proposed that Bill Keleher from Kennebec River Biosciences would be the nominee for the vice-chair position.

With regards to the USFWS report about a letter to request for blanket importation permits and fees for importation of samples to diagnostic laboratories (see above), the chairs will follow up by consulting Ben Richey, Executive Director of USAHA and Jim Kistler, Executive Director of AAVLD if a letter from the USAHA and AAVLD respectively is possible.
The Committee met on October 21, 2014 at the Sheraton Hotel in Kansas City, Missouri, from 1:00 to 5:30 p.m. There were 12 members and 19 guests present. There were no previous resolutions or other business to discuss.

Presentations and Reports

Proposal for Rational Swine Influenza Vaccine Design
Amy Vincent, USDA-ARS-National Animal Disease Center (NADC)

An integrated multi-agency approach is needed for improving influenza virus vaccine strain selection for use in swine, ideally with representatives from ARS, APHIS, NAHLN laboratories, and Industry. The USDA Swine Influenza Virus (SIV) Surveillance System must continue to monitor contemporary viruses identified in cases of respiratory disease outbreak investigations through veterinary/producer participation and submissions to NAHLN laboratories. Trends in changing subtypes or genetic evolution should be monitored by sequence analysis specialists. Representative viruses from predominant subtypes or genotypes should be evaluated at an antigenic level by serologic cross-reactivity with vaccine anti-sera. New anti-sera should be generated with antigenic drift viruses or with newly added vaccine strains. In vivo swine studies should be conducted when viruses with substantial changes have been identified or when vaccine strains have been substantially changed.

One or more influenza A virus backbones should be approved by Center for Veterinary Biologics (CVB) for ease of quickly generating viruses with new and relevant hemagglutinins (HA) and neuraminidases (NA) for vaccine purposes. Backbones should be demonstrated to provide attenuation in the case of modified live virus (MLV) as well as exhibiting high yield growth properties as a vaccine seed for influenza A virus vaccines for use in swine. The advantage to this is:

- Not all field strains provide sufficient antigenic mass of HA and this would facilitate the ease of testing several representative strains to select the optimal isolate.
Not all field strains grow well in culture and this would facilitate the ease of testing several representative strains to select the optimal isolate.

Reduces the risk of introducing extraneous agents from field isolates. By way of traditional reassortment or reverse genetics, licensed manufacturers generate reassortant viruses with relevant HA and NA found to circulate in pigs or that pose a significant risk to pigs (like the 2009 pandemic virus first found in humans) in order to meet the industry's needs. A company should be required to notify CVB of the HA and/or NA sequences being incorporated onto the approved backbone, adhere to previously approved Good Manufacturing Process practices, and get vaccine updates on the market without delay. Minimal safety and efficacy data should be required if the previously approved seed strain backbone and vaccine formulation is used, but should minimally demonstrate strong serologic cross-reactivity with homologous and heterologous contemporary strains. Companies may select HA and NA sequences from the USDA SIV surveillance system or from their own internal surveillance data for their customers. Viruses from the USDA SIV Surveillance Repository are available for this purpose.

Advantages of this over our current system:
- Vaccines can be rapidly engineered and manufactured to meet industry needs with less research and development investment from companies;
- Killed vaccines may still be made available but would be much improved by more rapid and cost effective regular updates of vaccine strains;
- Inactivated vaccine efficacy is reduced by maternal antibody and inactivated vaccines can have adverse effects in certain cases of virus strain mismatches. MLV/attenuated or vectored vaccines maintain greater efficacy in the face of maternal antibody compared to inactivated vaccines.
- MLV/attenuated or vectored vaccines have been proven superior to kill for protection against heterologous strains; and
- More doses of an MLV/attenuated or vectored vaccine may be mass-produced in the event of an emergency due to the reduced amount of virus required in the vaccine.

Role of Autogenous Products in Emerging Diseases Outbreaks and for Diseases with High Antigenic Diversity
Doug Stine, Newport Laboratories

Dr. Stine discussed the use of autogenous products, and discussed the 9CFR 113.113 requirements for autogenous products. He went on to describe the successful use of autogenous products for control of swine influenza. After pandemic flu introduction, they found that they had strains in their collection that protected against the H5N1 pandemic strain. They
continue to raise additional swine reference antisera and add it to their panel to monitor neutralizing activity. There is continued spillover of human flu into swine populations. This requires continuous monitoring of nonreactive strains. Success is dependent on accessible cell lines for viral growth.

An example of a “failure” with autogenous products is the 2013-2014 rotavirus occurrence. ISU submissions year to date are 3,618 positive samples. Newport only has a 25% success rate for rotavirus group A, and 0% for group C. This is due to lack of cell lines susceptible to the viruses. There is significant genetic diversity among isolates. The current method of control for rotavirus is back feeding piglets to susceptible sows. This is archaic and antiquated, and raises disease spread and animal welfare concerns.

PEDv is the latest emerging disease they’re trying to deal with, complicated with circulation of swine delta coronavirus. There are two conditional products in the U.S. Globally there are multiple modified live virus (MLV) and killed vaccines. The current industry response is feed back of live virus (serum or intestinal contents) to sows. Feed backs contain rotavirus, but possibly other pathogens, and is potentially a dangerous practice. Further, this forces producers to look to use of 9 CFR 107.1.

What could the alternative be? Vectored autogenous subunit vaccines should be an option. Make use of advances in molecular biology to produce viral subunit vaccines. This would avoid potential transfer of adventitious agents. A vector platform for autogenous products should be considered.

Center for Veterinary Biologics Updates
Byron Rippke, USDA-APHIS-VS-STAS, Center for Veterinary Biologics

CVB Director Search/Staffing: The announcements have closed, and the hiring certificates have been issued. The process has been taking a year to 14 months. The position should be filled within the next couple of months.

Budget: 2014 budget is $16,417,000. This is a slight increase over 2013. There is some funding to hire, but it’s taking a long time to fill positions.

Business Process Improvement Projects (BPI): a major project has been to build ability for receiving electronic licensing submissions. They’re currently looking to expand this to Outlines of Production and labels. Also, they’re working on electronic licensing plans and #1 file, and developing the infrastructure for an electronic portal. There is some work being done to develop a process for electronic serial release. APHIS is trying to integrate electronic processes, and how CVB fits into those efforts remains to be seen. Future projects include Master Seed/Master Cell testing processes.

Inspection and Compliance (IC) update: Licensing Serial Release and Testing System (LSRTIS) is the primary information management system. It touches virtually every part of the CVB’s operations. A big effort around LSRTIS in 2014 has been Certification and Accreditation of the system. The current system has the authority to operate until July 2017. The system was moved to the National Information Technology Center (NITC) in Kansas City in 2014.
Electronic Notification of Serial Release was fully implemented in 2013. Enhancements were implemented in August 2014.

Pharmacovigilance via PV Works was implemented. This provides CVB with a system that meets Veterinary International Conference on Harmonization (VICH) harmonized guidelines. This enables CVB to receive and process greater numbers of adverse event reports (AERs). CVB is finalizing a new proposed rule that will require mandatory periodic submission of AER data from Market Authorization Holders (MAH). Public comments have been addressed. The rule is currently under review by the APHIS Regulatory Analysis and Development staff. IC focus is on decreasing regulatory burden while maintaining integrity of the regulatory system.

IC is looking for non-regulatory solutions, enhanced transparency, and quality of manufacturing.

Policy, Evaluation and Licensing (PEL) update:

Draft Memorandum 440: release specifications (“antigen overage”). This looks at a more data-driven approach to establishing release specifications. There will be a 2-day stakeholder workshop to discuss the issues. This will result in another draft Memorandum for industry comment.

9CFR 107.1, Veterinary Exemption. The rule doesn’t allow for third party manufacture. The final rule is currently under Office of General Counsel review. Expect to see this within the next few months. Along with this are draft Memos 800.213 and 800.111. This guidance would help allow companies to get products out quickly without resorting to 107.1.

Single tier label claims: One of the first Business Process Improvement (BPI) efforts, is geared toward how information is presented to the user and provides more meaningful information to the user to better assess product performance. Two components: 1.) label would state, “this product has been shown to be effective for the vaccination of/against…” 2.) Second component would be data summaries of efficacy/safety data used to license the product, which would be available on the CVB website for public viewing. It will include a user guide. Implementation will be done by species group, and will be staged over the next 4-6 years. They anticipate that it will be published in the first couple of months of 2015.

Needs and Risks Related to Use of Fetal Bovine Serum (FBS) in Veterinary Biologics (panel presentations):

Topic Introduction
Julia Ridpath, USDA-ARS-National Animal Disease Center (NADC)

An oft repeated rumor is that New Zealand is exporting far more FBS than could possibly be produced in that country. BVDV costs the cattle industry at least $400 Million/year. There are numerous examples of contaminated FBS used in vaccines or other products. CSF has been detected in lots of FBS found in China. A number of viruses have emerged since the 9CFR regulations were written. Complicating the issue is that you can only test for what you know. We have more sensitive tests now, and very
different pathogens than what were available when the regulations were written.

Importation Requirements for FBS
Tracye Butler, USDA-APHIA-VS, National Import-Export Services (NIES)

USDA takes a very conservative approach because of wide dissemination. Currently, importation is allowed from Canada, Mexico, Central America, New Zealand, Australia, and Chile. This requires country certification that the animals were born in that country. Samples are collected from commercial imports that originated in all eligible countries except Canada and New Zealand. There are no NIES requirements for labeling. Samples remain in quarantine until completion of safety testing. One liter of the lot can be imported for the client’s specification testing. If there are positive results, the material can be re-exported or destroyed at the owner’s expense. There is a Risk Assessment underway with a delivery date not later than August 31, 2015.

A bovine spongiform encephalopathy (BSE) comprehensive rule was finalized in 2013, effective March 2014. It established BSE-related import provisions to align with World Animal Health Organization (OIE) guidelines. Now there are more markets from which to import bovine serum. NIES is updating the import requirements for fetal bovine serum (FBS) from each BSE risk category. The scope of the new risk assessment is for FBS, newborn calf, donor bovine serum, bovine serum albumin (BSA), and some other blood products.

CVB Testing Requirements for FBS Used in Veterinary Biologics
Geetha Srinivas, USDA-APHIS-VS-STAS, Center for Veterinary Biologics (presented by Dr. Byron Rippke)

Testing requirements for fetal bovine serum (FBS) include 9CFR 113.53, which refers to other regulations as well. Ingredients of animal origin must come from countries defined as no risk or low risk for bovine spongiform encephalopathy (BSE) as defined by the National Center for Import and Export (NCIE) (now National Import-Export Services (NIES) and 9CFR 94.18. Factors outside of CVB regulatory authority include relabeling of imported FBS, and blending of U.S. material with imported FBS Industry concerns include cost and availability, contamination, country of origin labeling, possibility of counterfeit FBS.

Biologics Industry Best Practices for Using FBS in Veterinary Biologics
Kent McClure, Animal Health Institute

Animal Health Institute (AHI) is an industry group that represents over 95% of the U.S. biologics manufacturers. FBS is an essential ingredient of cell culture media used in production of many biologicals. Quality of the serum can have dramatic impacts on the quality of biologics. Alternatives are routinely investigated during development. The business approach is very cautious. The regulatory responsibility lies with the manufacturer. They limit
the country of origin to U.S., Canada, Australia, New Zealand. They test to the highest possible level, and in fact to a higher level than is required by any government. Material is tested for mycoplasma, bacteria, fungi, and extraneous viruses. Further screening is also conducted to confirm purity and identity, including electrophoresis, osmolarity, total protein, hemoglobin, physiochemical testing, and other assays. Also, testing is done for cytopathic and hemadsorbing agents, fluorescent antibody (FA) tests for specific agents, and agents of major concerns for regional importance. Testing is relevant to the product and to the manufacturer. When emerging diseases are identified, those are added to the testing repertoire. Samples are tested before and after validated irradiation. Finally, animal screening is conducted prior to use of the FBS in manufacturing.

Standards tested to: USDA, Food and Drug Administration (FDA), European Medicines Evaluation Agency (EMEA), Australian, E.U. Pharmacopeia, USA, good laboratory practice (GLP), good manufacturing practice (GMP), ISO 9001. Validated irradiation is done at 25-50 kGy; the E.U. standard is 30kGy. Testing is done on pre- and post-irradiated samples. Typical irradiation reduction for BVDV is $10^6$.

Validation of virus inactivation includes multiple steps, and the impacts of many factors are considered. Vendor audits are standard practice as part of the companies’ quality management system. Things that are looked at include acquisition/disposition records, traceability systems, and quality assurance systems. These audits are more stringent than government inspection. The International Serum Industry Association offers an extensive process for certification. All records are available for audit, from harvest to testing to sales.

Proposed Importation of Irradiated FBS from FMD Free Countries (Free with Vaccination)

Percy Hawkes, Biowest, USA

Dr. Hawkes presented the following position in his presentation: the FBS industry recognizes that APHIS has the responsibility of ensuring that fetal bovine serum (FBS) imported from other countries is free of pathogens which do not exist in the United States and pose a risk to the U.S. livestock population. Yet, the limited supply of USDA approved FBS has not been able to keep up with the demand, and this has resulted in price differences that make USDA approved FBS as much as 12 times higher than non-USDA approved FBS. This price difference rewards smuggling and misrepresentation of FBS between origins, thus putting at risk the traceability and safety of “USDA approved FBS”, throughout the world. Gamma irradiation has been used by USDA-APHIS-VS for several decades as a method to inactivate potential pathogens in ruminant serum imported from countries known to have livestock diseases that do not occur in the United States. Importations of ruminant serum have been authorized by USDA-APHIS-VS in limited quantities for developmental research and diagnostic purposes by both governmental and private institutions. Gamma irradiation is
also routinely used by the serum industry to ensure compliance with 9CFR 113.28, 46, 47, and 53, to inactivate adventitious pathogens of concern. In addition, gamma irradiation is routinely used to eliminate potential pathogens in medical products used for both human and animal medical applications. Gamma irradiation is also routinely used by USDA for the treatment of many food products of animal and plant origin. Ten years ago, Resolution Number 13, approved at the 2004 United States Animal Health Association (USAHA) annual meeting, recommended that USDA-APHIS allow the importation of gamma irradiated commercial shipments of FBS. USDA-APHIS responded by completing a risk assessment and preparing a proposed rule, which was promised to be published in 2008. However, due to other pressing priorities APHIS has not yet published this proposed rule. In 2014, APHIS has announced that they have requested an in depth risk assessment for imported bovine sera, including Fetal Bovine Serum, in preparation for updating import requirements. In light of this announcement, the FBS industry requests that the Biologics and Biotechnology Committee recommend that APHIS follow up and publish the proposed rule prepared and promised by APHIS in 2008 to allow the importation of gamma irradiated FBS from FMD free countries with vaccination. The FBS industry also recommends that the Biologics and Biotechnology Committee urge USDA-APHIS-VS to work with the FBS industry to include the following options when updating FBS import requirements: 1.) Irradiation outside the U.S. with proper USDA oversight, 2.) Importation of irradiated FBS from FMD free countries with vaccination, 3.) Processing of FBS in third countries with proper USDA oversight, 4.) Safety testing of FBS using internationally accepted tests other than animal inoculation, and 5.) Define penalties for fraud and misrepresentation.

Committee Business

A resolution was presented by Percy Hawkes, entitled, “Importation of Fetal Bovine Serum”. His resolution was passed earlier this week by the Committee on Import-Export. The motion to “accept as written” failed for lack of a second.

A resolution was presented by Chuck Massengill, Vice-Chair of the Committee on Infection Diseases of Cattle, Bison, and Camelids, entitled “Importation of Fetal Bovine Serum”. A motion was made for a new and revised resolution from the Committee for Biologics and Biotechnology entitled, “Standards for Fetal Bovine Serum”. The motion was passed.

A resolution was presented by Joe Huff entitled, “Manufacturing of Veterinary Biologicals without Licensure”. A motion was made to accept as written. The motion was passed.

Being no further business, the meeting was adjourned.
REPORT OF THE COMMITTEE ON BLUETONGUE AND RELATED ORBIVIRUSES
Chair: N James Maclachlan, CA
Vice Chair: William Wilson, KS

T. Lynwood Barber, CO; Richard Breitmeyer, CA; Charles Brown II, WI; Kristina Brunjes, GA; Stan Bruntz, CO; Matt Cochran, TX; Joseph Corn, GA; Edward Dubovi, NY; William Edmiston, TX; Anita Edmondson, CA; James Evermann, WA; Robert Fulton, OK; Donna Gatewood, IA; Robert Gerlach, AK; Paul Gibbs, FL; Chester Gipson, MD; Sophie Girtanner, FRA; Katherine Haman, BC; William Hartmann, MN; Percy Hawkes, UT; Larry Hawkins, MO; Richard Hesse, KS; Linda Hickam, MO; Thomas Holt, FL; Dennis Hughes, NE; Holly Hughes-Garza, TX; Bruce King, UT; Todd Landt, IA; Emily Lankau, GA; Randall Levings, IA; Francine Lord, ON; Travis Lowe, KS; N James Maclachlan, CA; David Marshall, NC; Daniel Mead, GA; Myrna Miller, WY; Eric Mohlman, NE; Igor Morozov, KS; Cheryl Nelson, KY; Dustin Oedekoven, SD; Eileen Ostlund, IA; Charles Palmer, CA; William Parker, GA; James Pearson, IA; William Pittenger, MO; Justin Roach, OK; Mark Ruder, KS; Shawn Schafer, OH; Charly Seale, TX; Laurie Seale, WI; Tom Smylie, ON; David Stallknecht, GA; Brian Standafer, MN; Brad Thurston, IN; Curt Waldvogel, OH; Mark Walter, PA; Skip West, OK; William Wilson, KS.

The Committee met on October 21, 2014 at the Sheraton Hotel in Kansas City, Missouri, from 1:00 to 5:00 p.m. There were 15 members and 30 guests present. James Maclachlan as Committee Chair introduced the meeting, with apologies from Vice-Chair William Wilson that he wasn’t able to attend.

Presentations

Recent Impacts of Bluetongue on Livestock Exports from the United States
Gordon Thornhill, T.K. Exports

T.K. Exports, Inc (TKE) is a full service company dedicated to the export of live animals to international destinations. For the past 32 years, TKE has shipped U.S. and Uruguayan animals to some 45 countries world-wide. These animals have been used mainly to improve meat and milk production by clients in their respective countries. For many years, livestock shipments from the USA were very sporadic. In the last 8-10 years, these exports have grown in volume tremendously. Our business increased from 3,500 exported in 2007 to over 20,000 animals in 2013. Today, as economies grow and the demand for better food, coupled with food security, many countries have started developing their own sources of meat and milk. Policies of Food Security have led to the development of livestock sectors within many countries which did not exist before. So now there is a world-demand for quality breeding stock. Every national veterinarian in charge of imports of live
animals wants to guard against importing some dreaded disease. We now have higher demands for health background for the animals we export.

Today, the USA has become a major player to supply countries with animals. However, exporting of live animals still remains more of a burden to veterinarians rather than an additional source of income. Many of the challenges that exporters face are challenges that are related to science and not the actual sale of the animals. The USA national health program is superior to any that I know on the planet, but it is vastly different from most other countries in the world. So to combat the sometimes adverse import policies and rules, we must better understand the diseases that are important to them and learn what we might do to reduce risks of transmitting them. Many times these diseases are not ones we believe to be important to us in the USA.

As exporters of live animals, we therefore must be very conscious of animal health issues and the introduction of any new diseases both to our country and the countries of our clients. In reality, biosecurity is of the highest importance to what we are doing in the field of export. Since every country who imports animals wants some type of statements and or testing done, we have to be very conscious of not only what tests we do but also how we maintain the animals after we do this testing so that we do not re-infect the animals with the same disease after clearing them. TKE has designed our business model to minimalize these risks.

Our system was designed to bring together animals negative to both Leucosis and Bluetongue. Additionally we have placed these isolations in areas where the incidences of Bluetongue are minimal so that when we clear the animals with a negative Bluetongue test, then the chances of re-infecting should be minimal.

Bluetongue is a disease which we have known about in the field of exporting for many years. It was the one which the Europeans used to eliminate American animals from entrance into E.U. countries in the late 1970’s. Other countries have also used blue tongue as a reason to block imports of live animals from the USA. Initially, it became a non-tariff barrier to protect markets who politically did not want to allow large numbers of animals to be imported into their country. It was an easy one to use against the USA due to fact that there are areas which are endemic, but we have other areas where the vector does not exist. However, since animals freely move around the USA without being tested for this disease, other countries pointed out that we could not protect animals being exported from exposure since we did not have complete records as to where the animals have been prior to their export. In other words no national ID system or national data on movements of animals left some holes as to determine where animals had been moved during their lifetimes.

Over the years the knowledge grew about the disease and regionalization practices were accepted, so the USA was able to show that there are indeed areas where the vector does not exist. This enabled animals to be moved to these areas that are zero-negative and re-test them again.
negative without much risk of the animals being re-infected. However, in recent years, the E.U. has been adversely affected by some lethal strains of bluetongue virus (BTV) which has increased awareness in every country to be on the alert to not import these strains. So BTV has reappeared as an important disease for exporting animals.

Bluetongue diagnosis, ways of transmission, early detection and prevention has always been clouded with mystery and perhaps ignorance across international borders. Over the years, more and more knowledge has been gained about this subject but there still exists quite a bit of uncertainty at least in the field of export. Perhaps it is a complex disease which has many different forms and these forms affect many animals in different ways. Some species are not affected, but others may carry the disease and infect other species. Bluetongue transmission continues to evolve due to climate change and animal management procedures. So the study of the science of this disease is very important to exporting livestock and needs to be a main focal point for animal exports.

I do not need to tell you the difficulties which arise from doing any kind of biosecurity. Many times there are trade-offs between practicality and reducing risks to zero. Frankly I am not sure with living animals, there is such a thing as zero risks! However with bluetongue, the costs of reducing the risks are high, especially when you are dealing with several thousand animals on one shipment. Additionally, the stress of multiple blood sampling and meeting very specific timetables are stressful and costly to the animals and exporters.

So the work of this committee needs to be supported by our government, industry and, in turn, private veterinarians if we are going to meet the challenges ahead. We need science based knowledge on Bluetongue as to the types which are present in the USA, how it spreads, where it exists, what methods of detection are the most useful and how to protect transmission to animals. As a starting point, I believe the most important factor for all of us in the animal industry is to agree or disagree that exporting our breeding stock abroad is something that we want to support. If we support it, then it is not so hard to understand that to keep the markets, we have to meet their demands.

Today, I want to leave you with an idea of what it costs to buy an animal in Turkey or Russia. If the beginning price of an animal is about $2,000, then the end user will pay about double this amount at his farm. At a price of approximately $4,000 per animal, it is a very important investment to the buyer and the need for this healthy animal to produce for their operation. Within our economy the exporter utilizes many domestic operations such as cattle farmers, truckers, feed yards, laboratories, veterinarians, port operators, feed manufacturers and even APHIS who is paid user fees that generate revenue within the agricultural economy. The export industry is an important part of the livestock sector today and I believe it will grow in the future. Exporting is good for our economy and something we, as a country, should continue. Therefore, it is important that we treat my business, exporting, as an industry that makes an important contribution to the
agricultural economy. If we do this, then what this committee does is important and should be supported as such.

**USDA Gap Analysis of Orbivirus Diseases: Report Highlights**  
D. Scott McVey, Arthropod-borne Animal Diseases Unit, USDA-ARS

The viruses that cause bluetongue (BT) and epizootic hemorrhagic disease (EHD) are of concern to livestock producers in North America because of 1.) the emergence of new serotypes, 2.) increased reports of spillover and clinical disease in cattle, and 3.) increased spread and adaptation to new geographical areas. Accordingly, the United States Animal Health Association (USAHA) passed Resolution 16 in October 2012 requesting the United States Department of Agriculture (USDA) and the United States Department of Interior (DOI) to organize a diverse panel of experts including industry stakeholders, university and federal researchers, and federal and state regulatory agency representatives to determine research needs and identify and prioritize intervention strategies. In response to USAHA Resolution 16, USDA in collaboration with DOI organized a gap analysis workshop composed of international experts on *Orbiviruses*. The workshop participants met at the Arthropod-Borne Animal Diseases Research Unit in Manhattan, Kansas, May 14–16, 2013, to assess the available scientific information and 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 virus (EHDV).

The report of this workshop can be obtained through:


**Epizootic Hemorrhagic Disease Virus from White-tailed Deer Show Limited Genome Constellations and Preferential Reassortment**  
Srivishnupriya Anbalagan, Elyse Cooper, Pat Klumper, Ben M. Hause, Newport Laboratories

Epizootic hemorrhagic disease virus (EHDV) causes hemorrhagic disease in wild and domestic ruminants however infection of bovines is typically subclinical. A collection of 44 EHDV isolated from white tailed deer (WTD) (2008-2012) was fully sequenced and analyzed phylogenetically. High genetic similarity (>94% identity) between serotype 1 (ST1) and ST2 viruses VP1, VP3, VP4, VP6, NS1, NS2, and NS3 segments prevented identification of reassortment events for these segments. Additionally, there was little genetic diversity (>96% identity) within serotypes for VP2, VP5 and VP7. Preferential reassortment within the homologous serotype was observed for VP2, VP5 and VP7 segments for ST1 and ST2 viruses. In contrast, ST6 viruses were all reassortants containing VP2 and VP5 derived from an exotic ST6 with the remaining segments most similar to ST2 viruses. These results suggest that reassortment between ST1 and ST2 viruses requires
conservation of VP2, VP5 and VP7 segment constellation while ST6 viruses only require VP2 and VP5 and are restricted to ST2-lineage VP7. As ST6 VP2 and VP5 segments were exclusively identified in viruses with ST2-derived VP7, these results suggest functional complementation between ST2 and ST6 VP7 proteins. In addition to WTD, EHDV was isolated from a pregnant cow in Indiana, U.S.A., exhibiting clinical symptoms of excessive salivation, pyrexia, nasal mucosa epithelial sloughing and abortion. VP2, VP5, and VP7 sequences of the bovine EHDV showed 97.7, 97.4, and 97.9% identity to ST2 reference virus. When compared to WTD EHDV sequences, the bovine EHDV was most homologous (>99.9% identity) to an EHDV isolate from Iowa and showed less than 2.1% divergence to EHDV collected from WTD across the United States in 2013. The high genetic identity between bovine and WTD EHDV isolates suggests indirect, via the Culicoides vector, interspecies transmission and given the widespread distribution of similar viruses, the possibility of further incursions into bovines.

References:

Epizootic Hemorrhagic Disease Vaccination and Titer Response in Cervidae
Douglas Wagner, Tammy Kolander, Ron Batman, Newport Laboratories

The objectives of the study were to determine optimal antigen titers, minimum numbers of diseases, whether antigen interference occurs, and the best adjuvant. Thirty five does were split into seven groups each of five animals, with each group given one vaccine as three doses 21 days apart. A final bleed was done 20 days after the third dose. The specific groups were:
1. 4-way 9 log multivalent with TS6
2. 9 log monovalent with TS6
3. 4-way 9 log multivalent with Trigen
4. 9 log monovalent with Trigen
5. 8 log monovalent with Trigen
6. 7 log monovalent with Trigen
7. Non-vaccinated controls (NVC)

Immune responses were quantitated using enzyme-linked immunosorbent assay (ELISA), epizootic hemorrhagic disease vaccination (EHDV) and bluetongue virus (BTV) and serum neutralization (SN) (EHDV) assays.

EHDV Conclusions
• 8 to 9 logs antigen concentrations promote a more rapid and robust immune response than 7 log concentrations.
• At least 2 doses are necessary.
• There does not appear to be antigen interference when multiple antigens are combined into one vaccine.
• TS6 and Trigen are comparable.

BTV Conclusions
• The vaccinated animals developed positive titers after 1 dose.
• There doesn’t appear to be much difference in BTV titers after 2 or 3 doses at 9 logs.
• TS6 and Trigen are comparable.

Mechanism of Overwintering of Bluetongue Virus in Temperate Zones
Christie E. Mayo, Cameron Osborne, N. James MacLachlan, School of Veterinary Medicine, University of California

Recent field studies on commercial dairy farms have further identified how bluetongue virus is sustained in temperate regions between seasonal periods of transmission, which has been a topic of much conjecture and speculation for over 100 years. Earlier claims from the mid-20th century that the virus persisted in livestock were eventually disproven, and attention has increasingly focused on the insect vector. In a recent publication Mayo at al. reported that host-seeking parous female Culicoides midges were caught during daylight hours in midwinter in CO2 baited traps. Using RT-PCR, she then confirmed these traps midges had strong cycle threshold (CT) values for bluetongue virus (BTV) ribonucleic acid (RNA). The finding that bluetongue virus can “overwinter” in long-lived female midges has important ramifications for predicting the occurrence of bluetongue in livestock and to its eventual control. Subsequent studies have failed to show vertical transmission of the virus in either laboratory reared Culicoides midges or field-collected larvae.


Bluetongue Virus (BTV) and Epizootic Hemorrhagic Disease Virus (EHDV) Isolations/PCR Positives Calendar Year 2013
Eileen Ostlund, National Veterinary Services Laboratory, USDA-APHIS-VS

Bluetongue virus or RNA was detected in 102 samples submitted or collected during calendar year 2013. The positive bluetongue virus isolation (VI) and polymerase chain reaction (PCR) test results from submissions to the National Veterinary Services Laboratories (NVSL) in 2013 are listed in Table 1.
Table 1. BT virus isolation (VI) / PCR positives, Calendar year 2013

<table>
<thead>
<tr>
<th>State</th>
<th>No.</th>
<th>Species</th>
<th>PCR</th>
<th>VI</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA</td>
<td>5</td>
<td>Cattle</td>
<td>Positive</td>
<td>Negative</td>
<td>Unable to type; 1 also EHDV-2</td>
</tr>
<tr>
<td>CA</td>
<td>2</td>
<td>Cattle</td>
<td>BTV-11</td>
<td>Negative</td>
<td>1 also EHDV-2</td>
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<tr>
<td>CA</td>
<td>3</td>
<td>Pronghorn</td>
<td>BTV-13</td>
<td>BTV-13</td>
<td>1 also EHDV-2</td>
</tr>
<tr>
<td>CA</td>
<td>3</td>
<td>Cattle</td>
<td>BTV-17</td>
<td>BTV-17</td>
<td></td>
</tr>
<tr>
<td>CA</td>
<td>6</td>
<td>Cattle</td>
<td>BTV-17</td>
<td>Negative</td>
<td>2 also EHDV-2</td>
</tr>
<tr>
<td>FL</td>
<td>10</td>
<td>Nubian Goat (single herd)</td>
<td>Positive</td>
<td>Negative</td>
<td>Unable to type</td>
</tr>
<tr>
<td>FL</td>
<td>1</td>
<td>Nubian Goat</td>
<td>BTV-1</td>
<td>BTV-1</td>
<td></td>
</tr>
<tr>
<td>FL</td>
<td>1</td>
<td>Nubian Goat</td>
<td>BTV-2</td>
<td>BTV-2</td>
<td></td>
</tr>
<tr>
<td>FL</td>
<td>2</td>
<td>Nubian Goat (1), Deer (1)</td>
<td>BTV-3</td>
<td>BTV-3</td>
<td>Deer isolate (SCWDS)</td>
</tr>
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<td>FL</td>
<td>1</td>
<td>Deer</td>
<td>BTV-11</td>
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<td></td>
</tr>
<tr>
<td>IN</td>
<td>1</td>
<td>Saanen Goat</td>
<td>BTV-11</td>
<td>Negative</td>
<td></td>
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<tr>
<td>IA</td>
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<td>Bison (1), Cattle (2)</td>
<td>Positive</td>
<td>Not done</td>
<td>Unable to type</td>
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<td>Cattle</td>
<td>BTV-13</td>
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<td>BTV-17</td>
<td>BTV-17</td>
<td></td>
</tr>
<tr>
<td>NE</td>
<td>8</td>
<td>Bison (7), Cattle (1)</td>
<td>Positive</td>
<td>Negative or not done</td>
<td>Unable to type; 1 bison also EHDV</td>
</tr>
<tr>
<td>NE</td>
<td>4</td>
<td>Bison (single herd)</td>
<td>BTV-10</td>
<td>Not done</td>
<td></td>
</tr>
<tr>
<td>NE</td>
<td>1</td>
<td>Bison</td>
<td>BTV-11</td>
<td>Negative</td>
<td></td>
</tr>
</tbody>
</table>
During calendar year 2013, 113 samples tested positive for EHDV by virus isolation and/or PCR. The positive EHDV isolation and PCR test results from submissions to NVSL in 2013 are listed in Table 2.
# Table 2. EHDV isolation (VI)/ PCR positives, Calendar year 2013

<table>
<thead>
<tr>
<th>State</th>
<th>No.</th>
<th>Species</th>
<th>PCR</th>
<th>VI</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA</td>
<td>5</td>
<td>Cattle (single herd)</td>
<td>EHDV-2</td>
<td>EHDV-2 (1) Not done (4)</td>
<td>1 also BTV-pos 1 also BTV-11 2 also BTV-17</td>
</tr>
<tr>
<td>CA</td>
<td>3</td>
<td>Pronghorn</td>
<td>EHDV-2</td>
<td>EHDV-2</td>
<td>1 also BTV-13</td>
</tr>
<tr>
<td>FL</td>
<td>1</td>
<td>Deer</td>
<td>EHDV-6</td>
<td></td>
<td>SCWDS isolate</td>
</tr>
<tr>
<td>IL</td>
<td>1</td>
<td>Deer</td>
<td>EHDV-2</td>
<td>EHDV-2</td>
<td></td>
</tr>
<tr>
<td>IL</td>
<td>1</td>
<td>Deer</td>
<td>EHDV-2</td>
<td>Not done</td>
<td></td>
</tr>
<tr>
<td>IA</td>
<td>1</td>
<td>Cattle</td>
<td>Positive</td>
<td>Not done</td>
<td>No type</td>
</tr>
<tr>
<td>IA</td>
<td>14</td>
<td>Cattle (10), Deer (4)</td>
<td>EHDV-2</td>
<td>EHDV-2</td>
<td></td>
</tr>
<tr>
<td>IA</td>
<td>34</td>
<td>Bison (5), Cattle (20), Deer (9)</td>
<td>EHDV-2</td>
<td>Negative or not done</td>
<td></td>
</tr>
<tr>
<td>MN</td>
<td>1</td>
<td>Cattle</td>
<td>EHDV-2</td>
<td>Negative</td>
<td></td>
</tr>
<tr>
<td>MS</td>
<td>1</td>
<td>Deer</td>
<td>EHDV-2</td>
<td></td>
<td>Isolate submitted for typing</td>
</tr>
<tr>
<td>MO</td>
<td>1</td>
<td>Cattle</td>
<td>EHDV-1</td>
<td>Not done</td>
<td>Insufficient sample</td>
</tr>
<tr>
<td>MO</td>
<td>2</td>
<td>Deer (1), Sheep (1)</td>
<td>EHDV-2</td>
<td>EHDV-2</td>
<td></td>
</tr>
<tr>
<td>MT</td>
<td>1</td>
<td>Deer</td>
<td>EHDV-2</td>
<td>EHDV-2</td>
<td></td>
</tr>
<tr>
<td>MT</td>
<td>2</td>
<td>Bison</td>
<td>EHDV-2</td>
<td>Negative</td>
<td></td>
</tr>
<tr>
<td>NE</td>
<td>3</td>
<td>Bison</td>
<td>Positive</td>
<td>Not done</td>
<td>No type; 1 also BTV positive</td>
</tr>
<tr>
<td>NE</td>
<td>3</td>
<td>Bison</td>
<td>EHDV-2</td>
<td>EHDV-2</td>
<td>1 also BTV-13</td>
</tr>
<tr>
<td>State</td>
<td>No.</td>
<td>Species</td>
<td>PCR</td>
<td>VI</td>
<td></td>
</tr>
<tr>
<td>-------</td>
<td>-----</td>
<td>---------</td>
<td>-----</td>
<td>-------------------------</td>
<td></td>
</tr>
<tr>
<td>NE</td>
<td>9</td>
<td>Bison</td>
<td>EHDV-2</td>
<td>Negative or not done</td>
<td></td>
</tr>
<tr>
<td>NE</td>
<td>1</td>
<td>Bison</td>
<td>EHDV-2</td>
<td>SCWDS isolate; also BTV-17, BHV-4</td>
<td></td>
</tr>
<tr>
<td>ND</td>
<td>1</td>
<td>Cattle</td>
<td>EHDV-2</td>
<td>Negative</td>
<td></td>
</tr>
<tr>
<td>OK</td>
<td>1</td>
<td>Deer</td>
<td>EHDV-2</td>
<td>EHDV-2</td>
<td></td>
</tr>
<tr>
<td>SD</td>
<td>2</td>
<td>Deer</td>
<td>EHDV-1</td>
<td>EHDV-1</td>
<td></td>
</tr>
<tr>
<td>SD</td>
<td>12</td>
<td>Cattle (6), Deer (5), Elk (1)</td>
<td>EHDV-2</td>
<td>EHDV-2</td>
<td>2 Deer also BTV-17</td>
</tr>
<tr>
<td>SD</td>
<td>14</td>
<td>Cattle (9), Deer (4), Elk (1)</td>
<td>EHDV-2</td>
<td>Negative or not done</td>
<td></td>
</tr>
<tr>
<td>SD</td>
<td>1</td>
<td>Deer</td>
<td>EHDV-6</td>
<td>EHDV-6</td>
<td></td>
</tr>
<tr>
<td>WI</td>
<td>1</td>
<td>Cattle</td>
<td>Positive</td>
<td>Negative</td>
<td>No type</td>
</tr>
</tbody>
</table>

Part-year 2014 data for NVSL orbivirus identifications is shown in Table 3. As of October 10, BTV has been identified in seven samples from five states and EHDV has been identified in four samples from three states.
Table 3. Bluetongue virus (BTV) and epizootic hemorrhagic disease virus (EHDV) isolations/PCR positives during Calendar year 2014 (January 1 through October 10)

<table>
<thead>
<tr>
<th>STATE</th>
<th>NO.</th>
<th>SPECIES</th>
<th>PCR</th>
<th>VI</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO</td>
<td>1</td>
<td>Goat</td>
<td>BTV-11</td>
<td>BTV-11</td>
</tr>
<tr>
<td>ID</td>
<td>1</td>
<td>Alpaca</td>
<td>BTV Positive</td>
<td>Not done</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>High Ct; insufficient virus for typing</td>
</tr>
<tr>
<td>MO</td>
<td>1</td>
<td>Cattle</td>
<td>BTV Positive</td>
<td>Not done</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Insufficient virus for typing</td>
</tr>
<tr>
<td>NE</td>
<td>1</td>
<td>White-tailed Deer</td>
<td>BTV-17</td>
<td>Negative</td>
</tr>
<tr>
<td>NJ</td>
<td>3</td>
<td>White-tailed Deer</td>
<td>BTV-17</td>
<td>BTV-17 (2), 1 pending</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 were SCWDS submissions</td>
</tr>
<tr>
<td>FL</td>
<td>1</td>
<td>Deer</td>
<td>EHDV-2</td>
<td>EHDV-2</td>
</tr>
<tr>
<td>FL</td>
<td>1</td>
<td>White-tailed Deer</td>
<td>EHDV-6</td>
<td>EHDV-6</td>
</tr>
<tr>
<td>NC</td>
<td>1</td>
<td>White-tailed Deer</td>
<td>EHDV-6</td>
<td>Isolate submitted</td>
</tr>
<tr>
<td>TX</td>
<td>1</td>
<td>Eld’s Deer</td>
<td>EHDV-2</td>
<td>EHDV-2</td>
</tr>
</tbody>
</table>

SCWDS Update: Hemorrhagic Disease and Culicoides sp. Surveillance
Danny Mead, Southeastern Cooperative Wildlife Disease Study (SCWDS), University of Georgia

Dr. Daniel Mead presented the SCWDS hemorrhagic disease report as well as an update on the SCWDS Culicoides survey. SCWDS has received samples (mostly white-tailed deer (WTD) from 13 states for HD testing. EHDV-2 has been detected in samples submitted from Georgia, Louisiana, and Oregon. EHDV-6 has been detected in samples submitted from Florida and North Carolina. BTV-17 was detected in New Jersey. SCWDS has been conducting surveys to determine what Culicoides spp. are present in the SE since 2007. Since 2007 they have collected at 307 sites and have collected over 227,196 biting midges. Mead provided a list of species that were found outside of their previously recorded ranges.
The Arthropod-borne Animal Diseases Research Unit: Research Program Update and Current Status
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.

Committee Business
Nominations were received and passed by unanimous vote of the Committee membership that Dr. E. Paul Gibbs be recommended as incoming Chair of the Committee and Dr. D. Scott McVey as Vice Chair.
A resolution regarding a proposed national strategy for orbiviruses to support the international export of ruminant livestock from the United States was moved, seconded and passed unanimously.
With no further business the meeting was adjourned.
The Committee met on October 20, 2014 at the Sheraton Hotel in Kansas City, Missouri, from 1:00 to 6:00 p.m. There were 44 members and 30 guests present. One agenda topic was canceled, a presentation on how Brucellosis adult vaccination differs between Strain 19 and RB51.

Overview

The Committee on Brucellosis meeting was called to order by chair, Dr. Jim Logan, who introduced the vice chairs, Dr. Bill Barton and Dr. Tony Frazier; and the subcommittee chairs, Dr. Phil Elzer, Scientific Advisory Subcommittee; Dr. Marty Zaluski, Greater Yellowstone Area (GYA) Subcommittee; and Dr. Joe Corn, Feral Swine Subcommittee.
Dr. Frazier presented an overview of the 2013 Committee meeting, the resolutions passed in 2013, and the responses to those resolutions.

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.

National Brucellosis Program Update
John Belfrage, USDA-APHIS-VS

Current Status of Brucellosis: Each year, more and more states move into the longer time categories from when they’ve gone to Class Free. At this time, only Montana is still in the five years or less category, and next year they will move up so there will be no states left in that low category.

There are four affected herds in the Greater Yellowstone Area with all in the Designated Surveillance Areas in the three states. Of those, the Wyoming bison herd will probably be released soon. In Montana, one bison herd was released this last summer. In Idaho, the one cattle herd elected to keep the heifers that were in the herd while there were still reactors. Those will calve this next spring. If all tests are negative, then they will be released. That would leave just two bison herds, one in Montana and one in Idaho, left unreleased.

While we still haven’t gotten down to our target of about 1.3 million head, we have dropped the number to two million head tested at slaughter. Part of the reason is that some of the plants had not gotten everything in order to get their numbers down. We also had two cull cow plants go out of business this year, one in Wisconsin and one in Texas, and have brought two others online. Both the new plants are in the same states and have a similar source base as the old plants. Of course, there will be some changes in where the cattle from the closed plants go. We will just have to evaluate those changes as we go along.

There were still close to 97,000 head of cattle tested at market, about 250,000 head tested on farm or ranch, 1.9 million head calf-hood vaccinated, 262,000 head adult vaccinated, and about 276 certified herds.

Rules: The Interim Rule has been moving through the governmental approval process and will be published as a Final Rule before too long. The combined Brucellosis/TB rule is also progressing through the approval process. We are anticipating that the Proposed Combined Rule will be published next spring.

Alaska Woods Bison Introduction: In 2003, there was an illegal introduction of Woods Bison from Canada into Alaska. These were confiscated by the U.S. Fish and Wildlife Service (USFWS) and sent to the Alaska Wildlife Conservation Center. While there were natural additions to
that group, there are no livestock near the Center. In the meantime, a Risk Assessment was done and in 2008, 53 brucellosis and TB tested bison were also brought to the Wildlife Conservation Center. All the bison from both groups have been tested at the Center twice more and found negative for brucellosis and TB. These bison are to be released in Southwestern Alaska in the Lower Innoku-Yukon River area where there are a few moose but no other wildlife or livestock in that area. Other areas in Alaska have *B. suis* biovar four in caribou and captive reindeer.

**Montana Report Summary**

Marty Zaluski, Montana State Veterinarian

The Designated Surveillance Area (DSA) in Montana includes cattle operations at risk of transmission of brucellosis from infected wildlife.

The northern boundary of the DSA was adjusted in the summer of 2014 based on wildlife surveillance performed in January-February of 2014. The results of the wildlife surveillance yielded ten positive samples 40 samples in HD 311 positive with a greater number of positive elk being found towards the east (Belgrade) of the study area. This is the fourth year that elk have been captured and collared as part of an enhanced effort to ensure that all cattle at risk to wildlife brucellosis are within the DSA. The DSA now includes 333 producers with approximately 85,000 cattle.

Montana continues to test DSA cattle at a high rate with 42,000 DSA related samples being tested in 2013 (the last complete year). DSA regulations are enforced with the use of technology and partnership with the Brands Enforcement Division. The Brands Enforcement Division shares key staff with the Animal Health division. Brands personnel at markets use handheld units which identify DSA cattle.

Three affected herd quarantines were released in calendar year 2014. This includes two cattle (detected in 2013) and one domestic bison herd (detected in 2011). One of the cattle herds, and the domestic bison herd had only one reactor animal. One large domestic bison herd remains under quarantine in the state of Montana.

**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 Designated Surveillance Area (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 had 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
consecutive negative whole herd tests have been achieved. The first whole herd negative test was completed in December 2013. Another whole herd test is scheduled for late fall 2014.

A small beef herd was identified in April, 2012 as affected with brucellosis. The herd was located just outside of Idaho’s 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 April, 2013 post calving whole herd test. Whole herd negative tests were completed on October 11, 2013, March 19, 2014 and April 28, 2014 (post calving test). Although typically eligible for release from quarantine following the post calving negative test, the producer elected to retain 24 heifers from the 2013 calf crop as replacement heifers. Because a reactor was identified in the April 2013 whole herd post calving test, this herd will remain under quarantine until these heifers have completed a negative post calving test in the Spring of 2015.

2014 was the first full year that Idaho had movement and change of ownership testing requirements as part of our brucellosis rule. A total of 11,020 head of cattle were tested in 2014 due to movement out of or change of ownership within Idaho’s DSA. This number does not include cattle in other areas of the state outside of the DSA that were tested to meet other states import requirements.

In an effort to enhance compliance with Idaho’s DSA movement and change of ownership testing requirements, the ISDA, with full industry support, proposed a change to our Rules Governing Brucellosis in the 2014 Idaho Legislature. The change requires producers moving cattle out of the DSA to call and acquire a movement permit no less than 24 hours in advance of moving test eligible cattle outside of Idaho’s DSA. The rule change was passed by the legislature and went into effect at the conclusion of the legislative session in March, 2014. The permitting process will allow us to ensure that test eligible cattle are tested prior to movement. A civil penalty provision for non-compliance with permitting was included in the rule change.

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.

Idaho fish and game tested 350 elk in 2013 and found seven seropositive animals. 2.3%. Seroprevalence in elk is stable at 2 to 3% from 1998 to 2013. DSA boundary based on elk seroprevalence and locations of likely elk and cattle interaction in then risk period (January to May). Primary strategy is separation of elk and cattle in winter using hazing, depredation hunts and fencing of haystacks and winter cattle feeding enclosures.
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 was wild elk. All suspect and reactor animals found on any herd test have been 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). The herd has completed one negative whole-herd test. The next herd test is scheduled for late October 2014.

In 2013, the Wyoming Game and Fish Department (WGFD) found two Brucellosis seropositive elk on hunter-killed elk surveillance about 30 miles east of the DSA. Two additional seropositive elk were found during the 2013 hunt season in the same hunt area. 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) 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 seropositive 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 were conducted on area herds to determine if cattle/wildlife conflict existed that could cause exposure risks. The WGFD has also increased its elk surveillance activities in the area to determine the elk seroprevalence 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, 2013 to June 30, 2014 (state FY2014), 277,201 female cattle/bison were Brucellosis vaccinated – this includes calfhood, yearling booster and adult vaccinations. There were 40 herds that conducted adult and/or yearling booster vaccinations during the state fiscal year 2014, which accounts for 6,931 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 July 1, 2013 and June 30, 2014, 44,162 head of cattle were tested from Wyoming’s DSA and the area we are currently conducting surveillance on in response to seropositive 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 within the Wyoming DSA currently total 79,200 head. We have 149 DSA Brucellosis herd plans and 35 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.

**Mexico Brucellosis Update**

Jose Alfredo Gutierrez, CGRPA, Mexico

In 1966, Mexico published the NOM-041-ZOO-1995, *National Campaign against Brucellosis in animals*. From the publication, it began to operate the National Campaign which had as its main lines of action diagnosis, vaccination and animal disposal. The operability of the Campaign is founded and supported under the following legal framework: Federal Animal Health Law, Regulation of the Federal Law on Animal Health, Federal Law on Metrology and Standardization, NOM-041-ZOO-1995, *National Campaign against Brucellosis in animals*, NOM-054-ZOO-1996, Establishment of quarantine for animals and their products. Mexico has eradicated Brucellosis of cattle, goats and sheep (*Brucella abortus, Brucella melitensis and Brucella ovis*). Cattle, goats and sheep in Mexico have a low prevalence of brucellosis.

In Mexico, the total inventory of cattle is 1,366,373 heads found in free areas of the disease and 4,641,992 heads in eradication areas. By species, the following target population is reported: 3,409,221 cattle, 991,868 sheep and 240,903 goats. The livestock population is 32 million heads of cattle (30 meat and two dairy) at a value of $260 billion, 8.7 million head of goats at $6.9 billion, and 8.4 million head of sheep with a value of $8.8 billion.

In 2014, the federal budget is U.S. $7,275,913.00 with following figures: Cattle at $3,589,869 and Sheep and Goats at $3,686,044. Actions provided for the operation of the campaign are made under the following scheme which includes in the Strategic Plan: 1.) Surveillance: Surveillance in slaughter houses, only for bovine in eradication areas, provided 95% of eligible animals. Field and feedlots: In goats and sheep through Minimum Sample Size; 2.) Quarantine and Research; 3.) Epidemiological monitoring in positive herds; 4.) Animal identification and traceability through System of Individual Identification of Livestock (SINIIGA); 5.) Meet the intensive vaccination programs, and their evaluation on the fifth year; 6.) Control of mobilization; and 7.) Annual program of training to technical and operational staff associated with the Campaign.

The campaign has the following indicators:

- Diagnostic test: Cattle, 977,256; Goats, 242,471; Sheep, 101,608
- Vaccines: Cattle, 881,270; Goats, 248,842; Sheep, 29,274
- National frequency of the disease: Cattle, 0.06%; Goats, 0.01%; Sheep, 0.01%
• Free herds: Cattle, 3,575; Goats, 143; Sheep, 405

Quarantines and Investigation: An animal or herd is positive to brucellosis when diagnostic tests have been tested with positive results (official serology and or bacteriology). With surveillance, Mexico established 1,313 quarantines en brucellosis, from this 693 from cattle and in these quarantines exists 88,683 heads; also there are 620 quarantines in goats and sheep with 44,377 heads. With Epidemiological have been possible released 101 quarantines with 8,917 heads.

Organization: The administration and coordination of brucellosis campaign carries Zoo Sanitary Campaign Direction from animal Health General with 44 official veterinarians in central offices, 169 workers across the country, 49 brucellosis work plains and 2,870 authorized veterinarians.

Outlooks 2014-15: New Legal Agreement in Brucellosis; Recognition in Eradication to Nayarit and 56 municipalities from Guerrero; A1", “A2”, “A3” and “A4" areas from Jalisco; “A” zone from Aguascalientes, “A” from Baja California; Nuevo León and “A2” from Guanajuato; Recognition of Free of brucellosis to south from Sonora; Vaccination en dairy and goats (2013 – 2018); (From 2010 to 2014 has increased the cover in 7% to 9%, it means, the average increase its 250,000 heads vaccinated per Year. In 2013 were vaccinated 1'552,137.

Vision 2020: 60% of National land area is in Eradication and 40% with a prevalence lower than 3% and Goats are under a continuous and intensive vaccine system.

Update on Brucellosis Research Projects - Vaccines for Natural Hosts of Brucella
Steve Olsen, USDA-ARS

The efficacy of RB51 in Bison overall data for 2014 showed about the same results for hand vaccinated animals as single ballistic vaccination with a booster vaccination providing moderate results in relation to number of aborted or infected animals when challenged. A previous study suggested boosters increase vaccine efficacy. The 2014 results show that booster vaccine seems to improve protection and multiple boosters, (i.e. four times) only slightly improved protection. The impact of pregnancy on susceptibility to challenge revealed most all non-pregnant vaccinated animals had almost no colonization in lymph nodes and placentomes.

In studies on swine brucellosis, Brucella suis strain 353-1 was reviewed in domestic and feral swine. The antibody response was reviewed for control, parental and oral administration. Review of response was made at four week intervals and animals were challenged at 18 weeks post vaccination. Feral swine had higher antibody response for parental and oral vaccine than domestic swine. Post challenge colonization revealed similar results for feral swine and domestic swine.
Whole Genome Sequencing and Overview of Progress on the NSVL Archives of Brucella Isolates
Suelee Robbe-Austerman, NVSL

Whole genome sequencing (WGS) offers an unprecedented look into the genotypes of *Brucella abortus* that have been recovered in the USA. This presentation focused on the genotypes identified in the GYA. *B. abortus* spilled over into wild elk and bison from cattle at least five times within the Greater Yellowstone Area (GYA), with the most recent time occurring around 1978. WGS genotyping did not support direct transmission between domestic herds within the GYA. The most closely related isolates to domestic cattle and bison herds were elk isolates, however there was significant overlap between wild bison and elk isolates suggesting between species transmission occurred regularly. All *B. abortus* affected cattle herds in the USA identified since 2001 have been sequenced, and one Texas herd that was identified in the fall of 2003 had a strain that originated from the GYA. No other cases of GYA genotypes have been identified outside the designated surveillance area.

Abortion and Premature Birth in Cattle Following Vaccination with *B. abortus* Strain RB51
Amanda Dougherty, University of Wyoming, Department of Veterinary Services

*Brucella abortus* RB51 is the vaccine strain currently licensed for immunizing cattle against brucellosis in the United States. Most cattle are vaccinated as heifer calves at 4–12 months of age. Adult cattle may be vaccinated in selected high-risk situations. Two herds of pregnant adult cattle in the brucellosis-endemic area of Wyoming were vaccinated with a standard label dose (1.0–3.4 × 10^{10} organisms) of RB51. Reproductive losses in the vaccinated herds were 5.3% (herd A) and 0.6% (herd B) and included abortions, stillbirths, premature calves, and unbred cows (presumed early abortion). *Brucella abortus* was cultured from multiple tissues of aborted and premature calves (7/9), and from placenta. Isolates were identified as *B. abortus* strain RB51 by standard strain typing procedures and a species-specific polymerase chain reaction. Bronchopneumonia with intrallesional bacteria and placentitis were observed microscopically. There was no evidence of involvement of other infectious or toxic causes of abortion. Producers, veterinarians, and laboratory staff should be alert to the risk of abortion when pregnant cattle are vaccinated with RB51, to potential human exposure, and to the importance of distinguishing field from vaccinal strains of *B. abortus*.

GYA Brucellosis Risk Assessment
Dan Grear, USDA-APHIS-VS-CEAH

Currently, only portions of Idaho, Montana, and Wyoming have known *Brucella abortus* infection. Each of these three states has a designated surveillance area (DSA) which they use to implement their brucellosis
management plan. The DSAs represent zones that are identified by recognizable borders and allow epidemiologic separation of the subpopulations of livestock based on factors that influence disease transmission.

Inside the DSAs has known exposure in livestock and a wildlife reservoir in elk and bison. Outside of the DSAs is considered brucellosis-free in each of these three states, which allows for reduced surveillance. The objective of this risk analysis is to estimate the risk of exporting a shipment of breeding cattle infected with brucellosis, but undetected, from within the DSAs in Idaho, Montana, and Wyoming to uninfected areas outside the DSA. For the purpose of this risk assessment, disease is known to be present within the DSA and disease presence outside of the DSA is not considered.

To calculate risk of export, a data-driven epidemiological model was developed to quantify the entry and exposure that could produce an infected breeding animal leaving the DSA of Idaho, Montana, or Wyoming undetected. The model was developed under a formal risk analysis framework and several scenarios can be evaluated to produce a risk estimation based on a break-even benefit-cost value for applying additional testing and health monitoring of DSA origin breeding cattle when they are moved to herds outside of the DSAs (risk mitigation). Thus, the risk estimation was framed in terms of the costs for additional testing and reproductive monitoring for states outside the DSAs, relative the rate of receiving infected breeding cattle (exposure assessment) and the effectiveness of the post-movement mitigations.

The entry and exposure results suggest that 0.006 - 0.015 shipments would likely leave the DSA of any state in an average year. When standardized by number of breeding shipments per state leaving the DSAs, the results suggest that 0.01 - 0.025 per 1,000 shipments with breeding animals could leave the DSA infected and undetected.

The risk estimation suggests that a break-even value for post-movement risk mitigation (testing and reproductive monitoring) of all DSA origin breeding cattle, weighted by the exposure and mitigation effectiveness, would be in the $100-$300 million range. Due to the limitations of data available, an estimation of likely outbreak size and cost outside the DSAs was not evaluated. This break-even benefit-cost value is the amount that an outbreak, in the absence of post-movement risk mitigation, would have to cost to equal the expenditures of applying the post-movement risk mitigation for as long as necessary to detect an exposure event (receiving a DSA origin infected breeding cattle) at the rate determined in the exposure assessment (0.01 – 0.025 per 1000 breeding shipments).

**Committee Business**

A motion was passed to accept the three Subcommittee reports. Five resolutions were brought before the committee for discussion. Following discussion and amendments being made to the draft resolutions, the
BRUCELLOSIS

resolutions were voted on individually and were passed as amended, and submitted to the Committee on Resolutions.
The Subcommittee met at the Sheraton Hotel in Kansas City, Missouri on October 19, 2014 with five attendees: Phil Elzer, LA, Don Evans, KS, Steve Olsen, IA, Valarie Ragan, VA, Jack Rhyan, CO; absent: Walt Cook, TX, Don Davis, TX.

At the time of the meeting there were no official charges given since Dr. Logan did not receive any requests from USDA or any companies, individuals, or organizations working on Brucellosis procedures.

Presentations

Vaccine Development and a New Darting System Appropriate for Vaccine Delivery - Update
Jack Rhyan, USDA-APHIS-VS

Current work pertaining to brucellosis in the GYA consists of two studies on immunocontraception as a tool to reduce abortion and *Brucella abortus* shedding in seropositive bison, assisting Colorado State University researchers in assisted reproductive techniques to obtain brucella-free bison of Yellowstone genetics, development of a killed spray-dried *B. abortus* vaccine for oral use in elk, and development of a “dry dart” that delivers a vaccine payload approximately four times the volume of a biobullet at extended range with accuracy and is biodegradable. Additionally, analysis of volatile organic compounds from breath of animals is being tested as a screening tool for brucellosis infection. In two studies of *Brucella* seropositive and seronegative Yellowstone bison, different patterns of volatile organic compound (VOCs) were detected between seropositive and negative animals by GC/MS and an electronic nose. These studies are very preliminary, yet early results of these studies suggest the need for continued evaluation of this emerging technology.

Production and Distribution of Brucella FPA test
Miladin Kostovic, Prionics

In 2013, Ellie LLC, a Milwaukee, Wisconsin based company has concluded an acquisition of technology for production of Brucella FPA and other tests from Diachemix LLC, and is now a sole provider of this test worldwide. Production of diagnostics is contracted from a Serbia based, USDA approved vendor, and while marketing, sale and research are done in the U.S. Kits are available, always fresh and with consistent quality, without any interruption. Support for instruments and tests are also available in the U.S. Ellie has just finished development of a new FPA reader, Sentry 200 which is processing 12 samples at a time. The instrument has built in precise
injector for automated testing. We will be providing USAHA Brucellosis Scientific Subcommittee necessary information for approval of the instrument.

Consortium for the Advancement of Brucellosis Science (CABS) - Update
Frank Galey, University of Wyoming
The program is still moving forward and they are trying to find funding streams through Conservation Assessment Program (CAP) grants, philanthropic organizations etc. There should be a CABS meeting in Spring of 2015. Bruce Hoar was introduced as the new CABS coordinator.

Discussions Inconsistent Brucella tests on elk and bison samples, especially using the Rivanol test:
There appears to be a problem with the test in that some animals are Rivanol negative but positive on the other tests or high titer Rivanol but negative on the other tests. This has been primarily observed in elk and bison but there have been reports of issues using the test in cattle during the last few years. No data was provided. See below for committee recommendation.

Serological tests to differentiate between B. suis and B. abortus in bovine samples and standardized test for B. suis in swine:
Discussion centered around the need for a test in cattle because if there is a positive serologic test from slaughter samples then there is a need to go bleed the entire herd. Whereas if a test could determine a B. suis titer that could assist with the investigation and same manpower hours and supplies. There are new antigens being produced in the laboratory via synthetic means which might be useful in the FPA test in the future. What is the true need for a test? See below for committee recommendations.

Potential for B. suis vaccine development:
Everyone agrees there is a need for a B. suis vaccine in pigs especially feral swine.

Brucella ovis guidelines for management based on test results (retest, neuter, slaughter etc.):
There was discussion regarding the B. ovis test and what constitutes a positive, indeterminate or negative. It appears that the states of Wyoming, Montana and Idaho are getting inconsistent serological results between the states and there are also inconsistencies when the samples go to National Veterinary Services Laboratory (NVSL). See below for committee recommendations. There was also an active discussion on how to culture for B. ovis. See below for committee recommendations.
REPORT OF THE COMMITTEE

There were no issues for the committee to address from either the Greater Yellowstone Area (GYA) Subcommittee or the Brucellosis in Feral Swine Subcommittee.

Subcommittee Business

There was no old business. The Brucellosis Scientific Advisory Subcommittee recommends the following actions. If the appropriate data and information are collected prior to next year’s meeting, the Committee can meet remotely to address these points.

1. The Committee recommends that Wyoming, Montana and Idaho put together an elk serum panel of known positive and negative animals along with aberrant reactors to the rivanol test. This serum panel can be sent to National Veterinary Laboratory Service (NVLS) to help standardize some of the tests which are standardized on bovidae samples not cerividae. Don Evans can help with how many samples would be needed in the panel and how they should be coded. This panel can also be used by each state to see any regional differences using the same samples. A panel like this could also help NVSL set up a proficiency metric. In addition, the committee recommends collecting data on aberrant results in cattle to determine if there is a testing or antigen problem that may be causing unexpected results.

2. The Committee recommends that Dr. Logan solicits the state veterinarians to get data on the number of cattle which are positive on serological tests and if these positive reactions are known or thought to be due to Brucella suis exposure. This type of data will be important to have when asking companies to develop a test to distinguish between B. suis and B. abortus infections.

3. The Committee recommends that Wyoming, Montana and Idaho put together a data set of B. ovis test results including numbers, which tests were run, interpretations etc. This type of information will be helpful when looking at the problem as a whole. It would also be advised that everyone provide their exact protocols on how to run the tests in a step by step fashion (do not reference a manual). The committee would like these data and protocols as soon as possible (ASAP). Please provide the information to Dr. Logan.

4. The Committee recommends that Wyoming, Montana and Idaho provide their protocols on how to culture B. ovis. These protocols will be compared to both the OIE and the NVSL protocols. These protocols should be in depth and provided to Dr. Logan.
The subcommittee met on October 19, 2014 with subcommittee chair, Marty Zaluski, calling the meeting to order at approximately 12:30 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 and Marty Zaluski, Susan Keller, John Belfrage, and Mary Wood. Mark Drew was absent. The subcommittee received a presentation by Neil Anderson on wildlife surveillance in Montana. Montana Fish, Wildlife and Parks (MFWP) initiated a targeted surveillance project for brucellosis in elk in the winter of 2010/2011. As part of this study, abortions are monitored and submitted for culture. A relatively low number of samples from pregnancy failures have cultured positive, however, there are a number of field challenges to obtaining samples.

Neil Anderson also reported on an elk working group which made recommendations for elk/cattle separation in a focused area in Montana. The recommendations were adopted by the Commission of the Department of Fish Wildlife and Parks. Unfortunately, subsequent litigation is delaying further progress on this issue.

The subcommittee also received a presentation from Hank Edwards on Wyoming wildlife surveillance for brucellosis. In 2013 surveillance activities concentrated on the Bighorn Mountains; especially those hunt areas surrounding HA 40 where two positive elk were identified in 2012 outside of the designated surveillance area (DSA). Surveillance in the Bighorn Mountains yielded 486 suitable samples from the target hunt areas. Forty eight (48) samples were collected from hunt area 40, two of which were positive on both serological assays. These positive cases represent the furthest east location of any confirmed seropositive animal in the State, and their discovery raises concern for the spread of this disease to other elk herds as well as domestic livestock. Dr. Logan briefly presented on ongoing cattle surveillance in the area which has resulted in the testing of 8,000 cattle in the area over the last year and half.
REPORT OF THE COMMITTEE

REPORT OF THE FERAL SWINE SUBCOMMITTEE ON BRUCELLOSIS AND PSEUDORABIES
Joseph Corn, Chair
Southeastern Cooperative Wildlife Disease Study (SCWDS)
University of Georgia

Feral Swine Data Management Program
Dale Nolte, USDA-APHIS, Wildlife Services (WS)

Dr. Nolte provided an update on the USDA-APHIS National Feral Swine Damage Management Program. APHIS will serve as the lead federal agency in a cooperative effort with other federal, state, tribal, and local entities that share a common interest in reducing or eliminating problems caused by feral swine.

Overall Goal:
APHIS’ goal in conducting the National Feral Swine Damage Management Program is to reduce damage and risk to agriculture, natural resources, property, animal health, and human health and safety in the United States by reducing or eliminating feral swine populations, in cooperation with states, tribes, other federal agencies, organizations, and others.

APHIS Strategy:
APHIS’ strategy is to provide resources and expertise at a national level, while allowing flexibility to manage operational activities from a local or state perspective. The overall objective of the program is to minimize damage inflicted by feral swine. APHIS will implement activities to reduce problems associated with feral swine in most states where they are present. In states where feral swine are emerging or populations are low, APHIS will cooperate with local and state agencies to implement strategies to eliminate them.

Leadership:
Wildlife Services will lead the APHIS National Feral Swine Damage Management Program. A WS Feral Swine Program Manager will report to the WS Deputy Administrator’s Office and coordinate activities across organizations. The Program Manager will serve as the dedicated point of contact for all aspects of the APHIS National Feral Swine Damage Management Program. The Feral Swine Program Manager also will serve as lead for three groups: 1.) National Multi-Agency Feral Swine Committee; 2.) APHIS Feral Swine Coordinating Committee; and 3.) WS Feral Swine Steering Committee.

Funding:
Wildlife Services will establish baseline capacity to address feral swine damage through WS State Programs. Level of baseline capacity that is established will primarily depend on current feral swine populations and current damage to resources. Baseline capacity will be supplemented with designated national and local projects to achieve strategic accomplishments. National projects will be implemented to enable comprehensive coverage of disease monitoring, risk analysis, and economic analysis, along with other...
research activities on feral swine. Local projects will be generated by WS State Directors, along with cooperators, to address specific feral swine issues. WS will establish two helicopter teams in central locations to provide aerial support for operational programs. APHIS will seek partners in all aspects of feral swine damage management.

**National Feral Swine Mapping System (NFSMS) - Update**
Joseph Corn, Southeastern Cooperative Wildlife Disease Study (SCWDS), University of Georgia

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. 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, and other state/federal wildlife and agriculture agencies. 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 internet address has changed; the new address is [http://swine.vet.uga.edu/nfsms/](http://swine.vet.uga.edu/nfsms/). Additional data are provided to state/federal agencies and universities on request. Established feral swine populations currently are reported in 36 states.

**Surveys for Selected Disease Agents in Feral Swine Being Conducted - Update**
Thomas Gidlewski, USDA-APHIS-WS

In 2014 the USDA, APHIS, Wildlife Services (WS), National Wildlife Research Center (NWRC), National Wildlife Disease Program sampled approximately 3,000 feral swine in 31 states for classical swine fever (CSF), swine brucellosis, pseudorabies virus (PRV), influenza virus, and Porcine Reproductive and Respiratory Syndrome (PRRS), leptospira, toxoplasma, and trichinella. Most of these endemic diseases continue to exist in feral swine and pose zoonotic and agricultural risks. In addition to the national surveillance, we continue to collaborate with scientists on local and regional projects. Our feral swine serum archive now represents about 15,000 animals. We are very excited to be working with the National Feral Swine Damage Management Program to expand our surveillance into areas underrepresented in the past.
USDA-APHIS-VS Programs on Feral Swine - Update
Ellen Kasari, Barbara Porter-Spalding, Ryan Miller, USDA-APHIS-VS

The USDA is moving towards a comprehensive and integrated surveillance system (CIS) for all commodity groups. Monitoring for diseases in feral swine has a role in the swine CIS system. A brief overview of the comprehensive and integrated surveillance system will be provided. The current status of USDA swine activities will be covered and will include information on modifications being made to align with the CIS concept. Finally a brief overview of the role of Veterinary Services in the National Feral Swine Damage Management Program will be reviewed.

B. suis Infected Hog Dog
Gregory N. Hawkins, Texas Animal Health Commission

Dr. Hawkins reported on a case of a B. suis infected hog dog, the investigation of which led to an unpermitted feral swine facility and an infected transitional swine herd. The management of the case in the dog and comparison of test results is also presented. In addition, the disposition of the swine (both domestic and feral) is presented. It is emphasized that positive Brucellosis test results should be reportable for all species, and that epidemiological investigations should be conducted in each case reported. In addition, it is recommended that supplemental tests be evaluated/validated as confirmation on card test positive dogs and the public health significance of B. suis infected dogs be determined. Finally, the prevalence of feral swine sporting events is discussed as well as the need for increased awareness of their existence.
The Committee met on October 21, 2014 at the Sheraton Hotel in Kansas City, Missouri, from 8:00 a.m. to 12:00 p.m. There were 37 members and 29 guests present.

One resolution was brought forth in 2013. The Committee briefly discussed that there was a response to USAHA that addressed the resolution by both the USDA and the United States Department of Interior (USDI) but that no action was taken on specific request within the resolution.

**Arthropod Borne Animal Diseases Research Unit and Epizootic Hemorrhagic Disease Virus Update**

Scott McVey, Arthropod Borne Animal Disease 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 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 viruses that cause bluetongue (BT) and epizootic hemorrhagic disease (EHD) are of concern to livestock producers in North America because of 1.) the emergence of new serotypes, 2.) increased reports of spillover and clinical disease in cattle, and 3.) increased spread and adaptation to new geographical areas. Accordingly, the United States Animal Health Association (USAHA) passed Resolution 16 in October 2012 requesting the United States Department of Agriculture (USDA) and the United States Department of Interior (DOI) to organize a diverse panel of experts including industry stakeholders, university and federal researchers, and federal and state regulatory agency representatives to determine research needs and identify and prioritize intervention strategies.

In response to USAHA Resolution 16, USDA in collaboration with DOI organized a gap analysis workshop composed of international experts on Orbiviruses. The workshop participants met at the Arthropod-Borne Animal Diseases Research Unit in Manhattan, Kansas, May 14–16, 2013, to assess the available scientific information and 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 virus (EHDV).


**Mycoplasma Bovis** – an Emerging Pathogen of Ranched Bison

Jack C. Rhyan, USDA-APHIS-VS-NWRC

David L. Hunter, Karen B. Register, Murray R. Woodbury, Neil W. Dyer, Patrick H. Burrage, M. Claire Windeyer, Kelly A. Patyk, Margaret A. Parker, Steven J. Sweeney, **Jack C. Rhyan**

1 Turner Enterprises, Inc. 2 USDA-ARS 3 University of Saskatchewan, Western College of Veterinary Medicine 4 Veterinary Diagnostic Laboratory, North Dakota State University 5 Bluffton Veterinary Services 6 University of Calgary, Faculty of Veterinary Medicine 7 USDA-APHIS-IS 8 USDA-APHIS-VS-NWRC

**Abstract:** *Mycoplasma bovis (M. bovis)* is the most important emerging infectious pathogen affecting the ranched bison industry in North America. *M.
bovis in bison (unlike in cattle) seems to be a primary pathogen, causing severe disease among animals in feedlots and in breeding-age cows and bulls on pasture. Mortality rates in adult bison have been as high as 25 percent, causing severe economic losses to producers. Clinical expressions of Mycoplasma bovis disease in bison have been variably reported as caseonecrotic pneumonia, pharyngitis, polyarthritis, dystocia and abortion, with lesions disseminated to various organ systems. Affected animals may be alert at the onset of disease, but eventually become emaciated and weak, usually leading to death or euthanasia. It is unknown to what extent epizootics of Mycoplasma bovis in bison are influenced by geographic and environmental variables, or by differences in bacterial strains or disease resistance among herds. Canadian and U.S. researchers have launched several studies of M. bovis disease in bison to establish the causes and risk factors for the large outbreaks of severe Mycoplasma-mediated pneumonia and arthritis that have plagued the commercial bison industry.

Updates from the Field
David Hunter, Turner Enterprises, Inc.

A number of diseases including Johne’s disease, Mycoplasma bovis, blue tongue, epizootic hemorrhagic disease (EHD), brucellosis and anthrax have impacted the bison herds at a number of the Turner Enterprises, Inc. ranches. Due to unique management approaches practiced on the ranch to promote natural habitats, the veterinary staff and animal managers have had to change the way they approach infectious disease investigations and subsequent management of disease. Principles that have been considered include:

- How we view issues concerning health in captive and free-ranging species
- How we understand and deal with populations
- Assessing true Biodiversity
- Role of pathogens in an ecosystem

The first veterinarian at Turner Enterprises was hired to address Johne’s disease in the bison herd. To better understand the pathogenesis of the disease in bison, an extensive epidemiologic investigation was conducted. The findings from this investigation provided the framework for a management plan that maximized eradication of the disease, while minimizing overall loss of animals from the herd. Turner Enterprises, Inc. has since focused on developing a greater understanding of the unique physiology of bison including providing animals for complete genome mapping. Nutritional and physiologic studies have shown that bison are not just fuzzy cattle.

Pneumonia and reproductive loss from Mycoplasma bovis has also plagued bison herds on a number of ranches. Turner Enterprises, Inc. has collaborated with researchers and animal producers across North America to better understand the pathogenesis of the disease in this species.
Anthrax outbreaks have also been documented on a few Turner ranches. A novel approach to carcass disposition was utilized to decrease the necessity of burning the carcasses. Hydrogen peroxide based foam, currently utilized in other countries with endemic anthrax was utilized to coat the animals before deep burial. Through the manipulation of the delivery system, a currently available vaccine has been modified to extend the recommended inter-dose interval for anthrax immunization.

Blue tongue and EHD have also caused mortality in elk and bison. Turner Enterprises has worked with a laboratory to develop a vaccine which has also been made available to other producers.

Fecal cortisol measurements have been collected on pastured and intensively handled bison to determine stress levels in the animals to determine whether stress acts as a predisposing cause of disease in bison.

Research Update on VOC Sampling in Wildlife and Livestock for Bovine TB and Brucella
Jack Rhyan and Pauline Nol, USDA-APHIS-VS

Analysis of volatile organic compounds (VOCs) from breath of animals is being tested as a screening tool for brucellosis and bovine tuberculosis. In two studies of Mycobacterium bovis naturally- and experimentally-infected animals, analyses of breath VOCs by gas chromatography/mass spectrophotometry and by an electronic nose showed different patterns of VOCs in breath of infected and non-infected cattle. In two studies of Brucella seropositive and seronegative Yellowstone bison, different patterns of VOCs were detected between seropositive and negative animals by GC/MS and the electronic nose. Results of these studies suggest the need for continued evaluation of this emerging technology.

Impacts of CWD on Captive and Free-ranging Cervids
Brant A. Schumaker, Department of Veterinary Sciences, University of Wyoming

Chronic wasting disease (CWD) is a devastating disease to captive and free-ranging cervid populations. Captive cervids typically are found in much higher densities than free-ranging populations and can incur much higher CWD prevalences. Recently, 80% of the deer in a captive cervid farm in Iowa tested positive for the disease. As the area where CWD has been found continues to expand, there is concern over the impact it may have on elk (Cervus elaphus) populations that congregate on winter feedgrounds in Wyoming. A stochastic simulation model was created to determine the effect that genotype-specific CWD mortality rates had on a hypothetical free-ranging elk population. Life table data gathered from captive elk held in a CWD-contaminated facility was used to parameterize the model. This “worst-case scenario” modeling framework predicted severe reductions in elk population numbers, primarily due to CWD. However, adaptive management of hunting in free-ranging populations may allow elk to adapt to CWD through
changes in the frequency of genotypes associated with the incubation time for the disease.

**Chronic Wasting Disease Ante Mortem Testing: Where We Are and Where We Are Going**

Tracy Nichols, USDA-APHIS-WS

Development and testing of a chronic wasting disease (CWD) ante mortem test would allow for more targeted herd management, and be a step toward a herd certification program.

APHIS has allocated funds to the CWD program in Veterinary Services to find an effective ante mortem test to be utilized at the National Veterinary Services Laboratory (NVSL) for regulatory testing purposes. For an ante mortem test to be useful it must have a high degree of sensitivity and specificity, utilize easily accessible sample tissues, not require a large sample volume, be able to detect the disease early in progression prior to symptoms, be cost effective, have a reasonable turnaround time, must not be overly complex, and allow multiple diagnosticians. In addition there are some confounding factors that have an impact on test efficacy. A test that is effective in deer may not be effective in elk, and the genotype of the animals has a significant impact on disease trafficking within the body, which ultimately has an effect on the ability of an ante mortem test to detect disease.

Currently, the CWD laboratory at the USDA National Wildlife Research Center in Fort Collins, Colorado is evaluating the latest published ante mortem testing for applicability in “real world” situations. In addition, we are establishing a blood and fecal archive for use in method testing and ultimately validation, working on developing a novel volatile organic compound ante mortem test, and supporting new test development at other institutions via sample sharing.

Once an assay shows promise the sensitivity and specificity must be established. If more than one assay has potential they will be compared for cost effectiveness, ease of use, and sample availability. Successful test/s will be presented to the CWD program and NVSL for consideration. We will train the NVSL laboratories to conduct the assays, and assist with test validation.

**Cervid Health Program Update**

Patricia Klein, USDA-APHIS-VS

**Chronic Wasting Disease Herd Certification Program**

The national chronic wasting disease (CWD) herd certification program (HCP) and requirements for interstate movement were established whenAPHIS published the CWD interim final rule (9 CFR Parts 55 and 81) in June 2012. The rule became effective in August 2012. APHIS accepted public comments on preemption of State regulations, as that aspect of the rule had changed significantly since the rule was proposed. APHIS considered the preemption comments and revised the rule by amending the definition of herd plan to replace ‘eradication’ with ‘control’ of CWD and adding the
The CWD program standards accompany the rule to provide clarification and guidance on how to meet CWD herd certification program and interstate movement requirements. The standards were first published in July 2012. In response to stakeholder requests, APHIS set up a discussion group in November 2012 to provide input on revisions to these program standards. The group included representatives from the cervid industry, State animal health officials, State wildlife officials, diagnostic laboratories, and Veterinary Services. APHIS published the revised Program Standards in the Federal Register in December 2013 and accepted comments until March 31, 2014. APHIS received 328 comments reflecting the diverse stakeholder positions noted in the discussion group and made four changes as a result of these comments. APHIS considered several factors to determine whether changes to the standards were warranted at this time. Specifically, APHIS could not make changes in the program standards that would contradict existing CWD rule language. Further, several comments supported opposite sides of a single issue where some advocated for APHIS to allow States to implement more stringent CWD requirements, while others asked APHIS to encourage States to implement less stringent standards. No changes were made in this area, as APHIS believes States are better able to determine their own additional risk mitigations for CWD, and the rule does not preempt State regulations related to CWD to be stricter than the federal rule, with the exception for transiting of animals. The revised standards became effective on May 9, 2014. A provision exists for the annual review of the Program Standards by representatives of the cervid industry and appropriate State and Federal agencies, and further revision as necessary.

In September 2014, APHIS met with representatives of the Cervid Industry to discuss their issues and concerns. Topics discussed included sustained indemnity funds in the Cervid Health Program budget, trade and marketing opportunities, outreach/education on CWD, and research needs (vaccines, live animal test methods, and genotyping) to support control of CWD and decrease risk of disease transmission.

A total of 29 States are participating in the national voluntary CWD Herd Certification Program (HCP) through FY2014 and this year also marks the first year that Approved States have submitted their CWD HCP annual reports to APHIS.

As of October 2014, CWD has been confirmed in wild deer and elk in 19 U.S. States, and in farmed cervids in 13 States. In total, 22 States have identified CWD in wild and/or farmed cervids. Confirmation of the disease in a free-ranging, wild white tailed deer in northeastern Iowa in April 2014 marked the first report in the wild cervid population in this State.

To date, CWD has been reported in 65 farmed cervid herds in the United States. In the last two years, CWD has been identified in a red deer herd in Minnesota (May 2012), and a white tailed deer (WTD) herd each in Iowa (July 2012), Wisconsin (November 2013), and Pennsylvania (April 2014).
The herds in Minnesota, Iowa, and Pennsylvania were depopulated in 2014 and provided federal indemnity. All animals from these depopulated herds are tested for CWD. No additional CWD positives were reported in the red deer; a total of seven of 15 WTD in the Pennsylvania herd were reported CWD positive; and approximately 80% of the deer in the Iowa herd tested CWD positive. The Wisconsin herd and the owner’s hunt facility, as well as the five herds in Colorado and three herds in Nebraska remain under State’s quarantine. All mortalities from these quarantined herds are tested for CWD.

In September 2014, two new CWD positive WTD herds were reported, one in Wisconsin and the other in Pennsylvania (same county as previous herd). APHIS is in discussion with the state officials to consider indemnity for these herds.

In FY 2014, routine surveillance testing was conducted on approximately 20,000 farmed /captive cervids. Currently, APHIS has approved 18 NAHLN laboratories for immunohistochemistry testing and ten NAHLN laboratories for the use of the Bio-RAD ELISA test as official screening tests for the CWD program. Any suspect positive ELISA results will be confirmed by NVSL using immunohistochemistry.

Cervid Tuberculosis

In February 2013, APHIS implemented official program testing at the National Veterinary Services Laboratories (NVSL) for cervids with the CervidTB Stat-Pak and Dual Path Platform (DPP) serologic tests in captive and free-ranging North American elk, white-tailed deer, red deer, fallow deer, and reindeer. However, the CervidTB Stat-Pak was discontinued by its manufacturer in early 2014. APHIS amended and published the cervid TB serology interim final rule in July 2014 making the DPP test both a primary and secondary serology test for bovine TB in cervids. No public comments were received. VS Guidance (6701.2) on the Primary and Secondary Serological Test for Diagnosing Bovine Tuberculosis (TB) in Farmed and Captive Cervids also was amended in March 2014.

A manufacturer’s shortage of the DPP test kits occurred in April 2014 resulting in an interruption of testing at NVSL for three weeks. NVSL banked submitted samples to test when the DPP test kits became available and reported in less than two weeks after the remaining test kits arrived. Another manufacturer’s shortage of DPP test kits is expected by end of October due to increased submissions for serological testing at NVSL. The manufacturer is unable to resupply test kits for at least six weeks. NVSL will again freeze all samples received and resume testing as soon as kits are available.

In FY 2014, to date, 16,300 Cervids have been tested serologically for bovine TB. Eight necropsies have been performed on serologic suspect and reactor cervids. Mycobacterial cultures for *M. bovis* were negative on six of those animals; two cultures are pending.

National Animal Health Monitoring System Cervid Industry Study

Beginning in September 2014, VS, in cooperation with the National Agricultural Statistics Service (NASS), initiated the first national study of the U.S. farmed-cervid industry. The study includes a survey of 3,000 producers
from all States that have farmed cervids and will provide baseline industry statistics, a description of current production practices and challenges, producer-reported disease occurrences, and an overview of health management and biosecurity practices. Reports from the study should be available in Spring 2015.

**Cervid Health Program Budget**

The Cervid Health Program includes the CWD herd certification program and the cervid TB program within the Equine, Cervid, and Small Ruminant Health Center. In FY 2014, the Cervid Health Program was appropriated $3.0 million by Congress for cervid health activities.

Funding was allocated to provide $1.1 million for indemnity, $200,000 in CWD research towards development of live animal diagnostic test methods, and $1.2 million for general program support. APHIS anticipates the FY 2015 Cervid Health Program budget to remain at FY 2014 levels and will propose similar funding allocations.

**Zoo and Aquarium All-Hazards Preparedness, Response and Recovery Center**

Julie Napier, Omaha’s, Henry Doorly Zoo

The Association of Zoos and Aquariums (AZA) and the United States Department of Agriculture is pleased to announce the creation of the Zoo and Aquarium All-Hazards Preparedness, Response and Recovery Center, known as the “ZAAHP Fusion Center” The goals of the Fusion Center are:

- Identifying the current state of emergency readiness and response in the managed wildlife community
- Identify necessary steps that must be taken to close gaps between existing and ideal states of readiness
- Act as a conduit of that information to all stakeholder groups

The Fusion Center staff will work with new partners at the highest levels (Department of Homeland Security, the Federal Emergency Management Agency, International Association of Emergency Managers, etc.) to advocate for our industries, and prepare them for all hazards.

**Committee Business**

There was one resolutions presented to the Committee. A summary of the resolution is included below. The Committee accepted the proposed resolution, Epidemiology of Chronic Wasting Disease in Farmed Cervids.
The first meeting of the Subcommittee on Farmed Cervidae was held on October 20, 2014. The following committee members were present: Co-chair Charly Seale TX; Co-chair Bret Marsh, IN; Co-chair: Paul Anderson, MN; Shawn Schafer, ND; Eric Mohlman, NE; Warren Bluntzer, TX; John Fischer, GA; David Hunter, MT; Collin Gillin, OR; and Robert Meyer, WY. Glen Zebarth, MN was unable to attend. There were a total of 41 people in attendance the meeting. Introductions were made and the purpose of the committee was reviewed and discussed. The purpose of the Subcommittee on Farmed Cervidae is:

1.) To review and make science-based recommendations on federal Chronic Wasting Disease (CWD) regulations and any other animal health and disease-related concerns of interest to the farmed cervidae industry including necessary research;

2.) To represent the interests of the farmed cervidae industry as it relates to the health of the livestock industry;

3.) To provide the information and expertise to USAHA which can be used to make appropriate decisions regarding the health of domestic livestock that also consider the needs of the farmed cervidae industry;

4.) To assist in the development of sound policies governing the dispersal and movement intra and interstate of farmed cervidae;

5.) To present appropriate information to assist in the development of sound governmental policies concerning farmed cervidae by providing recommendations based on scientifically valid principles and methods;

6.) To provide information and assist in the development of sound policies governing the importation and exportation of farmed cervidae, their germ plasm and other biomaterials; and

7.) To assist in the identification and management of disease and welfare problems affecting farmed cervidae.

The Subcommittee on Farmed Cervidae recommends the following changes to the purpose statement of the Subcommittee on Farmed Cervidae:

2.) To represent the interests of the farmed cervidae industry as it relates to the health of the livestock industry and wildlife resources;

3.) To provide the information and expertise to USAHA which can be used to make appropriate decisions regarding the health of domestic livestock and wildlife that also consider the needs of the farmed cervidae industry;

7.) To assist in the identification and management of disease and welfare issues affecting farmed cervidae.
CWD: Progress on a Live Animal Test
Nicholas Haley, Kansas State University

Dr. Haley discussed the use of new prion amplification tests for CWD including Protein Misfolding Cyclic Amplification (PMCA) and RT-QuIC and the importance of developing live animal tests for CWD. Test results were discussed for animals tested in depopulation of two CWD positive whit-tailed deer herds, one in Pennsylvania and one in Iowa. In the Pennsylvania herd, five of 14 deer were positive for CWD. The rectal biopsy using the RT-QuIC detected three of the positive animals for a sensitivity of 60 percent. In the Iowa herd, 283 of 355 deer were positive for CWD. The rectal biopsy using the RT-QuIC detected 198 of the positive animals for a sensitivity of 68 percent. The sensitivity of nasal brushes was about 24 percent. Blood samples were also collected from all the animals in these two herds and will be tested at a later date when improved testing procedures are developed.

Subcommittee Business
The subcommittee had a lengthy discussion on two sections of the CWD Program Standards.

The first discussion was in regard to the requirements for CWD sample collection as specified in sections (5.6), (5.7) and Appendix III. Specifically, the subcommittee discussed the requirement for collection of both obex and medial retropharyngeal lymph nodes in order for a CWD test to be counted as valid. Some members felt that collection of both tissues should be required. Others felt that collection or one or the other of these tissues is adequate for herd certification purposes. No consensus was reached and the issue was tabled for further discussion.

The second discussion was in regard to tracing protocols for newly CWD infected herds as specified in Part B. (1.2). The question was asked about whether we should consider a herd a “trace-forward herd” and place it under quarantine if it contains animals that came from a “trace-back herd” and there is no evidence that the “trace-back herd” is infected with CWD. Several committee members voiced concern about placing herds under quarantine unnecessarily and discussed the effect such action has on the owners. There was general agreement that more work needs to be done on this section of the CWD Program Standards.

The Subcommittee on Farmed Cervidae moves to continue to work on Part B. of the CWD program Standards, Guidance on Responding to CWD Affected Herds, over the next year and develop a recommendation to be finalized when the Subcommittee on Farmed Cervidae meets at the 2015 USAHA meeting.

The Subcommittee on Farmed Cervidae supports a resolution to urge USDA-APHIS-VS in consultation with state animal health officials to compile the epidemiologic information surrounding all CWD infected herds in the United States and Canada and share the report with all stake holders. The resolution will be presented to the Committee on Captive Wildlife and Alternative Livestock for final approval.
The Committee met on October 17, 2014 at the Sheraton Hotel in Kansas City, Missouri, from 3:00 to 6:00 p.m. There were five members and 12 guests present.

Presentations and Reports

State Diagnostic Laboratory Survey Results
Gary Anderson and Michael J Gilsdorf

Drs. Anderson and Gilsdorf presented the results of the Joint Workforce Development survey among state animal health officials and state laboratory directors. A total of 30 responses were received with mixed results. A copy of the results can be requested from the chair.

VS Antibiotic Resistance Activities
Dave Dargatz, Center for Epidemiology and Animal Health, USDA-APHIS-VS

NAHMS Commodity Surveys are:
- Periodic
- Cross-sectional
- Broad scope
- Stakeholder driven
- Confidential
- Voluntary
- Statistically based for population estimation
- Collection of biological samples
There is a need and potential for new initiatives to address the antimicrobial resistance (AMR) issue. There is a growing demand for more detailed quality data on use and resistance, including

- Legislative efforts
- Advocacy groups
- Agriculture industry
- Policy makers
- Others

The President has initiated the National Strategy for Combating Antimicrobial Resistance (CARB) through an executive order. Next steps include:

- Stakeholder engagement to define
- Needs
- Feasible options
- Resource the plan
- Implementation
- Reporting
- Review status/needs

Animal Agriculture Emergency Response Training (AAERT) framework-

Marvin Meinders DVM, Food, Agriculture, and Veterinary Defense Division, Office of Health Affairs, DHS

Need

- Consistently train, increase awareness, and improve access to responders in support of an animal emergency.

Purpose
Provide framework for organizing training
Assess existing training
Provide platform to recommend and record training for individuals with responsibilities in an animal emergency
Create database of all relevant trainings and courses available

Next Steps
- Exploring potential oversight committee for project
- Discussing potential with NASAAEP in September
- Test administrator function of software in October
- Test responder function of software in November
- Projected to go live in January 2015

Veterinary Services Reorganization Update
Jack Shere, USDA-APHIS-VS
Dr. Shere provided a review of the current status for the Veterinary Services (VS) reorganization.
Animal agriculture’s changing needs continue to impact VS resources and programs. VS has reorganized itself to meet animal health challenges. VS reorganization was officially in place November 2013; however, it takes time to fully acclimate to the new structure. Customer service is important to all of us in VS and we continue to work hard to ensure that customer needs are met as we continue our transition into the new structure. We value our relationships with our State and private partners.

One Health Collaboration Activities for Diagnostic Labs and Veterinarians
Tom Gomez, USDA-APHIS-VS
Dr. Gomez presented activities related to One Health on behalf of Veterinary Services. APHIS-VS priorities in one health include:
1. Zoonotic Disease Engagement, Investigation, and Response
2. Preharvest Food Safety
3. Antimicrobial Resistance
4. Pandemic and Animal Disease Preparedness
5. Global Health Security
VS continues to support the mission of safeguarding the health of animals, people and the environment. This includes continued assessment to improve our national veterinary and animal health laboratory workforce to effectively continue protecting the nation’s animal and public health in two key areas:
- Laboratory: training in bio-informatics, next generation diagnostics, QMS
- Field: training in epidemiology and One Health core competencies

Committee Business
There was no Committee action was taken.
REPORT OF THE USAHA/AAVLD COMMITTEE ON ENVIRONMENT AND TOXICOLOGY
Chair: Larry Thompson, MO
Vice Chair: Tim Evans, MO

David Ailor, DC; A. Catherine Barr, TX; Adrienne Bautista, CA; Karyn Bischoff, NY; Tim Evans, MO; Michael Filigenzi, CA; Francis Galey, WY; Tam Garland, TX; Cynthia Gaskill, KY; L. Wayne Godwin, FL; Ramesh Gupta, KY; Jeffery Hall, UT; Dwayne Hamar, CO; William Hare, MI; Brent Hoff, ON; Stephen Hooser, IN; Paula Imerman, IA; Laurent O'Gene Lollis, FL; Travis Mays, TX; David Meeker, VA; Sandra Morgan, OK; Michelle Mostrom, ND; Motoko Mukai, NY; Gene Niles, CO; Eileen Ostlund, IA; Stephanie Ostrowski, AL; Gary Osweiler, IA; Robert Poppenga, CA; John Rathje, IA; Jane Robens, MD; Wilson Rumbeiha, IA; Nick Schrier, ON; Lori Smith, KY; Patricia Talcott, WA; Larry Thompson, MO; Deon Van der Merwe, KS; Gary Weber, MD; Christine Wilson, IN.

The Committee met on Saturday October 18, 2014 at the Sheraton Hotel in Kansas City, Missouri, from 3:35 until 6:30 p.m. There were 17 members and 20 guests present. The meeting was called to order by Dr. Thompson who reviewed the mission statement of the Committee and quickly went through the proposed agenda. Business of the Committee was delayed due to time constraints of the first speakers.

Time-Specific Papers:

Dr. Lee Anne Palmer of the FDA-CVM presented a time-specific paper entitled Jerky Pet Treat Adverse Events: Descriptive Epidemiology 2014. Palmer reviewed the background of the reports submitted to the FDA-CVM by owners and veterinarians related to the ingestion of chicken jerky pet treats. First reports started in 2007 and the wide variety of clinical signs reported as well as the FDA-CVM’s grouping and evaluation of these reports were covered by Palmer. The presentation is available at http://www.usaha.org/Portals/6/Committees/environment/presentations/2014-Palmer-PetTreatAdverseReaction.pdf.

Dr. Renate Reimscheussel of the FDA-CVM Vet-LIRN program presented a time-specific presentation entitled Update on CVM’s Jerky Pet Treat Investigation: Diagnostic Sample and Product Testing. Reimscheussel discussed in depth the analytical approach the FDA-CVM has taken in its investigation of the reports of adverse effects in dogs following the ingestion of chicken jerky pet treats. The presentation is available at http://www.usaha.org/Portals/6/Committees/environment/presentations/2014-Reimschuessel-PetTreat.pdf.
Reports and Presentations:

Development of Information on Radionuclides: Veterinary Aspects  
Steve Hooser, Purdue University

Dr. Hooser provided information about the need for experts on radiation poisoning and exposure in cattle. There is a national need for experts to deal with residue issues after accidental radiation exposures. The plan is to do a literature review, identify experts and resources in the U.S., and convene a panel of specialists. No funding is available yet, but once the gaps in resources are identified, funding may become available. Dr. Sherman, a Program Leader from the National Institute of Food and Agriculture, also provided input. Dr. Hooser will coordinate the Committee in this effort and individuals from the Committee expressed interest in the topic which will be further reported next year.

State Reporting Regulations for Toxicology Issues  
Jeff Hall, Utah State University

Dr. Hall presented information and a document with proposed language that could be used by state veterinarians to establish legislation in their states making intoxications reportable diseases.

Committee Business

One resolutions was addressed regarding states making intoxications reportable diseases, from the presentation from Dr. Hall. Discussion ensued, and a motion was made, seconded and approved that this document will be amended by Dr. Hall using suggestions from the Committee and then moved by the co-chairs forwarded as a Resolution to both the AAVLD and USAHA.

The Committee was informed that Dr. Thompson’s final year as USAHA Co-chair will be in 2015 and a new co-chair must be selected from the USAHA members of the Committee.

Dr. Cindy Gaskill of Kentucky presented a proposed approach to quality control of toxicology interpretations. The Committee had a short discussion and recommended follow up and expansion at the 2015 meeting.

Drs. Thompson and Evans quickly reviewed potential topics for the 2015 Committee meeting which was received favorably by the Committee.
The Committee met on October 19, 2014 at the Sheraton Hotel in Kansas City, Missouri, from 1:30 until 5:45 p.m. There were 11 members and 31 guests present. Dr. McDonough introduced himself and Vice Chair Dr. Shultz. Then he provided the committee with an overview of the current issues facing the United States in part due to the global nature of the challenges; the “One Health” concept provides us with the framework in which to consider the food safety continuum as sharing in the interdependence of human-animals-and the environment. The recent European “horsemeat scandal” highlighted the dangers of long supply chains, greed leading to food adulteration with cheaper horsemeat, the related issues of damaged consumer confidence, inaccurate food ingredients labels, and international participation. Brief, mention was made of the spillover of wildlife disease into human populations and their animals (brucellosis in feral swine affecting hunting dogs; the growing Ebola epidemic in Africa and the issues of the international trade in bushmeat derived from
African wildlife such as fruit bats). Severe drought in the Western states has led to concerns for using alternative water sources for livestock (e.g., reclaimed human sewage water), including any risks that this practice may pose. Dr. McDonough briefly went over the following issues, i.e., sign the attendance sheet indicating whether attendees were either committee members and/or desired to join the committee; he discussed developments within the USAHA and the AAVLD to align the committee mission statement with new strategic plans within both organizations (requiring ongoing committee discussion). A brief overview was given of the agenda for the meeting.

Overview of Multistate Foodborne Outbreaks
Stacey A. Bosch, Centers for Disease Control and Prevention

Dr. Bosch reviewed the major outbreaks of foodborne disease occurring in the United States during 2013-2014. She described the changing landscape of foodborne disease from predominantly localized to more large scale outbreaks encompassing many more cases and wider distribution of those cases. She went on to describe the process for investigating multistate foodborne outbreaks, including the role of PulseNet in the evaluation of bacterial strains, the typical timeline for reporting illnesses (Salmonella was used as an example) as being part of an outbreak (usually 2-4 weeks), and the role of the CDC Outbreak Response Team in evaluating outbreaks.

Dr. Bosch then presented an overview of the 2013-2014 multistate foodborne outbreaks. The following pathogens are screened by laboratories, i.e., E. coli, Salmonella spp, Listeria monocytogenes, Campylobacter spp, Shigella sonnei, and others. During 2013, a total of 221 multistate clusters were investigated or an average of 35 clusters/week (range:29–41.). Of these clusters 187/221 (85%) are typically selected for intensive follow-up. During 2014, 191 total clusters were investigated (as of the date October 15, 2014). There is a seasonality to foodborne outbreaks attributed to environmental temperatures, i.e., fewer outbreaks during the cooler fall and spring months. New food vehicles are being identified in multistate outbreaks such as Tahini sesame paste, cucumbers, dog food, raw cookie dough, and pine nuts. Food vehicles and associated pathogens were outlined for 18 outbreaks.

Recent trends indicate that non-bacterial pathogens are involved in outbreaks, too, e.g., Cyclospora caryetanesis was the agent in two large foodborne outbreaks in the United States in 2013–2014. In 2013 – 631 ill, 25 states, likely two separate outbreaks (salad mix from Guanajuato, Mexico and fresh cilantro from Puebla, Mexico); 2014 – 133 ill in Texas, linked to fresh cilantro from Puebla, Mexico. Hepatitis A was part of a large foodborne outbreak in the United States in 2013 - 165 ill in ten states; Hepatitis A was linked to pomegranate arils imported from Turkey that was part of a frozen organic antioxidant berry mix, and to frozen organic pomegranate kernels.

Since 2011, three multistate outbreaks of L. monocytogenes linked to soft cheeses made with pasteurized milk have occurred; contamination
occurred in the production facility where unsanitary conditions were cited. The practice of cutting and repackaging cheese leads to cross-contamination. Due to this practice occurring in distribution centers, stores, and in people’s refrigerators, product identification and traceback are a bit challenging; this has been a particular problem with artisanal cheeses.

A review of the poultry outbreaks during 2011-2014 showed that six multistate outbreaks of Salmonella infections linked to poultry products occurred:

- *Salmonella* Hadar: Turkey burgers
- *Salmonella* Heidelberg: Ground turkey
- *Salmonella* Heidelberg: Chicken livers
- *Salmonella* Heidelberg (2): Brand A chicken products
- *Salmonella* Heidelberg: Mechanically-separated chicken

Multiple outbreak strains were resistant to several commonly prescribed antibiotics: Although these antibiotics are not typically used to treat *Salmonella* blood infections or other severe *Salmonella* infections, antibiotic resistance can be associated with increased risk of hospitalization in infected individuals.

A review of Shiga toxin-producing *E coli* that more non-O157 outbreaks were identified, i.e., O121, O145, O26, O111, O104, and others. New food vehicles were identified such as frozen snack foods, hazelnuts, and Lebanon bologna; raw flour was the suspected ingredient in two outbreaks (cookie dough O157:H7 in 2009 and frozen snack foods O121 in 2013). However, the “usual suspects” are still being found in outbreaks, i.e., ground beef, leafy greens (mixed salads, spinach, romaine lettuce, cabbage), and raw sprouts.

**2011-2012 FERN Collaboration Microbiology Study**

Renate Reimschuessel, Center for Veterinary Medicine

Dr. Reimschuessel discussed the results of a collaborative study done with Food Emergency Response Network (FERN) laboratories to evaluate pet feeds for bacterial pathogens: Salmonella, Listeria, *E. coli* 0157H7, and generic *E. coli*. The goals of the study were to increase proficiency and capacity and to get data on pet feeds. A total of six FERN Food and Drug Administration (FDA) laboratories participated (Florida Department of Agriculture and Consumer Services, Michigan Department of Agriculture, Minnesota Department of Agriculture, North Carolina Department of Agriculture, Ohio Department of Agriculture, Washington Department of Agriculture). Results of the study have been published in the journal *Foodborne Pathogens and Disease* 11(9) in 2014.

**Jerky Pet Treat Adverse Events: Descriptive Epidemiology**

Lee Anne M. Palmer, FDA Center for Veterinary Medicine

Dr. Palmer presented an update and review of the jerky pet treat (JPT) problems. What are jerky pet treats? JPT consist of dried chicken, dried duck, dried sweet potato or yams, and variations (such as jerky wrapped yams, sweet potatoes, rawhides). Ingredients in treats usually consist of
meat, often contain glycerin and +/- seasonings, usually without preservatives; treats are shelf stable for months at room temperature and most product is irradiated. Most product is foreign/imported, due to cheaper source materials (white meat chicken), and the fact that other cultures prefer the dark meat for human consumption.

History of JPT’s - the jerky pet treat (JPT) issue came to the attention of Food and Drug Administration (FDA), Center for Veterinary Medicine (CVM) in the summer of 2007 after the melamine incident was coming to a close. Blog reports appeared after a major retailer withdrew a brand of chicken JPT from shelves and it was stated that trace melamine was detected, but not confirmed by FDA. On September 13, 2007, the American Veterinary Medical Association (AVMA) issued an alert regarding illness and consumption of JPT (specifically chicken), and then on September 14, 2007, the American College of Veterinary Internal Medicine (ACVIM) issued an alert: ACVIM Diplomats were reporting primarily small breed dogs presenting with acquired Fanconi syndrome following consumption of JPT from China. By early September 2007, FDA had received approximately 70 complaints (reports) of illness involving 95 dogs. The FDA issued a caution to consumers on September 26, 2007, after which report numbers increased further. In total, during 2007, FDA received approximately 180 complaints of canine illness with a reported history of consumption of JPT (~21 were reports of acquired Fanconi syndrome).

The Australian Experience with Chicken Jerky – Australian reports from September 2007 spoke of an acquired Fanconi “outbreak” starting September 2007. Reports of 108 cases of acquired Fanconi were reported in Australia associated with consumption of the same brand of chicken jerky treats imported from China (Kramar Supa Naturals) (Reference: MF Thompson, LM Fleeman, AE Kessell, LA Steenhard, Australian Vet Journal 91(9): 368-373, 2013). The chicken jerky treats (CJT) were introduced to the market two weeks prior to the first reports, with a median onset of 12 weeks. The product was withdrawn from the market about 16 months later and reporting declined. With the introduction of a “budget version”: Kramar Supa Naturals Chicken Breast Bites in 2009, cases appeared again and the product was withdrawn quickly.

The Canadian Veterinary Journal in June 2011 contained a notice: “Recently, several veterinarians in Ontario have reported cases of dogs that have been showing signs similar to Fanconi syndrome. All dogs in the reported cases had been fed chicken jerky treats that were manufactured in China. Signs of Fanconi syndrome can include decreased appetite, decreased activity, vomiting, and increased water consumption and/or increased urination. Blood tests may show increased urea nitrogen and creatinine. Urine tests may indicate Fanconi syndrome (increased glucose). The problem is that this can be confused with diabetes.”

Palmer presented the methods of reporting pet food related adverse effects, including the FDA’s Safety Reporting Portal. Consumer complaints are taken by FDA Consumer Complaint Coordinators (CCC) located in
district offices. They may alert CVM or request guidance; the CVM monitors consumer complaints collected by CCC’s
(www.fda.gov/Safety/ReportaProblem/ConsumerComplaintCoordinators).
She presented the CVM information processing for pet food and animal feed, as well as case definitions for each body system.

What is Fanconi syndrome? This syndrome includes proximal renal tubular dysfunction in which glucose, amino acids and electrolytes fail to be reabsorbed and pass into the urine leading to clinical signs of increased thirst and urination, metabolic acidosis and eventually renal failure. There can be Genetic based disease: i.e., Basenji dogs are usually affected between the ages of one and five years. In the U.S., 10% of Basenjis are found to have glycosuria; disease in Labrador Retriever is suspected, too?

Acquired Fanconi Syndrome/acquired proximal renal tubulopathy any: may occur at any age, may resolve with treatment (genetic forms don't resolve). Glycosuria, aminoaciduria, +/- azotemia (all may resolve). It is considered uncommon in dogs, and the potential causes may include: heavy metals (lead, mercury, cadmium), Lysol, nitrobenzene, maleic acid, ethylene glycol; medications: outdated tetracyclines, gentamycin, azathioprine, valproic acid, salicylates; and Disease states: Leptospirosis, hepatic copper storage hepatopathy. Reports from the University of Pennsylvania indicate that acquired Fanconi occurs in younger dogs, often small breeds, often after opening a new bag. Aminoaciduria outlasts the glucosuria, and aminoaciduria may start high and normalize. In contrast, genetic forms don’t resolve, they worsen.

Normally the kidney reabsorbs 100% of glucose; however, for dogs affected by Fanconi Syndrome, reabsorption of glucose can decrease markedly, even down to 39-65%. Thus almost all dogs affected by Fanconi Syndrome exhibit glucose in the urine coupled with normal blood sugar concentrations. Palmer gave examples of cases and their laboratory results.

Geographic locations: reports have been received from all 50 states, and five Canadian provinces. Besides the large number of reports from Florida, California and Texas, there does not seem to be a geographic distribution pattern that lends clues to etiology. Reports tend to coincide with the distribution of the U.S. population, and a greater proportion of Fanconi-like Syndrome (FLS) reports from Florida may be due to interest and awareness among specialists.

Case-control Study with the CDC: In May 2014, FDA and the CDC collaborated on a study of cases reported to FDA of sick dogs compared with “controls”. The goal was to compare foods eaten by both groups and determine if sick dogs are eating more jerky. “Sick dogs” included diagnosis of Fanconi (or FLS and dogs ≤5 years with renal failure. This study is still ongoing.

The 2012 Inspections: in April 2012, FDA inspected five jerky pet treat facilities in China. Firms were selected based on both the number and severity of illness reports. Valuable information was obtained regarding manufacturing operations, ingredients and raw materials used, processing,
FOOD AND FEED SAFETY

packaging, quality control, sanitation, and product testing. The FDA identified concerns on record keeping practices of several inspected firms. The inspections resulted in Administration of Quality Supervision, Inspection and Quarantine (AQSIQ) seizing products and suspended exports to the U.S.

Some take home points: Pets can be sentinels for broader food issues because they have a more limited diet generally with less variety. As far as acquired Fanconi:

- Urine samples – treat eaters
- Small breed dogs affected, but not limited to those
- Withdrawal of treats and institute support therapy
- The signs may resolve
- Report cases to FDA

Update on CVM’s Jerky Pet Treat Investigation: Diagnostic Sample and Product Testing

Renate Reimschuessel, Center for Veterinary Medicine

Dr. Reimschuessel presented an update of the Vet-Laboratory Investigation and Response Network (LIRN) activities: prior to 2010, the Vet-LIRN did not exist. Back then the FDA relied on the medical history as is with no opportunity to request additional information. In contrast the Vet-LIRN has funds to request further diagnostic workup by the owner’s veterinarian and a Vet-LIRN network laboratory. The focus is on Animal Diagnostics and not product testing. Usually the Office of Regulatory Affairs does product testing for regulatory action if routine testing has not identified a Root Cause; in 2011 the Vet-LIRN began to assist by conducting Investigational Testing of consumers’ jerky products. They used product collected from the consumer’s bag, conducted tests trying to identify or eliminate toxicants. The idea was to think about the big picture rather than individual cases. It was noted that no individual owner’s product can be tested for all the potential toxicants. Aggregate data is needed for the investigation.

For the product testing we first developed a list of toxicants that could cause the clinical signs in the dog or cat patient. The Vet-LIRN also needed to develop a budget and write contracts and cooperative agreements to get the testing done. Getting such funding in place can take up to a year, so products being tested now were collected a year ago. They try to collect product from cases where there are the fewest complicating factors to reduce variables during data interpretation, i.e., cases without pre-existing medical issues, cases ingesting only one type of treat, and cases with a good veterinary medical history.

There are quite a few challenges when faced with testing jerky products (JPT), here are just a few, e.g.; sample size – some tests require more sample than others; how many tests should one run per sample/case, additional analytes are often requested due to new findings, which means either renegotiating an existing contract or developing a new contract; some methods don’t work for jerky and need to be developed; testing can be quite
expensive – especially when looking for unknowns; working within a
government setting has its own challenges, too.

The Vet-LIRN developed a testing plan for the jerky treats, which
Reimscheussel presented. Again the choice of tests done on each product
depends on the clinical signs, amount of product available and previous
testing results.

Reimschuessel discussed the importance of negative data: sometimes a
first step to understand a problem is to identify what it is NOT; how many
negative test results do you need before you eliminate that particular
toxicant? (i.e., metals); what about positive data? If you find something does
it necessarily mean that it is the cause of the illness (i.e. in very, very tiny
amounts)? Metals – when Vet-LIRN began product testing, metals had been
tested, but only on about ten samples. Since then the LIRN has tested over
100 samples for various toxic metals using three different screens (the third
was done to test for S which wasn’t on the first two screens). They have
concluded that metals are probably not involved in these illnesses, but may
need to test some additional products since new products come on the
market and those haven’t been tested. Positive data – extremely low levels of
antibiotics and one antiviral (amantadine) have been detected in jerky – but
their contribution to the illnesses is questionable. Of the testing done during
the investigation, most of the tests were negative or within the expected
levels. Several brands tested positive for Antiviral drugs (Amantadine). Early
on, we had a few samples positive for diethylene glycol (DEG), ethylene
glycol (EG) and propylene glycol (PG). PG is allowed to be used in animal
food. Concentrations of EG and DEG were very low at levels not considered
to be toxic. Several samples tested positive for antibiotic residues which were
found in very low levels and are not considered to be of concern. These
findings are similar to the findings of New York State Department of
Agriculture and Markets (NYSDAM) which initiated nationwide recall of
several different brands of treats. Several microbiology tests were positive
but these findings are not considered to be a root cause of JPT related
problems. Compositional analysis showed that several types of treats from
several brands were mislabeled for glycerin. Several samples were
mislabeled for species.

They looked at the physical characteristics of the treats by soaking the
treats and stomaching them, and some of them remained very tough after
the treatments. One hypothesis related to the gastrointestinal (GI) illnesses
was – “Is the toughness of the product contributing?” They have one case
where a necropsy was done in a dog that had eaten jerky three days before
death, but nothing else since then. Intact jerky product was found in the dog’s
stomach. So they designed a study where jerky was rehydrated on shakers
and after seven days the samples were still very tough. They also put jerky
pieces in a stomacher that smashes samples; some products disintegrated
but others remained intact even after 90 minutes. The results of this study
showed that many products are very tough and resist mechanical disruption,
so they concluded that some of the mild GI upsets could be due to the
physical properties of jerky. They recently had a case where the dog ate 3.5 lbs. of treats and developed severe hemorrhagic gastritis and melena. Upon necropsy the stomach was ulcerated and full of blood. This, of course, was an extreme case, but serves to show that jerky physical properties can cause GI problems.

The Vet-LIRN tests diagnostic samples; the Vet-LIRN’s mission really is focused on the diagnostic sample testing, to provide the Food and Drug Administration (FDA) with more information on consumer complaint cases. They consider diagnostic sample testing as the very important tool for understanding the root cause of the JPT reported problems. They could also potentially help to understand if there is an idiopathic reaction to JPT (or some of the ingredients) in some dogs. They began collecting samples in 2012. Samples included: Urine (urinalysis, Franconia panel), Clinical chemistry, fecal cultures, necropsies, tissues (toxicology, histopathology, culturing, Raman analysis of crystals, etc.).

Consumer complaints reporting death are of great concern to FDA, thus it is very important for them to follow up with as complete an investigation as possible. Last year the Vet-LIRN really focused on these reports. The results of necropsy exam of 71 deaths reported to FDA indicated that 37 of these were not related to jerky, i.e., 22 dogs died of renal problems, four of liver disease and three of GI problems. They are having further diagnostics done on the renal cases to get a better idea about the nature of the lesions to better understand the etiologies that may be involved.

Necropsies are important to identify the true cause of death, to determine the nature of the lesions associated with potential jerky related deaths, to correlate similar lesions with associated products, and to focus efforts for product testing. They have also focused a large effort on doing Fanconi testing on dogs presenting with glycosuria. Of the 170 dogs tested so far 107 were positive (63%). They conducted follow up testing on 59 of these and 47 of those animals near (80%) were positive approximately two months after the first test. Seventeen of these dogs were tested a third time (4-6 months later) and 11 of these were positive (65%). Many were clinically normal at this point. The “take home message” – even if glycosuria has resolved, it is worth testing these animals. Question - are some animals predisposed to renal problems and pushed over the edge by jerky type treats or are the results of testing showing prolonged effects? Most of the small breeds (Chihuahua, Shiz Zu, Maltese, mini/toy Poodle, Yorkie and Pomeranian. Shih Tzu) have ~80% of the tested animals positive (sometimes they test GI cases and/or housemates – so not all are symptomatic – but most of these we have a reason to suspect that they are Fanconi positive).

What you can do? Report cases to FDA (http://www.safetyreporting.hhs.gov); get a good feeding history including: exact Name (get the bag), when first fed?, when was it last fed?, how many per day?, any other treats? what is usual diet? Also get the all of medical records of the patient including drug usage. Be sure to do your routine work up so you don’t miss a lot of diseases that can explain the animal’s signs,
e.g., Leptospirosis, Addison’s Disease, Cushing's Disease, medication – nonsteroidal anti-inflammatory drugs (NSAIDS), immune mediated hemolytic anemia, neoplasia, congenital renal dysplasia, etc. If the Vet-LIRN requests diagnostic samples, for GI cases – fecal routine usually already done, but the Vet-LIRN may want cultures – refrigerate, don’t freeze, get fresh samples; Renal cases – urine sample - get as much as possible (>10 ml) and don’t insert dipstick (contaminates), but freeze ASAP; for Necropsies – refrigerate the body, but they will work with frozen bodies if that is all that is available.

**Update: Preventive Controls for Animal Food- FDA Food Safety Modernization Act**

Daniel G. McChesney, Office of Surveillance and Compliance

Dr. McChesney provided an update and discussion of the Food Safety Modernization Act (FSMA). The law was needed because of Globalization (15 percent of U.S. food supply is imported); the Food supply is more high-tech and complex (more foods in the marketplace, and there are new hazards in foods not previously seen); there are shifting demographics (growing population, about 30% of individuals are especially “at risk” for foodborne illness).

What is so historic about the law? It involves the creation of a new food safety system with a broad prevention mandate and accountability, also it is a new system of import oversight; it emphasizes partnerships, and farm-to-table responsibility; plus it was developed through a broad coalition.

The current view is that the food and feed supply is very safe; it is a global supply system that is reactive to problems; that the inspection of all facilities by the FDA on a reasonable frequency is impossible, and lastly that the current system while good, cannot keep up. In contrast the FSMA directs FDA to build a new, modern food safety system that includes standards all must follow for preventing food safety problems; and also provides the FDA with tools for gaining high rates of compliance with those standards. To meet the vision, the FDA will promulgate new regulations that will provide the standards for protecting food from farm-to-table, will develop guidance with and for the regulated industry to enhance understanding of what is needed to protect food, will provide for a common understanding of how to comply with the standards through training, and then will develop and apply the tools for gaining high rates of compliance with the standards. Also to meet the vision industry itself must be primarily responsible for food safety, must implement risk based preventive measures at all appropriate points, and must manage supply chains to assure appropriate measures are being implemented as part of routine practice.

Who is covered? Facilities that manufacture, process, pack or hold human or animal food. In general, facilities required to register with FDA under sec. 415 of the *Food, Drug, and Cosmetic (FD&C)* Act are covered; the act applies to domestic and imported food, although some exemptions exist and modified requirements are being proposed.
Summary of the FSMA’s requirements: to establish, for the first time, Good Manufacturing Practices for animal food, to establish Hazard Analysis and Risk-Based preventive controls; each facility would be required to implement a written food safety plan that focuses on preventing hazards in foods.

Comments and Outreach by the FDA: Comment period closed March 31, 2014, and over 2,100 comments were received. The FDA has pulled and reviewed some of the larger comments, but they are still reviewing all of the comments. They have had three town meetings, plus numerous listening sessions with industry groups have been held including American Feed Industry Association (AFIA), National Grain and Feed Association (NGFA), Pet Food Institute (PFI), Grocery Manufacturers Association (GMA), Brewers Assoc., United Egg Producers (UEP), National Chicken Council (NCC), National Turkey Federation (NTF), and United Fresh. There have also been letters from Congress, particularly related to coverage of breweries’ spent grains.

What is the definition of the “Farm”? Farm means a facility in one general physical location devoted to the growing and harvesting of crops, the raising of animals (including seafood), or both. The term “farm” would include establishments that:

1.) Pack or hold raw agricultural commodities,
2.) Pack or hold food, provided that all food used in such activities is grown, raised, or consumed on that farm or another farm under the same ownership and,
3.) Facilities that manufacture/process food, provided that all food used in such activities is consumed on that farm or another farm under the same ownership.

The implications of the farm definition are that there is no evidence that the safety of animal food varies with feed mill model (independent, contract farming operations, and fully vertically integrated operations). The FDA is requesting comment on whether feed mills associated with fully vertically integrated operations should be required to register; the FDA is requesting comment on how to value the animal food being fed when no sales are involved for the purpose of determining whether they would be a very small business.

More information is available on the Web site: http://www.fda.gov/fsma that has a subscription feature available; you can also send questions to FSMA@fda.hhs.gov.

Raw Milk: Politics and Policy
Shelley Mehlennbacher, Vermont Agency of Agriculture
Raw Milk Associated Outbreaks in Vermont

During 2010 there were three outbreaks in Vermont. Outbreak #1 - Guests and workers at a bed and breakfast (B&B) who drank raw milk developed symptoms consistent with Campylobacter. Two were children; one experienced febrile seizures that required emergency care. They were
suspect for Campylobacter but no confirmatory tests were performed. Outbreak #2 - Inmates at a work camp painting fences at a dairy were offered raw milk by the dairy farm owner. Five of ten inmates on the work crew developed diarrhea and tested positive for Campylobacter. Outbreak #3 - during a school field trip to a dairy farm, students were offered raw milk; ten students and one teacher developed diarrhea.

From 2003 to 2013, 215 Vermonters with Campylobacter infections reported consuming raw milk.

The History of Raw Milk Sales in Vermont:

- Sales prior to 2008
  - Max of 25 quarts per day at the farm
- 2008 statutory change
  - Raised to 50 quarts per day/ 350 quarts per week
  - Requirement of basic cleanliness
- 2009 statutory change to a two tier system
  - Tier I – up to 350 quarts/week
  - Tier II – 351 to 1120 quarts/week
    - Allowed for delivery
    - Added requirements and accountability
- 2011 – fluid milk for personal consumption only
- 2014 statutory change
  - Allows delivery to farmers markets for Tier II producers

Note: “personal consumption” is defined as milk that is ingested by the consumer and members of the consumer’s household or nonpaying guests. It does not include taking raw milk products to a social function or otherwise distributing the products made.

Tier I and Tier II Requirements: allow raw milk producers to sell directly to consumers without requiring a milk handler’s license. Requirements for both Tiers:

- Animal Health testing
- Customer inspection
- Sanitation
  - Clean animals and environment
  - Potable water – bacteriological testing every three years
- Milk tested for antibiotic residue
- Record keeping
- Farm signage and product labeling
- Temperature – cooled to 40F within two hours after milking

Record keeping and reporting:

(A) A producer shall collect one composite sample of unpasteurized milk each day and keep the previous 14 days' samples frozen. The producer shall provide samples to the agency if requested.
(B) A producer shall maintain a current list of all customers, including addresses, telephone numbers, and email addresses when available.
(C) The producer shall maintain a list of transactions for at least one year which shall include customer names, the date of each purchase, and the amount purchased.

(2) Labeling. Unpasteurized (raw) milk shall be labeled as such, and the label shall contain:

(A) The date the milk was obtained from the animal.
(B) The name, address, zip code, and telephone number of the producer.
(C) The common name of the type of animal producing the milk (e.g. cattle, goat, sheep) or an image of the animal.
(D) The words "Unpasteurized (Raw) Milk. Not pasteurized. Keep Refrigerated." on the container's principal display panel and these words shall be clearly readable in letters at least one-eighth inch in height and prominently displayed.
(E) The words "This product has not been pasteurized and therefore may contain harmful bacteria that can cause illness particularly in children, the elderly, and persons with weakened immune systems and in pregnant women can cause illness, miscarriage or fetal death, or death of a newborn." on the container's principal display panel and clearly readable in letters at least one-sixteenth inch in height.

Animal Health Testing for Tier I and Tier II requires:
- Annual health exam by a licensed veterinarian
- Current rabies vaccination performed by a licensed veterinarian
- Official identification
- Brucellosis testing – producer expense
- Adult cattle 24 month of age and older
- Initial blood test
- Annual Brucellosis Ring Test (BRT) on a sample of milk
- Adult goats/sheep 12 months of age and older - annual blood test
- Annual tuberculosis test – producer expense
- All adult animals in the herd

Milk testing for Tier II:
- A producer shall have unpasteurized milk tested twice per month by a U.S. Food and Drug Administration accredited laboratory. Milk shall be tested for the following and the results shall be below these limits:
  (i) Total bacterial (aerobic) count: 15,000 cfu/ml (cattle and goats);
  (ii) Total coliform count: 10 cfu/ml (cattle and goats);
  (iii) Somatic cell count: 225,000/ml (cattle); 500,000/ml (goats).

Agency Implications: Delivery to Farmers Markets
- Both Tier I and Tier II may deliver to customers if the milk is presold and they meet the common requirements and additional requirements.
- Inspection needed at Farmers Markets
  - Ensure compliance with regulations
REPORT OF THE COMMITTEE

- Other product at markets
  - Scales
  - Apples
  - Meat
  - Eggs
- Lack of resources
  - Number of inspectors
  - Budget to cover salaries
- Most markets on weekends/after work hours
  - Overtime for inspectors

Agency implications: Animal Health Testing Policy - the Statute:

"Unpasteurized milk shall be derived from healthy animals which are subject to appropriate veterinary care, including tuberculosis and brucellosis testing and rabies vaccination, according to accepted testing and vaccinations standards as established by the agency."

There has been some push back on the Agency testing policy; it is viewed as unfair and burdensome. The Agency added the Brucellosis Ring Test option in place of blood testing for maintenance in January of 2014.

Mehlenbacher discussed the “penalty matrix” of fines for first compliance action and additional compliance actions in the same area of violation.

Agency implications of the Compliance Policy:

- Why have written compliance policies? Serve to keep penalties fair and consistent; consistently set (monetary amounts; actions needed for the non-compliant individual)
- Required by law – the Supreme court case regarding written policies (Algiers)
- Not generally shared with external stakeholders (Agency actively provided the raw milk policy; huge push back on policy and what is in statute)
- External input on an internal policy (motor vehicle fines)

Why the Controversy?

- Raw milk regulations taken more personally
- Lack of a company buffer between producer and regulator
- Processing plant serves as the interface between the public and the producers
- Raw milk producers in charge of their own recalls
- High bacterial counts
- High somatic cell counts
- Morphs into a small farm vs. large farm issue
- PMO does not work as a regulatory framework
- Assumptions made that milk will go to further processing (pasteurization; aged – cheese)

Advocacy Group Activity:

- Press for changes to the law every legislative session
  - Once law passed – repeated call for more changes
FOOD AND FEED SAFETY

- Retail sales goal
  - Advocacy activities more pronounced in an election year
    - Agency serves as evil entity
    - Provides a focus for fund raising efforts
  - Completely opposite reaction from our tissue residue penalty

Tissue Residue Penalty:
- 6 V.S.A. § 2744a. Drugs
(b)(1) No producer shall sell livestock for slaughter which contains any drug or drugs in excess of tolerances established by the United States Food and Drug Administration in the Code of Federal Regulations.
(2) In the event that livestock intended for slaughter is found to contain a drug or drugs in excess of levels established by the United States Food and Drug Administration in the Code of Federal Regulations at the time of sale, the secretary may assess an administrative penalty not to exceed $1,000.00 for each violation.
(c) Before issuing an order or administrative penalty under this section, the secretary shall provide the producer and the handler or dealer an opportunity for hearing. (Added 1991, No. 232 (Adj. Sess.), § 2; amended 1997, No. 88 (Adj. Sess.), § 2; 2003, No. 42, § 2, eff. May 27, 2003; 2011, No. 39, § 1, eff. May 19, 2011.)

Penalty set at highest allowable amount:
$1000 per animal or drug

Tissue Residue Penalties:
- Offenders tend to be conventional dairies
- Opt for payment versus hearing
- Disappointing from a preventive aspect
- No outcry or public request for input on the penalty
- Why the difference in compliance policy outcry?
  Different population of people
  Raw milk producers:
    1. More likely to engage in on-farm slaughter
    2. Keep cows longer
    3. Less likely to cull and send to a slaughter plant
    4. More organic certification?

Lead Residues in Animal Products from Exposed Cattle
Karyn Bischoff, Animal Health Diagnostic Center, College of Veterinary Medicine

Dr. Bischoff discussed the issue of lead and lead dust in the farm environment. Lead is a ubiquitous environmental contaminant and most species are susceptible to toxicosis. Acute Pb poisoning is commonly diagnosed in cattle and can be associated with large ingestions of Pb from a point-source by a few animals. However, environmental Pb contamination or feed contamination can lead to chronic exposure of a large number of...
animals who may appear clinically unaffected. We wanted to determine if products from chronically exposed cattle contained Pb residues. Only 11 of 94 cattle with detectable blood Pb concentrations had clinical signs of toxicosis. Clinical and subclinically lead-exposed cattle had blood lead half-lives ranging from three to 577 days (n=44). Our laboratory followed a Pb-exposed dairy herd for 2.5 years (n = 32). Lead was detectable in the milk of some cattle throughout the study period. The bulk tank Pb concentration was 100 ppb early in the study, and the highest milk Pb concentration from an individual cow was 466 ppb. Though the data is unpublished, we have sampled a small number of Pb exposed and recovered (n = 5, blood Pb < 10 μg/dL) and cattle with high blood Pb concentrations (n =4, blood Pb > 35 μg/dL) of varying purposes and ages and from a variety of farms. Soft tissue lead concentrations were low (< 10 ppm) in recovered cattle, and ranged from 17 to >1000 ppm in cattle with high blood Pb concentrations. Bone Pb concentrations ranged from one to 22 ppm in recovered cattle and up to 122 ppm in cattle with high blood Pb.

Committee Business

During the business meeting, we discussed the goal of responding to the AAVLD and the USAHA offices concerning their request to align the Committee’s mission statement with the newly written strategic plans of both organizations. We also talked about the need to continue the discussions throughout the year (between national meetings) perhaps via a quarterly conference call. The Committee had no resolutions this year.
REPORT OF THE COMMITTEE ON FOREIGN AND EMERGING DISEASES
Chair: Tammy Beckham, TX
Vice Chair: Alfonso Clavijo, TX

Helen Acland, PA; Bobby Acord, NC; John Adams, VA; L. Garry Adams, TX; Bruce Akey, TX; Wilbur Amand, PA; Gary Anderson, KS; Joan Arnoldi, WI; Lyndon Badcoe, WA; George Badley, AR; Karen Beck, NC; Tammy Beckham, TX; Lisa Becton, IA; Peter Belinsky, RI; 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; Corrie Brown, GA; Charles Brown II, WI; Johnny Callahan, TX; Jon Caspers, IA; Nancy Chapman, MD; Gregory Christy, FL; Jeein Chung, MN; Neville Clarke, TX; Alfonso Clavijo, TX; Matt Cochran, TX; Leslie Cole, OK; Thomas Conner, OH; Joseph Corn, GA; Paula Cowen, CO; Stephen Crawford, NH; Wendy Cuevas-Espelid, GA; Glenda Davis, AZ; Donald Davis, TX; Ignacio dela Cruz, MP; Thomas DeLiberto, CO; Leah Dorman, OH; Brandon Doss, AR; Edward Dubovi, NY; Anita Edmondson, CA; Dee Ellis, TX; Larry Elsken, IA; François Elvinger, VA; Peter Fernandez, AA; Katherine Flynn, CA; W. Kent Fowler, CA; Richard French, NH; Mallory Gaines, DC; Tam Garland, TX; Cyril Gay, MD; Robert Gerlach, AK; Paul Gibbs, FL; Samantha Gibbs, MD; Colin Gillin, OR; Michael Gilsdorf, MD; Linda Glaser, MN; Timothy Goldsmith, MN; Paul Grosdidier, KS; James Mark Hammer, NC; Cathleen Hanlon, GA; William Hare, MI; Larry Hawkins, MO; Greg Hawkins, TX; Rudolf Hein, DE; Terry Hensley, TX; 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; Barbara Kamicker, NY; Gary Kinder, WV; Paul Kohrs, WA; Darlene Konkle, WI; Charlotte Krugler, SC; Elizabeth Krushinskie, DE; Elizabeth Laurtner, IA; John Lawrence, ME; Randall Levings, IA; Tsang Long Lin, IN; Linda Logan, TX; Pat Long, NE; 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; Rose Massengill, MO; Todd McAloon, MN; Tracy McCracken, MD; Thomas McKenna, MA; David Meeker, VA; Shelley Mehlenbacher, VT; Gay Miller, IL; Frank Milward, GA; Ray Mobley, FL; Janice Mogan, IA; Igor Morozov, KS; Thomas Myers, MD; Lee Myers, GA; Sherrie Nash, MT; Cheryl Nelson, KY; Sandra Norman, IN; James Novy, TX; Kenneth Olson, IL; Stephanie Ostrowski, AL; Kristy Pabilonia, CO; Lanny Pace, MS; Charles Palmer, CA; Elizabeth Parker, TX; William Parker, GA; Roger Parker, TX; Boyd Parr, SC; David Pyburn, IA; Jeanne Rankin, MT; Tom Ray, NC; Anette Rink, NV; Keith Roehr, CO; James Roth, IA; Mark Ruder, KS; Emi Saito, OR; Mo Salman, CO; John Sanders, WV; A. David Scarfe, IL; Shawn Schafer, OH; David Schmitt, IA; Dan Sheesley, DC; Kathryn Simmons, DC; Heather Simmons, TX; Marilyn Simunich, ID; Jonathan Sleeman, WI; Tom Smylie, ON; Harry Snelson, NC;
The Committee met on October 21, 2014 at the Sheraton Hotel in Kansas City, Missouri, from 8:00 a.m. to 5:30 p.m. There were 53 members and 70 guests present. The committee began with a review of the committee mission and subsequently moved to a review of the 2013 resolution.

Time-Specific Paper:
Markos Tibbo, Food and Agriculture Organization of the United Nations, Emerging Diseases of Global Concern, with a Focus on Middle East Respiratory Syndrome presented a time-specific paper which is included in its entirety at the end of this report.

DHS S&T Agricultural Defense Program Overview
Michelle Colby, Department of Homeland Security, Science and Technology Directorate

The Agricultural Defense (AGD) Branch within the Department of Homeland Security (DHS) consistent with the roles and responsibilities articulated in Defense of United States Agriculture and Food (Homeland Security Presidential Directive, HSPD-9). This includes a broad range of research in development efforts to enhance current capabilities and develop state-of-the-art countermeasures for high-consequence foreign animal diseases. This includes near- and long-term research and development for vaccines and diagnostics, in coordination with internal and external stakeholders. This consists of five main projects covering the breadth of an animal health response: Enhanced Passive Surveillance; Foreign Animal Disease Vaccines and Diagnostics; Foreign Animal Disease Modeling; Agricultural Screening Tools; and Livestock Decontamination, Depopulation and Disposal. The Agricultural Defense Branch funds most of their research through contracts, but there are multiple ways of working with agricultural defense projects within the Science and Technology Directorate including: 1.) Grant; 2.) Cooperative Research and Development Agreement (CRADA); and 3.) Contract. The grant process is a competitive process with the deliverables to include publication, report, or completion of a project. The contract is also a competitive process in which the deliverable is a product or service. The CRADA is awarded by the Notice of CRADA intent, and either party may approach the other to initiate. The deliverable is a product or services agreed to on both sides, but no money is awarded from the Federal
National Veterinary Services Laboratories Update
Sarah Tomlinson, National Animal Health Laboratory Network, USDA-APHIS-Veterinary Services
Fernando Torres, Foreign Animal Disease Diagnostic Laboratory, Plum Island USDA-APHIS-Veterinary Services

Diagnostic testing at National Veterinary Services Laboratory (NVSL) showed a slight reduction in numbers compared to FY 2013. During the time period between October 1, 2013 and September 1, 2014, NVSL received over 38,500 accessions, processed 175,000 samples, and reported 332,600 tests. NVSL continues to support the swine enteric corona disease (SECD) outbreak in 2014 by conducting feed and diagnostic testing and providing equivalency panels for SECDv to the National Animal Health Laboratory Network (NAHLN) laboratories. Also, in collaboration with the University of Minnesota, NVSL isolated porcine delta coronavirus (PDCoV) from a clinically affected herd. Both porcine epidemic diarrhea and PDCoV virus field strains are available from the NVSL. In May, NVSL confirmed a finding of vesicular stomatitis virus (VSV) infection (New Jersey serotype) in Texas. This was the 2014 VSV index case for the nation. Currently multiple premises remain under quarantine for VSV in Texas and Colorado. NVSL Diagnostic Virology Laboratory (DVL) and Foreign Animal Disease Diagnostic Laboratory (FADDL) received MERS-CoV real time PCR assays and reagents from the Centers for Disease Control and Prevention (CDC) and examined the specificity of the MERS-CoV PCR using several animal coronaviruses. There was no detection by any of the MERS-CoV PCRs of the following coronaviruses: infectious bronchitis virus, canine coronavirus, porcine delta coronavirus, transmissible gastroenteritis virus, porcine epidemic diarrhea virus, porcine respiratory coronavirus and bovine coronavirus. We are awaiting shipment of MERS-CoV and provision of serology protocols from Center for Disease Control and Prevention (CDC). In 2014 DVL also identified IgM antibodies against eastern equine encephalitis (EEE) virus in equids from several states and Canada. The largest number of EEE IgM positive samples came from Florida. Presence of EEE viral ribonucleic acid (RNA) was also detected in equine brain samples submitted from Alabama and South Carolina. NVSL Diagnostic Bacteriology Laboratory (DBL) participated in a joint investigation with CDC regarding a multi-state outbreak of *Salmonella* serotypes Cotham and Kisarawe infections in people linked to contact with bearded dragons. NVSL provided *Salmonella* isolation, identification, serotyping, antimicrobial resistance and genotyping. NVSL’s Pathobiology Laboratory harmonized bovine spongiform encephalopathy (BSE) testing protocols in 2014 with the Canadian Food Inspection Agency’s World Organisation for Animal Health (OIE) bovine spongiform encephalopathy (BSE) reference laboratory, and validated a new manual.
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immunohistochemistry (IHC) method for BSE. This method will replace the previous IHC platform that has been obsoleted.

NVSL successfully completed an ISO 17025 renewal audit in May. In July, the NVSL hosted an Organization for Standardization (ISO) 9001 certification audit. ISO 9001 registration will certify the quality management system implementation in all areas not directly covered by ISO 17025, and includes the following areas: budget and contracting, procurement, user fees, warehouse, sample processing, media prep, glassware, human resources, training and the NAHLN.

National Animal Health Laboratory Network Update
Sarah Tomlinson, National Animal Health Laboratory Network, USDA-APHIS-Veterinary Services

National Animal Health Laboratory Network (NAHLN) continues to focus on support and training for quality management systems through collaboration with International Services, VS’ Professional Development Staff, and AAVLD trainers for the annual Quality Management System Training that was conducted August 4-8.

The NAHLN Coordinating Council met June 25-26, focusing on finalization of the updated NAHLN strategic plan and transition planning for the NAHLN restructure. The transition timeline includes four steps over the next year.

Additionally, great improvements have been made for the network’s secure electronic communications. Electronic messaging of test results is now available for swine enteric coronavirus diseases, foot-and-mouth disease, African swine fever and Influenza A. Furthermore, laboratory results are now electronically integrated with the Emergency Management Response System (EMRS). Improvements on the NAHLN Portal for management of laboratory information, documents, standard operating procedures (SOPs) and proficiency testing have also been made.

Further, NAHLN continued to focus on preparedness with the Exercises and Drills Working Group’s information webinars and designing a two-part accessioning exercise to be completed in NAHLN laboratories this fall.

Finally, the NAHLN Methods Technical Working Group continued to finalize assay development and validation processes, as well as review proposed studies and assay dossiers. The group met in April to discuss technical approaches to emerging diseases and review a proposal for multiplex assay development. Dossiers for real-time polymerase chain reaction (RT-PCR) for FMD virus in bulk tank milk and a foot-and-mouth disease (FMD) penside antigen assay were presented and reviewed. Other upcoming dossiers for review include the RT-PCRs for Lumpy Skin Disease and Contagious Bovine Pleuropneumonia, and two FMD serological negative cohorts.
Foreign Animal Disease Diagnostic Laboratory Update
Fernando Torres, Foreign Animal Disease Diagnostic Laboratory, Plum Island, USDA-APHIS-Veterinary Services

The Foreign Animal Disease Diagnostic Laboratory (FADDL) is one of the National Veterinary Services Laboratories (NVSL), where many foreign animal disease (FAD) agents are diagnosed and studied. The FADDL is composed of two sections, Diagnostic Services (DSS) and the Reagents and Vaccine Services (RVSS). The DSS is a World Organisation for Animal Health (OIE) Reference Laboratory with the capacity to diagnose more than 30 exotic and endemic animal diseases. During FY14 the FADDL received 180 submissions associated to Foreign Animal Disease (FAD) investigations. Epizootic Hemorrhagic Disease (EHD) and Bovine Papular Stomatitis (BPS) were frequently diagnosed in these cases. During this year the DSS conducted over 7,000 CSF serologic tests as part of the CSF surveillance program. The RVSS is responsible for the production and quality testing of novel and routine diagnostic reagents, including the proficiency testing program for the NAHLN. During FY14 RVSS produced and shipped PCR proficiency panels for foot-and-mouth disease virus (FMDV), classical swine fever virus (CSFV), and African swine fever (ASF) to 43 NAHLN laboratories. In addition, 13 laboratories received serology panels for FMD. The FADDL is the custodian of the North American Foot-and-Mouth Disease Vaccine Bank (NAFMDVB), a trinational agreement between the USA, Mexico and Canada. The Bank stores concentrated FMD antigen that can be formulated into vaccines if an FMD introduction occurs. During FY14, the NAFMDVB conducted safety and potency testing of three new antigens and improved and standardized SOPs for antigen quality testing and assurance. Training is an integral part of FADDL’s mission and this is accomplished to a great extent in synergy with the Professional Development Staff. During FY14 125 new Foreign Animal Disease Diagnosticians were trained at FADDL; 108 State and Federal VMOs received continuing education credits through FAD refresher courses conducted in California, New York, and New Mexico.

Foreign Animal Disease Research Updates from USDA-ARS Plum Island
Luis L. Rodriguez, Plum Island Animal Disease Center

During the past year the Foreign Animal Disease Research Unit at Plum Island Animal Disease Center (PIADC) has continued to focus research efforts on foreign animal diseases; foot-and-mouth disease (FMD), classical swine fever (CSF) and African swine fever (ASF). Also research continued on emergence of vesicular stomatitis (VS) in the U.S. FMD research focused on countermeasure discovery (vaccines, biotherapeutics), virus host interactions and epidemiology. Research and development continued on our two vaccine platforms: the leaderless FMDV3B3D and the hAd5-FMD vaccines. Research included efficacy studies, studies on route of delivery, adjuvant studies and duration of immunity. In addition methodologies to assess immune response to infection and vaccination, including FMD virus
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(FMDV) specific B cell and T cell responses in cattle and swine. Recent studies showed that swine are not long-term carriers of FMDV. This data is relevant for the pork industry. International research on FMD ecology continued with Global Foot-and-Mouth Disease Research Alliance (GFRA) partners in Africa (Cameroon, Uganda, South Africa) and Asia (India, Pakistan, Vietnam). The research focuses on understanding phylogeographic relationships of virus strains circulating in endemic areas both causing clinical or subclinical infections and the coverage of current vaccines against those strains. Research on CSF has continued mainly aimed at the development of the CSF marker vaccine FlagT4G with an commercial partner. Additionally in FY14, an ARS program increase was realized that allowed increase of the ASF research effort, along with DHS investment this effort has resulted in significant advances developing challenge methods, understanding early pathogenesis and functional genomics aimed at identifying vaccine candidates. Studies in the mechanisms of emergence of VS in the U.S. have continued. The current outbreaks in Texas and Colorado are caused by a strain identified by us in 2006 circulating in endemic regions in Mexico. Pathogenesis studies using this strain demonstrating its high virulence for swine, this might be one of the factors mediating its wide distribution in 2014. Studies on disinfection of Foreign Animal Disease (FAD) agents on work surfaces by industrial use disinfectants yielded valuable information and important differences between disinfectants and FAD agents. In FY15 we hope to add two new scientists to the research unit and continue making progress in FAD research.

Center of Excellence for Emerging and Zoonotic Animal Diseases (CEEZAD) Update

Steven Ellsworth, Center of Excellence for Emerging and Zoonotic Animal Diseases

As co-lead of the Department of Homeland Security (DHS) Center of Excellence for Zoonotic and Animal Disease Defense (ZADD) with the Institute of Infectious Animal Diseases (IIAD), CEEZAD is in its fifth year of implementation of its Six Year Strategic Plan. Pursuant to our mission to develop innovative countermeasures against high-priority transboundary, emerging and zoonotic diseases that threaten human and animal health, CEEZAD focuses on developing novel vaccine candidates and diagnostic technologies supporting the Differentiating Infected from Vaccinated Animals (DIVA) concept. CEEZAD’s major vaccine project is centered on development of a recombinant subunit vaccine for Rift Valley fever virus (RVFV). As a major development, we have received a Select Agent permit for work with RVFV in large animals at the Biosecurity Research Institute at Kansas State University (KSU), and have successfully established a RVFV challenge model in sheep for use in upcoming efficacy trials for the developed vaccine. Work is also ongoing on an NDV-vectored vaccine platform for use in mammalian species, and on development of a recombinant vaccine for Schmallenberg virus. This year, with a collaborating
partner in Spain, we have begun work on novel vaccine approaches against African swine fever. CEEZAD is also involved in efforts for future transition of research projects from Plum Island Animal Disease Center to the planned National Bio- and Agro-Defense Facility (NBAF) in Manhattan, Kansas. In our theme area of Detection we started a pilot project this year to test MassTag PCR technology in a veterinary diagnostic laboratory setting. Other projects in this area include development of unbiased pathogen detection techniques in agricultural settings and the deployment of penside PCR detection systems for emergency response.

Our Education/Outreach programs emphasize web-based courses developed by the Center for Food Security and Public Health on zoonotic and emerging diseases of agricultural animals. These courses are used for continuing education of veterinarians and animal health and homeland security professionals and some are currently being adapted as training courses for Federal Emergency Management Agency (FEMA).

**Institute for Infectious Animal Diseases (IIAD) Update**
Melissa Berquist, Institute for Infectious Animal Diseases

The Institute for Infectious Animal Diseases (IIAD) was awarded as a Department of Homeland Security (DHS) Science and Technology Center of Excellence in 2004, with Texas A&M University as the lead institution and renewed as a co-lead with Kansas State University’s Center of Excellence for Emerging Zoonotic and Animal Diseases (CEEZAD) in 2010. The mission of IIAD is to conduct research and education to protect the nation’s agriculture and public health sectors against high consequence transboundary, emerging, and/or zoonotic diseases. To accomplish this mission, IIAD leverages leading experts, researchers, and resources within major universities, minority serving institutions (MSIs), national laboratories, federal agencies, international organizations, industry, and other Centers of Excellence (COEs). IIAD’s multidisciplinary teams address complex problems and challenges and are capable of rapidly addressing emerging issues and current gaps in the nation’s ability to protect our agricultural and public health sectors.

IIAD focuses research priorities to help support and defend U.S. agriculture as a critical infrastructure. Maintaining disease freedom is essential to protecting animal and public health and ensuring a robust economy. The IIAD mission helps support this goal through the development of research and education products that support our industries, state, and federal partners. The Institute has robust programs in zoonotic and emerging disease detection; information technology for enhanced decision support and situational awareness; as well as in the development of knowledge products, and education and training curriculum.

IIAD is a multi-institutional organization, with partners in 48 states and the District of Columbia, plus collaborations or training programs established with 17 international organizations or countries. These partnerships are critical to developing new capabilities under the IIAD portfolio that will
significantly impact the nation’s ability to prepare for, detect, respond to and recover from a high consequence transboundary, emerging and/or zoonotic disease. IIAD has also worked with great success to expand its international partnerships by building on the investment of DHS to bring a more global focus to the Institute. In 2014, IIAD was recognized by the World Organisation for Animal Health (OIE) as a collaborating centre in the specialty of biolocal threat reduction. IIAD is the only centre of this kind in the OIE’s America’s region; this is a significant recognition of the expertise held within the Institute and the importance of the core DHS investment as a Science and Technology Center of Excellence.

SECD: Reporting on a Transboundary Disease from a State’s Perspective
Beth S. Thompson, Minnesota Board of Animal Health

In the spring of 2013, a new virus was diagnosed in the nation’s swine herd. Termed “transboundary” diseases, porcine epidemic diarrhea and porcine delta coronavirus were found in a number of states in a short period of time. A Federal Order addressing these swine enteric coronavirus diseases (SECD) was issued approximately a year later.

According to the Federal Order, producers, veterinarians, and diagnostic laboratories are required to report all cases of PEDv and other new swine enteric coronavirus diseases to USDA or State animal health officials. In addition to diagnostic samples being reported through the Laboratory Information Management System (LIMS) and eventually being reflected in the USDA’s emergency management response system (EMRS2), producers and veterinarians began reporting immediately after the issuance of the Order.

Different factors have played a role in each state’s involvement in the process outlined by the Federal Order, including size of state and number of hogs, role of swine veterinarians and producers, and importantly, the interplay between state animal health officials and USDA.

The presentation will identify issues, questions, and comments from the states, if the SECD model is the example of what may come with other transboundary or FADs introductions into the United States.

Veterinary Services Emerging Disease Framework and National List of Reportable Animal Diseases (NLRAD)
Beth Lautner, USDA-APHIS-VS, Science, Technology, and Analysis Services (STAS)
T.J. Myers, USDA-APHIS-VS, Surveillance, Preparedness, and Response Services

APHIS-Veterinary Services has developed two documents for which it is seeking stakeholder input: a concept paper for a United States National List of Reportable Animal Diseases (NLRAD) and a proposed framework for responding to emerging diseases. The NLRAD will be a uniform, science- and policy-based, nationally supported standardized list of animal diseases.
It will provide the basis for consistent reporting with uniform case findings and reporting criteria. This will facilitate national, interstate, and international commerce; assist in meeting international reporting obligations; support the generation of export certifications; contribute to the assessment and reporting of listed zoonotic and endemic animal diseases; and facilitate response to an emerging disease or issue in the United States. The proposed framework for emerging diseases defines the process by which VS will identify, evaluate, and respond to emerging diseases, and the implementation of this process as a VS core business practice. Emerging animal diseases include occurrences of illness or death in animals caused by a newly identified pathogen or strain, a known pathogen in a new geographic location, or a new presentation of a known pathogen.

Response Planning & Management of Producer Data in the U.S. Pork Industry for Emerging Swine Production Diseases
Patrick Webb, National Pork Board

Porcine Respiratory and Reproductive Syndrome and Porcine Circovirus are emerging swine production diseases that have become endemic in the U.S. swine herd. More recently, novel H1N1 and Porcine Epidemic Diarrhea Virus (PEDV) have been introduced and while these diseases have a limited effect on trade and commerce they have resulted in significant negative effects on swine health and producer profitability. To help mitigate the adverse effects it’s important to improve the process to identify and address emerging diseases that could threaten the U.S. pork industry. The pork industry is currently developing a standardized process to identify and report incidences of emerging swine production diseases (foreign or domestic) for shared analysis, decision-making and action. The challenge is developing an infrastructure and process that is sustainable, reliable, protects producer data and provides value back to the industry with timely information for action when an emerging swine production disease is identified.

Emerging Swine Disease Matrix
Harry Snelson, American Association of Swine Veterinarians

The American Association of Swine Veterinarians’ Swine Health Committee has been charged with analyzing a list of known swine viruses to affix some significance to each virus relative to their potential impact on the U.S. swine industry considering several factors; trade impact, economic impact, zoonotic, and chance of U.S. introduction/emergence/re-emergence. This effort has resulted in a matrix highlighting key issues of importance regarding our ability to diagnose, monitor, control and eradicate the virus.

Our mission is to delve into each virus and define what we know about each one. What tools we would need to have in place to recognize the clinical disease as early as possible, diagnose the virus, determine virulence and viability, what effective disinfectants and vaccines are available, where is it currently known to exist, how is the virus transmitted, what products or mechanisms might pose a possible route of introduction into the U.S., etc.
FOREIGN AND EMERGING DISEASES

This virus list will be used to direct possible resources towards addressing the gaps identified. It will also be used to engage USDA regarding monitoring for these diseases globally and help us understand the potential threats to our industry. The current system did not work with PED. It evaded our established safeguards and took us way too long to diagnose and implement a response. Can we be better next time if we know what to look for and are monitoring internationally and domestically? This is a first step at trying to answer those questions.

Development of the Animal Agriculture Emergency Response Education and Training Framework, Animal Emergency FRAME
Jimmy Tickel, North Caroline Emergency Management

Dr. Tickel provided an update on the National Center for Food Protection and Defense’s Animal Agriculture Emergency Response Education and Training Framework, Animal Emergency FRAME.

USDA’s Support for FMD Eradication in Latin America: History, Current Status, and Future Challenges Historic U.S. Support to Control and Eradicate FMD in Latin America
Conrad Estrada, USDA-APHIS, International Services (IS)

Dr. Estrada provided an overview of work on foot-and-mouth disease in Latin America.

FMD in Latin America: A Status Report and Next Steps
Cesar Orozco, USDA-APHIS, International Services (IS)

The USDA’s international cooperation in animal health in regards to foot-and-mouth disease (FMD) goes back to at least the 1940s when they first collaborated with Mexico in the eradication of FMD. In the 1980s, the USDA signed international FMD cooperation agreements with each of the countries from Mexico to Colombia. Given the advance stage in FMD eradication in the region, these agreements do not receive any funds from the U.S. APHIS continues to work jointly using these agreements for technical training and collaboration projects as needed.

With USDA’s support and financing of vesicular disease surveillance programs, a need was identified, and in the 1990s the Regional Vesicular Laboratory (LADIVES) was created in Panama. USDA has been very active in the surveillance operations in Latin America. El Salvador during the 1990s, El Salvador sent LADIVES more than 300 samples per year. In recent years, Nicaragua and Costa Rica, with the support of APHIS, substantially increased the number of samples for the surveillance and diagnosis of vesicular up to 250 samples per year.

During the 1990s, APHIS, the Colombian Agricultural Institute (ICA), and the Colombian Federation of Cattle Raisers (FEDEGAN) revolutionized the relationship between the public and private sector in the fight against FMD in Latin America achieving the first free zone without vaccination in the department of Chocó in Colombia. This cooperative relationship at that time
allowed Colombia to remarkably reduce the number of FMD foci of 500 per year to less than ten.

In 2000, APHIS and Bolivia initiated the eradication program in the departments of Beni and Pando. The USDA’s economic investment was three million USD, coming from the PL480 Program. After three years of intensive vaccination and surveillance, no cases have been reported in that region since 2003.

In 2007 APHIS focused their attention on the South American Chaco region and initiated cooperative projects with Bolivia and Paraguay in strengthening surveillance and bolstering equipment and infrastructure systems in the remote zones of the Chaco, with APHIS resources amounting to 650,000 USD, managed by Inter-American Institute for Cooperation on Agriculture (IICA).

In summary, APHIS has a long history of participation in the eradication of FMD in South America. Overall, in the last 10 years over 30 million dollars and substantial resources have been dedicated to the effort. Through multiple APHIS staff’s secondment to Pan American Foot-and-Mouth Disease Center (PANAFTOSA), dedicated APHIS and USDA funded FMD staff, and additional staff doing FMD eradication work as collateral duty, hundreds of thousands of hours have been spent on this effort. Many projects have been done including projects on vaccination, surveillance, disease identification, movement control, laboratory testing and diagnosis, and emergency response. Currently, APHIS supports the South American efforts to eradicate FMD by the year 2020, and is actively involved in providing technical support as needed to achieve this goal.

Rift Valley Fever Research at the Arthropod-Borne Animal Disease Research Unit
David Scott McVey, USDA-ARS, Center for Grain and Animal Health Research (CGAHR), Arthropod-Borne Animal Disease Research Unit (ABADRU)

The potential introduction of Rift Valley fever virus (RVFV) is a very significant arthropod-borne animal disease threat to U.S. livestock. Understanding the epidemiological factors affecting disease outbreak and the interepizootic maintenance of RVFV is necessary for the development of appropriate countermeasures and control strategies. The overall goals of this project are to utilize the unit’s unique multidisciplinary expertise to fill knowledge gaps about the interepidemic cycle of RVFV and provide the tools necessary for detecting, controlling and eradicating RVFV should it be introduced into the U.S. Improved Rift Valley fever risk models were created for the United States that account for two species of mosquitoes (Aedes vexans and Culex tarsalis), cattle, humans, and pathogen transmission along a contact network continue to provide insight into the potential epidemiology should the virus be introduced. To provide additional information related to RVF models, the potential susceptibility of North American wildlife has been accessed using RVF virus MP-12 vaccine strain infection of wildlife cell
cultures as a model have suggested that North American wildlife including
native deer species could be epidemiologically important. New technologies
for multiple pathogen detection and characterization have been explored
including the MassTag multiple pathogen detection. The previously
developed production of RVFV proteins was used to develop fluorescent
microsphere based assays for early and late antibody responses to these
proteins subsequent to immunization or infection. The assay development
has been extended to lateral flow assays for both laboratory confirmatory
testing as well as rapid, presumptive field diagnostics.

**Swine Enteric Coronavirus Diseases International Meeting (SECD International Meeting)**
Randall L. Levings, Science, Technology, and Analysis Services (STAS), Veterinary Services (VS), APHIS-USDA
Dr. Levings provided a summary of the Swine Enteric Coronavirus Diseases (SECD) International Meeting held September 23-25 in Chicago, Illinois.

**FMD Epidemiology: Results from a Modeling Study of a Minnesota FMD Outbreak**
Susan Gale, Arizona Department of Agriculture
Gay Miller, University of Illinois
The objective of this study was to model an outbreak of Foot-and-Mouth Disease in Minnesota using the North American Animal Disease Spread Model (NAADSM) to simulate the outbreak. Farm location data and food production livestock practices specific to Minnesota were incorporated into the model. Two different Index Herd production types were used for beginning the simulated FMD outbreak - Dairy and Large Swine. Modelled disease control measures included quarantine, movement restrictions and depopulation. Model outcomes were reported as mean number of farms and animals infected, mean duration of active disease spread, and mean outbreak duration. This study found that Index Herd production type was significantly associated with differences in outbreak scale. The mean values for disease duration, outbreak duration and number of farms and animals infected were larger in the Dairy Index Herd scenario. A major difference between the Dairy and Large Swine Index Herd maximum values was prolonged outbreaks in five out of 1,000 iterations of the Dairy Index Herd Scenario. This study provides animal health officials with important data that can inform FMD preparedness and planning.

**FMD Vaccination: Results from a Modeling study of a MN FMD Outbreak**
Gay Miller, University of Illinois
Susan Gale, Arizona Department of Agriculture
The objective of this study was to evaluate emergency vaccination control strategies. The North American Animal Disease Spread Model
(NAADSM Version 3.2.18) was used to simulate an FMD outbreak in Minnesota. Large scale (1,500 herds per day) emergency vaccination diminished the size of the modeled foot-and-mouth disease (FMD) outbreak in Minnesota for both production type scenarios. The parameter estimates provided by Minnesota experts knowledgeable about Minnesota herds and FMD found that aspects of the way Minnesota dairies are managed make these herds more likely to spread FMD than swine herds. As a consequence, the model results found that outbreaks beginning in large swine herds were associated with smaller outbreaks. Herds vaccinated per day, vaccination delivery delays, and time to develop immunity were components of the modeled outbreak. Only herds vaccinated per day influenced size and duration of an outbreak.

Influenza Vaccination and FMD Preparedness: What is the Link?
Mo Salman, Colorado State University

The aim of this 15 minute presentation was to compare the current strategies of controlling human flu to the existing preparedness plans for controlling Foot-and-Mouth Disease (FMD) if this virus introduces to the USA. The presentation will focus on reviewing the approved plans for preparedness of handling FMD including the vaccination options and their availability. The current understanding of the preparedness FMD plans (emergency response plan and stockpiling vaccine approach) will be presented with their similarities and contrasts to existing vaccination plans for human influenza. A recently published book by the American Public Health Association under the title Warning Shot – Influenza and the 2004 flu vaccine shortage will be used as lessons gained from previous public health policy. Items that will be considered for comparison between FMD and human flu vaccination plans in the USA are the variation in epidemiology of these two infections, aims of the vaccine, targeted populations, endemic vs. exotic, and structure of the delivery system. The intention of this presentation is to get better preparedness for FMD preparedness plan utilizing scientific tools to identify the existing gaps that can be bridged in the near future. International observations and experiences will be presented as evidence to reduce these gaps.

USDA, APHIS, Veterinary Services Emergency Preparedness and Response Training/Exercise Strategy and Plan
Liz Clark and Paula Cowen, USDA-APHIS-VS

Ms. Clark and Ms. Cowen provided an update on the activities of the Professional Development Staff of the USDA-APHIS-VS.

Committee Business

The Committee considered and passed one resolution on "Need for APHIS Risk Assessment and Rulemaking Prior to Allowing Imports from Countries with African Swine Fever."
EMERGING DISEASES OF GLOBAL CONCERN, WITH A FOCUS ON MIDDLE EAST RESPIRATORY SYNDROME

Markos Tibbo
Food and Agriculture Organization (FAO) of the United Nations, Cairo, Egypt

Nearly 70 percent of all emerging and re-emerging diseases affecting humans originate in animals. Notable examples are the Severe Acute Respiratory Syndrome (SARS), Highly Pathogenic Avian Influenza (HPAI), Swine Influenza (H1N1), Middle East Respiratory Syndrome Coronavirus (MERS-CoV), and Ebola. MERS-CoV is a strain of coronavirus that causes MERS and was first identified in 2012 in Saudi Arabia. World Animal Health Organization (OIE) classified the disease as an emerging disease owing to its impact on public health. MERS-CoV genetic sequences from humans and camels demonstrate a close link between the virus found in camels and that found in people in the same geographic area. MERS-CoV antibodies were profoundly found in camels in Africa and the Middle East. The virus may have been circulating in camels at least since 1992 and since 1983 in East Africa. People working closely with camels may be at higher risk of the infection than people who do not have regular close contacts with camels. Experimental evidence is published recently that supports dromedary camels as the primary reservoir, or carrier, of MERS-CoV. The report disclosed the replication and shedding of MERS-CoV in upper respiratory tract of inoculated Dromedary camels. Another study on full genome sequence of a coronavirus by researchers from a South African bat showed that it shared essential genome details with MERS-CoV, a possibility that the bat may be an ancestor host of MERS-CoV with a spill over event to camels in Africa. No other livestock species and wild birds tested positive for antibodies to MERS-CoV. Camels are therefore a likely primary source of the MERS-CoV that has infected at least 898 confirmed human cases with 359 confirmed deaths (as of October 18, 2014). It is believed that there are repeated introductions of the virus from camels to people, resulting in limited human-to-human transmission, but not in sustained transmission. Unravelling the routes of transmission, whether direct or indirect, between camels and people, is critical to stopping transmission of the virus. Since the 2012, FAO in close collaboration with OIE and WHO, has been: i) monitoring the situation/interagency teleconferences; ii) analyzing available data including test results and characterization of the virus; iii) providing technical assistance and guidance to countries to help investigate the source of infection and/or prevention measures; iv) developing communication strategies to ensure appropriate information reaches the public on MERS-CoV and avoid possible negative impacts of the crisis on the livestock industry. In addition to fielded missions, FAO organized a regional consultation on MERS-CoV in animals that led to a Muscat Declaration.
REPORT OF THE COMMITTEE ON GOVERNMENT RELATIONS
Chair: David Schmitt, IA

Stephen Crawford, NH; Barbara Determan, IA; Kent Fowler, CA; Rod Hall, OK; Heather Hirst, DE; Christine Hoang, IL; Linda Hickam, MO; Annette Jones, CA; David Meeker, VA; Boyd Parr, SC; Charlie Hatcher, TN; David Schmitt, IA; Scott Stuart, CO.

The Committee met on March 4 and 5, 2014 in Washington D.C. Due to weather conditions, there was limited attendance and an adjusted schedule that limited participation of several attendees and agency partners.

The Tuesday session began at the American Veterinary Medical Association (AVMA) office at 12:00 pm, with lunch and a discussion with Drs. Bernadette Dunham, Bill Flynn, and Renate Reimschussel with the Food and Drug Administration, Center for Veterinary Medicine.

- VET LIRN Program update
- Update on Veterinary Feed Directive
- Update on Guidance for Industry (GFI) 213
- New residue testing requirements (penicillin) and potential impacts on use
- Results of Milk Residue study; related updates
- Q-Fever discussion.

The next meeting was with USDA Agriculture Research Service (ARS), with Dr. Caird Rexroad. Discussion items included:

- FY14 Budget/FY15 Outlook
- Research priorities
- Resolutions – updates on responses
  - Res. 6: Vaccine and Vector control methods for Bluetongue/Orbiviruses
  - Res. 7: Equine Piroplasmosis Genetic Strain typing
  - Res. 16: National Review of chronic wasting disease
  - Res. 27: Knipling-Bushland Livestock Insects Laboratory
- Possibility of B. suis vaccine for use in swine and cattle
- Dr. Rexroad will be retiring in 2014.

Dr. Chester Gipson represented USDA –APHIS-Animal Care (AC), with several items of discussion.

- Internet Pet sales
- Elephant tuberculosis Guidelines
- Animal Welfare Center activities/updates (Kansas City)
- AC roles in emergency management, working with FEMA at state levels
Dr. Doug Meckes and Jamie Johnson next joined the group from the Department of Homeland Security. Johnson provided an update on the National Bio- and Agro-defense Facility (NBAF). The basic support infrastructure is being completed, with continued funding for the project. The group also addressed emergency response initiatives. In particular, funding of future foreign animal disease plans or exercises and the need to include state animal health officials in those efforts.

The Animal Ag Coalition (AAC) next met with the Committee, represented by Gina Luke, Dudley Hoskins and Jamie Jonker. The group discussed opportunities to partner on issues of common ground, and key issues impacting the sectors of animal agriculture represented in the room.

The meeting was then adjourned for the day.

The Wednesday session was convened at 8:30 a.m. at the offices of the National Pork Producers Council.

USDA Food Safety Inspection Service (FSIS) was first on the agenda, represented by Mr. Philip Derfler and Dr. Daniel Englejohn. Discussion items included:

- Horse slaughter update
- *Salmonella* as adulterant petition/USAHA Resolution
- Animal ID collection update
- How is FSIS addressing their humane handling initiatives?
- New residue testing requirements (penicillin) - potential impacts on use

Dr. Gary Sherman and Adele Turzillio joined the group on behalf of USDA-National Institute of Food and Agriculture. Several issues were brought forth in the discussion.

- Veterinary Medicine Loan Repayment Program (VMLRP)
- National Animal Health Laboratory Netowrk (NAHLN)
- Budget Situation
- Food Animal Residue Avoidance Databank (FARAD)

Dr. Beth Lautner next joined the meeting to discuss NAHLN and NVSL. Sarah Tomlinson was also included by telephone. Dr. Lautner provided the group with several updates, along with discussion on the following items.

- NAHLN funding
  - How handled when funded
- NAHLN IT updates
- National Veterinary Services Laboratory Updates
- Resolution 8: Information Sharing for Swine Herd Health
REPORT OF THE COMMITTEE

- Importance of including state veterinarians in future plans for NAHLN oversight of laboratories
- Brucella isolate management and the ability to share with ARS for vaccine development
- *Brucella abortus* genotyping
- Equine Infectious Anemia (EIA) laboratory approval

The Committee concluded its session with Dr. John Clifford and USDA-APHIS-VS Staff. The following issues were addressed to staff.

**APHIS-level:**
- Rabies vaccination funding
- National review of CWD

**VS:**
- FY14 Budget/FY15 Budget Outlook
- Resolution Responses
  - 12 Eliminating Brucellosis testing requirements in whitetail and mule deer
- USAHA Resolution #26 – National Animal Health IT Board (NAHITB) proposal discussion/State movement requirement repository
- NAHLN IT/General VS IT updates
- VS Reorganization update - status of vacancies being filled
- Possible discussion on use of FAD tests without a full blown FAD like we do with avian influenza testing.
- Cooperative agreements – discussing more flexibility in using commodity umbrella funds
- Swine brucellosis – there should be a national surveillance initiative worked out for *B. suis* just like what was recently completed by USDA for *B. abortus*.
- Risk analysis for the threat of introduction of diseases into the U.S. along the Mexican border –USAHA Resolution
- EIA laboratory policy
- Center for Veterinary Biologics rabies potency test initiative

The Committee meeting was adjourned.
REPORT OF THE COMMITTEE ON IMPORT-EXPORT
Chair: Mark Engle, TN
Vice Chair: Robert Blomme, IA

Bobby Acord, NC; Debbie Barr, CAN; Robert Blomme, IA; Bob Bokma, MD; Joyce Bowling-Heyward, MD; Gary Brickler, CA; Charles Brown II, WI; Stan Brunzt, CO; Jess Burner, TX; Ignacio dela Cruz, MP; Larry Elsken, IA; Effingham Embree, Jr., IL; Mark Engle, TN; J Amelita Facchiano, TX; William Fales, MO; Mallory Gaines, DC; Julie Gard, AL; Paul Gibbs, FL; Chester Gipson, MD; Tony Good, OH; Cathleen Hanlon, GA; Percy Hawkes, UT; Rick Hill, IA; Robert Hilsenroth, FL; Donald Hoenig, ME; Floyd Horn, MD; Laurie Hueneke, DC; Annette Jones, CA; Elizabeth Lautner, IA; R.J. Layher, DC; Kevin Maher, IA; Brittany McCauslin, CO; Susan McClanahan, MN; David Meeker, VA; Gay Miller, IL; Richard Mitchell, CT; Sandra Norman, IN; Elizabeth Parker, TX; James Pearson, IA; Alejandro Perera, MEX; William Pittenger, MO; Herbert Richards, HI; Paul Rodgers, WV; Larry Samples, PA; A. David Scarfe, IL; Travis Schaal, IA; Shawn Schafer, OH; Kathryn Simmons, DC; 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; Mary Anne Williams, TX; William Wilson, KS; David Winters, TX; Richard Winters, Jr., TX; Cindy Wolf, MN.

The Committee met on October 19, 2014 at the Sheraton Hotel in Kansas City, Missouri, from 12:30 to 5:00 p.m. There were 22 members and 17 guests present. Dr. Robert Blomme called the Committee to order and welcomed participants. The Committee purpose, membership, meeting, and resolution guidelines were reviewed. There were no previous resolutions.

NIES Import of Animal Products and By-Products
Tracye R (Butler) Hernandez-Bynum, USDA-APHIS-VS-NIES

Dr. Butler provided an overview of National Institute for Environmental Studies (NIES) activities related to import of animal products. A detailed report is included at the end of this report.

Products Trade Negotiations Staff FY 2014 Activities
Tracye R (Butler) Hernandez-Bynum, USDA-APHIS-VS-NIES

Dr. Butler provided an overview of staff activities related to exports of animal products. A detailed report is included at the end of this report.

Import-Export Update FY 2014
Joyce Bowling-Heyward, USDA-APHIS-VS-NIES

Dr. Bowling-Heyward provided an overview of FY 2014 export and import activities including employee training for the Veterinary Export Health Certification System (VEHCS), semen and embryo facilities inspection, and certificate endorsement. Other focused activities included talks with Canada and Mexico on the acceptance of electronic signatures, expanding exports.
for live cattle, providing technical expertise to stakeholders, technical support for visiting foreign veterinarians and responding to trade disruptions in live swine for PEDv. Bowling-Heyward provided overviewed VEHCS system which is designed to be a standard globally accepted export health certificate system with a database for analytics and reporting. Recent updates to the system include digital signatures, external web viewer and a universal health certificate in English. The next step is to work towards World Trade Organization (WTO) notification to alert trading partners, expand acceptance of the digital signature with partner countries, development of a universal Spanish certificate and full implementation of the system across the United States.

Fiscal year 2014 import activities included approval of several privately owned equine quarantine facilities, renovation of a USDA bird quarantine facility in San Ysidro and construction of import inspection facilities at various Mexican border port locations. Staff continues to work with Mexico on joint tuberculosis strategic planning activities. Improvements are being made to the import tracking system to improve collection and trace back of animal identification. Staff participated in Northern Border Port Conference, Air and Sea Port Conference, and Animal Import Center Conference to review policies and improve consistency at import and port facilities. Import staff continues to issue important transit permits, provide technical expertise, negotiate import protocols, provide training at the field level and responding to questions from importers and foreign governments. Animal import numbers were provided for porcine, ovine, bison, equine, avian and bovine and swine semen in FY 2014.

**Vision and Science: National Import Export Services (NIES)**  
Joyce Bowling-Heyward, USDA-APHIS-VS-NIES

Dr. Bowling-Heyward provided an overview of the recent reorganization of the National Import Export Services (NIES) which included the vision and mission statements, key services of the agency, the organizational chart, and fiscal year 2014 priorities related to operations, customer service, information technology (IT) strategies and workplace culture.

**Entry Assessment for Exotic Viral Pathogens of Swine**  
Kelly Rhodes, USDA-APHIS-VS-NIES

Dr. Rhodes provided an overview on the entry assessment for exotic viral pathogens of swine. She reviewed the objectives of the assessment which were to identify and describe pathways by which exotic viral pathogens of swine may enter the United States and estimate the likelihood that each identified pathway may introduce exotic pathogens of swine into the United States. The assessment included hazard identification, entry assessment methods, risk estimation terms, uncertainty terms, assumptions, pathway groups and feed ingredient origins. The assessment used Foot-and-mouth Disease, Pseudorabies and Classical Swine Fever as representative viruses and identified negligible risk pathways for animal tissues or fluids, articles,
animal feeds, animal tissues and fluids and other articles, animal feed and human food. The assessment also identified non-negligible risk pathways for animal feeding and human food. The next steps for this process are to look at pathways with non-negligible likelihood of introduction and estimate the likelihood of exposure, and evaluate the consequences. In regards to pathways where risk introduction and overall exposure are non-negligible the goal would be to identify potential mitigation measures.

**Importation of Fetal Bovine Serum**  
Percy W. Hawkes, Biowest

Dr. Hawkes provided an overview of a request that USDA-APHIS-VS update and publish a proposed rule for importing fetal bovine serum. The overview included an overview of the world supply for fetal bovine serum, identified suppliers and their capacity, and international trade statistics. A background was provided on the USDA and industry efforts to update fetal bovine serum (FBS) import requirements. Hawkes also reviewed five points for consideration when updating importation requirements. Those five points are included in a resolution submitted by Hawkes for committee consideration.

**Committee Business**

Three proposed resolutions relating to African swine fever, fetal bovine serum, and bluetongue were brought before the Committee for consideration. The Committee reviewed and discussed each proposed resolution and the following resolutions were passed. All three resolutions passed and were submitted to the Committee on Resolutions.
Import Animal Products

National Import Export Services (NIES) continues its mission to facilitate safe international trade of animal products and by-products, regulate the importation of animal products and by-products, prevent the introduction of dangerous and costly pests and diseases, promulgate import regulations and policies, collaborate with other government agencies and issue import permits. During FY14, NIES issued a total of 4,725 permits for animal products, as well as Organisms and Vectors.

NIES is continuing to work on streamlining animal product import regulations provided in Title 9, Code of Federal Regulations, Parts 94, 95 and 96. This streamlining process will reorganize, clarify and update the regulations for easier understanding. It will also provide for a notice-based process and risk-based criteria for acceptance of new disease mitigation procedures. These new mitigation procedures will be posted on our website and the mitigation requirements will be less prescriptive.

**Bovine Spongiform Encephalopathy (BSE) Comprehensive Rule**

The BSE Comprehensive Rule was finalized December 2013; and became effective March 4, 2014. It established BSE-related import provisions more closely aligned with OIE guidelines including country risk status classifications (Negligible, Controlled, and Undetermined). It also allows flexibility in the BSE risk classification process allowing APHIS to concur with OIE BSE determinations after APHIS has evaluated a country or region’s BSE status. All countries will be considered undetermined risk until such time that APHIS determines them to be Negligible or Controlled Risk. Recognition will be based on the following criteria:

1) APHIS concurrence with OIE classification, OR
2) APHIS evaluation, upon request, of countries not classified by the OIE

The BSE Comprehensive Rule eliminates the need for formal rulemaking for each individual country/region. The importation of bovines and bovine products from BSE minimal-risk regions (Canada) and for boneless beef from Japan have been removed from the Federal Register and incorporated into the final rule. It allows the importation of additional bovine and bovine products into the United States from the three risk category countries under certain conditions. The bovine products include:

1.) Hides/skins and Gelatin/Collagen from hides/skins
2.) Deboned meat (excluding MSM) from cattle ≤30 months of age provided the animals pass ante- and post-mortem inspection, specified risk materials (SRM) are removed, and they were not subjected to an air injected stunning process or pithing
3) Protein-free tallow and derivatives made from this tallow
4) Dicalcium phosphate with no trace of protein or fat
5) Blood/blood by-products derived from cattle not subjected to an air injected stunning process or pithing, and collected in a manner that avoids contamination

Ruminant meat-and-bone meal (MBM) and greaves from controlled and undetermined risk countries will remain as prohibited materials.

**APHIS Concurs with OIE Designations**

On October 1, 2014, APHIS published its concurrence with World Organisation for Animal Health’s (OIE) BSE risk designations for the following countries:

1) Negligible risk for BSE: Austria, Belgium, Brazil, Colombia, Israel, Italy, Japan, the Netherlands, Singapore, and Slovenia.
2) Controlled risk for BSE: Bulgaria, Costa Rica, Croatia, Nicaragua and Taiwan

**Transmissible Spongiform Encephalopathies (TSE) Rule**

OIE Code does not address BSE risk for ovines/caprines. Therefore, a separate rule is currently under development that will address import requirements for TSEs and allow importation of sheep and goats, their embryos, and their products/by products from countries classified as Negligible or Controlled Risk for BSE under certain conditions. This rule is currently undergoing Departmental clearance. The importation of sheep and goat material will continue to be regulated under the BSE conditions that existed prior to implementation of the new BSE Comprehensive rule until the TSE rule is finalized.

**Regionalization Update**

Argentina: Patagonia South and Patagonia North B recognized as free of Rinderpest and foot-and-mouth disease (FMD) with special restrictions – chilled or frozen beef (September 2, 2014).

Mexico: Proposed rule to define a low-risk classical swine fever (CSF) region in Mexico from which fresh pork and pork products would be eligible for importation under certain conditions (published July 29, 2014).
The Animal Products Trade Negotiations Staff (or Export Animal Products Staff – EAP) provides leadership for all Veterinary Services (VS) export activities and provides a unified, seamless approach to developing and implementing export policies across the organization. VS employees in this subunit are export specialists and enable VS to meet our stakeholders’ expectations of high quality and timely service.

The EAP conducts activities that foster the export of animal products, including development of policy pertaining to export, clarification of the requirements of other countries, and management of the inspection and approval of facilities that to export certain commodities to certain countries. In order to assure consistent policy and compliance with the requirements of other countries, EAP works in collaboration with other agencies, such as USDA Food Safety Inspection Service, the Food and Drug Administration, Veterinary Export Health Certification System’s (NOAA) Seafood Inspection Program and National Marine Fisheries Service (NMFS) Fishmeal Certification Program, among others. EAP also works with the USDA Agricultural Marketing Service for the certification of dairy products and shell eggs. EAP collaborates with the Trade Support Team, Foreign Agricultural Service, the Office of the U.S. Trade Representative, and with foreign officials, providing expertise and technical support during negotiations concerning animal disease requirements. Finally, EAP negotiates directly with counterparts in foreign governments to seek access, as well as OIE-consistent and favorable conditions, for diverse animal product commodities intended for use in animals, for further processing, or for human consumption.

The EAP has worked diligently since the OIE’s reclassification of the U.S. BSE status from “controlled risk” to “negligible risk” to re-open markets for bovine origin products. Removal of all BSE-related restrictions on U.S. origin animal products is one of the top ten goals for APHIS, and the major goal for Veterinary Services.

The EAP has also worked diligently to retain market access in Canada for aquatic animal products intended for human consumption, bait use, research and education. The bulk of this product falls into food service, retail use and further processing. To facilitate exports, EAP is working with the Live Animals Staff to develop registration programs that would allow the movement of shipments without lot-specific health certificates. EAP is currently involved in another major initiative with Canada precipitated by the changes in import policy for pet foods being proposed by the Canadian Food Inspection Agency (CFIA).
Endorsement of Certificates and Facility Inspections:

APHIS, Veterinary Services field offices (District Offices and Service Centers) support the export of U.S. origin animal products through the endorsement of export certificates and inspection of manufacturing, processing, or handling facilities. Unfortunately, there is no longer a reliable way to determine the actual number and/or types of export certificates endorsed for animal products. Through June 2014, one set of data reported 8,241 export certificates for animal products. Extrapolating through the end of FY 2014, the estimated number of product certificates issued by VS field offices would be approximately 10,250.

Other agencies also certify products such as dairy and shell eggs (USDA Agricultural Marketing Service); meat and meat products and processed egg products (USDA Food Safety and Inspection Service); and fish products (National Oceanic and Atmospheric Administration). While Export Animal Products (EAP) is involved in negotiating the animal health requirements for these commodities, Veterinary Services (VS) does not have information on the numbers of product certificates issued by these agencies.

Veterinary Services also inspects manufacturing facilities to open or retain markets and support the export of our animal products. These inspections may be done unilaterally to verify information for required attestations; or they may be done as part of a bilateral agreement with a trading partner. Currently, EAP has bilateral agreements with many countries that include the requirement for facility inspections. These include, but are not limited to, the European Union (E.U.), the Russian Federation, Mexico, Australia, Canada, China, Indonesia, Israel, Japan, Korea, Malaysia, and Taiwan. Facility inspections are generally done for specific commodities, such as a variety of animal byproducts to the European Union; rendered meals to Mexico, Indonesia, and Malaysia; several types of non-ruminant fats and feeds to China; pet foods to Australia and Canada; and porcine spray dried blood to Japan and Taiwan.

For some commodities/countries, the VS field offices inspect and approve the facilities locally, and maintain all records at the field level. When required by bilateral agreements or there is a need to provide approved facility lists to trading partners, or for complex inspections, final approval is done by National Institute for Environmental Studies (NIES) – EAP in Riverdale, Maryland, and the information is maintained in a central database accessible to the endorsing VS field offices. Information includes the contact data for the facility (address, phone number), the type of facility, approval date, last validated inspection date, expiration date, and detailed information on the type of approval or products eligible for export. EAP currently has approximately 1,000 active facilities in the database (Veterinary Services Process Streamlining (VSPS)). These include 96 pet food facilities for Australia; 87 pet food facilities for Canada; 72 facilities for China (pet foods, rendered meals, porcine spray dried blood); 552 facilities for the European Union (variety of animal byproducts); 40 rendering facilities for Indonesia; two porcine spray dried facilities for Japan; six rendering facilities for Malaysia;
71 rendering facilities for Mexico; ten facilities for Russia/Kazakhstan/Belarus; ten facilities for Korea; 30 facilities for Taiwan; and 15 rendering facilities for Thailand. Several of these facilities hold more than one type of approval (e.g., for the European Union, a facility may have 3, 4, or more different commodity approvals). Most facility inspections are done on an annual basis. If a facility holds more than one type of approval (e.g., the E.U.), a separate inspection package is required for each commodity.

**BSE Negligible Risk status and Bovine Commodities:**

In May 2013, the World Organisation for Animal Health (OIE) General Assembly concurred with the reclassification of the United States as a Negligible Risk country. The U.S. has been working with a number of countries towards their acknowledgement of the new status and the applicability of OIE Code conditions for bovine and ruminant, as well as non-ruminant, commodities. Commodities of principal interest include beef and beef products, gelatin, and pet foods that contain bovine or ruminant meals as ingredients. Also of major interest are safe-to-trade commodities identified by the OIE, as well as non-ruminant commodities such as hydrolyzed protein products and rendered meals that have historically been banned due to BSE-related concerns. The OIE Terrestrial Animal Health Code guidelines provide for safe and unrestricted trade in all U.S. origin bovine products, including rendered meals. The OIE Code also does not support BSE-related prohibitions on non-ruminant commodities.

Regarding bovine meat and meat products, legacy restrictions by importing countries due to BSE include no access for beef, access for deboned beef only, access for bone-in beef from animals under 30 months of age, and access for bone-in beef under the definitions of USDA’s Food Safety Inspection Service. The OIE Code definition of specified risk materials (SRMs) is somewhat different than the U.S. definition (i.e., the OIE Code does not exempt parts of the vertebral column). As part of interagency teams, EAP has been seeking acceptance by our trading partners of the U.S. definition of SRMs, as well as the removal of other restrictions that necessitate costly export verification programs run by the USDA’s Agricultural Marketing Service. As a negligible BSE risk country, our bovine products do not, by definition, include any SRMs. However, U.S. regulations requiring the removal of these tissues will not be repealed, and most of our trading partners demand removal of SRMs because the United States has reported indigenous cases of BSE.

Removal of all BSE-related restrictions on U.S. origin animal products is one of the top ten goals for APHIS, and the major goal for Veterinary Services (VS). The EAP (Products Trade Negotiations Staff) was part of interagency teams that achieved full or expanded market access for U.S. beef meat in 11 countries, including Hong Kong, Singapore, Vietnam, Ecuador, Indonesia, Uruguay, Mexico, Sri Lanka, Trinidad and Tobago, Turks and Caicos Islands, and the Dominican Republic. Efforts to achieve full or expanded market access for U.S. origin beef meat through OIE-consistent
protocols are ongoing with trading partners throughout the world. While our goal is to eventually achieve full market access for U.S. beef in all markets, APHIS has partnered with industry to determine the highest priority markets. These priorities may be based on potential volume of trade, as well as other factors, such as the likelihood of success.

During the summer of 2014, APHIS-VS, together with an interagency team that included State officials, hosted a delegation from China auditing BSE controls in the United States. China has published their findings, and EAP will be a part of an interagency team negotiating in October 2014 for beef market access in China with China’s Ministry of Agriculture (MOA) and Administration of Quality Supervision, Inspection and Quarantine (AQSIQ).

Other Bovine/Non-bovine Commodities:

In addition to negotiation efforts on behalf of our U.S. beef industries, EAP was able to successfully negotiate removal of BSE-related restrictions and open or expand market access for several other commodities, such as non-ruminant rendered meals (e.g., Thailand); pet foods with U.S. origin ruminant ingredients (e.g., Guatemala, El Salvador, Peru, Barbados, Malaysia, Indonesia); bovine gelatin and collagen (e.g., Argentina, Korea, Peru); fetal bovine serum (e.g., Brazil); and fertilizers with ruminant ingredients (e.g., Mexico).

Aquaculture Products

Canada: The EAP continues to work with the Live Animals Staff to retain market access in Canada for U.S. origin aquaculture commodities.

Poultry

The EAP continues efforts to get trading partners to follow OIE guidelines which do not recommend any restrictions on poultry meat and meat products due to H5/H7 subtypes of low pathogenicity avian influenza (LPAI). While the ultimate goal is to avoid all trade restrictions due to this disease, EAP’s mid to short term goals are to get our trading partners to minimize restrictions to the smallest zone possible (e.g. affected county or counties; a concentric zone around affected premises); to limit restrictions to occurrences/findings in commercial poultry only; and to lift restrictions no later than 90 days post cleaning and disinfection of the last affected premises or when the incident is notified to the OIE as closed. To that end, EAP has made some progress this year.

Japan – Following many years of negotiations, EAP has successfully negotiated a protocol with Japan whereby LPAI restrictions are limited to a 10 km zone around affected premises. This is a significant accomplishment and will have a positive impact on our poultry meat exports.

China – EAP successfully negotiated lifting of avian influenza (AI) restrictions on the State of Virginia. Efforts continue to get long standing bans removed for the States of Arkansas, Wisconsin, and New York. October 2014 correspondence signed by Dr. John Clifford requests (again) that China remove the bans on these States and provides (again) all the technical information on those events. Due to AI events in commercial poultry, China now also has bans on the States of California and New
Jersey. EAP has provided the requisite AI questionnaire to China on the California incident and officially requested the ban be lifted. Similar actions will be taken for New Jersey as soon as the AI questionnaire for that event is completed.

Singapore – Following years of negotiations, Singapore now limits AI bans to the affected county or counties. EAP has successfully negotiated the release of restrictions on Stanislaus County, California.

Hong Kong – Hong Kong also limits bans to the affected county. EAP has successfully negotiated the release of restrictions on Stanislaus County, California.

French Polynesia – EAP has also been successful in getting French Polynesia to limit AI bans to the affected county. Upon official request from EAP, French Polynesia recently lifted AI restrictions on Stanislaus County, California.

Philippines – Following years of efforts, the Philippines no longer imposes LPAI restrictions on U.S. origin poultry meat and meat products.

Taiwan – Our bilateral agreement with Taiwan to voluntarily suspend exports from States with LPAI events until 90 days after the last confirmed case has been working well. EAP intends to initiate discussions with Taiwan to modify our agreement to limit the scope of the restrictions to the affected county or counties – or to a zone, similar to what Japan has accepted.

India: EAP was a major contributor of information to support the WTO complaint the United States brought against India for their continued AI ban on poultry and pork products from the United States. The initial results of that complaint were in favor of the United States. EAP will continue to work to attaining market access for U.S. origin poultry products in India.

Poultry – Other than LPAI

The EAP Staff continues to work unilaterally and cooperatively with other agencies to seek new or expanded market access for U.S. origin poultry products. Our market access request for cooked turkey meat to Australia is one of our four priority market issues through the U.S.-Australia Free Trade Agreements (FTA)/Standing Technical Working Group. New Zealand has finished their risk assessment for turkey meat and published their import requirements; and EAP continues to work with industry and to negotiate with New Zealand for attainable market access. Market access in Uruguay for poultry meat other than turkey meat was finally attained during FY 2014.

The EAP Staff continues to work to gain market access for poultry-based products other than meat. During FY 2014, we successfully negotiated protocols for poultry meals (as well as porcine meals) to Thailand and hydrolyzed poultry protein to Korea.

Pork

With regard to pork products, EAP is working with industry to negotiate the removal of trichinae restrictions (i.e., either freezing or testing) currently imposed by several of our trading partners. Removal of trichinae restrictions is a major goal for the United States and our pork industry in the Trans-Pacific Partnership (TPP) negotiations currently underway with several
participating countries, including Singapore. EAP was successful in getting Colombia to accept a protocol for pork meat products that removes trichinae restrictions. Similar agreements are in the works with Peru and Chile. VS recently sent another proposal to Singapore to remove these restrictions, and EAP is awaiting a response.

While removal of trichinae restrictions is a top priority for EAP and our pork industry, EAP is also involved in efforts to get trading partners to remove restrictions on our pork products due to other diseases of concern, including PPRS (South Africa and Australia) and PMWS (Australia). VS recently sent correspondence to Australia requesting expanded market access for U.S. origin pork meat and meat products again, and providing additional requested information on PRRS and PMWS.

Other Examples:

European Union: The EAP continually worked with both central E.U. authorities and individual E.U. countries to retain and expand exports of animal by-products estimated to be worth approximately $500,000,000 annually.

Russian Federation/ Kazakhstan/Belarus: The EAP retained and expanded U.S. exports of various animal products to the Russian Federation, Kazakhstan, and Belarus by participating in an ongoing interagency effort to negotiate new protocols (and retain and expand pending protocols in the interim) with the three customs making up the Russia-Kazakhstan-Belarus Customs Union (CU). Due to Russia’s ban on U.S. animal products due to political reasons, progress was slower in FY 2014 than hoped for by EAP.

Taiwan: The EAP negotiated new certificates for dog/cat chews and dog/cat food with non-exempt ingredients to implement Taiwan’s new requirements for these commodities which became effective October 1, 2014. EAP continues to negotiate with Taiwan on an accepted protocol for APHIS to re-approve currently approved facilities for Taiwan to allow them to incorporate new ingredients and facility options; and for a bilaterally acceptable inspection package/protocol that will enable APHIS to inspect and approve new dog/cat food facilities for Taiwan.

Canada – EAP, in consultation with the U.S. pet food industry, is in negotiations with Canada on their new import requirements for U.S. origin pet foods and animal byproducts intended for use in pet food production or for rendering, in an attempt to retain market access at least equal to current market access for these commodities.

China – EAP has requested market access for U.S. origin bovine blood for technical use (primarily fetal bovine serum and bovine serum albumen). NIES, with assistance from industry, is working on a questionnaire for China. EAP is also working with Foreign Agricultural Service (FAS) and Agricultural Marketing Service (AMS) to seek a solution to China’s new and cumbersome facility registration process.
REPORT OF THE COMMITTEE ON INFECTIONOUS DISEASES OF CATTLE, BISON, AND CAMELIDS

Chair: James Evermann, WA
Vice Chair: Chuck Massengill, MO

Helen Acland, PA; Chris Ashworth, AR; Gary Brickler, CA; Charlie Broaddus, VA; Charles Brown II, WI; Beth Carlson, ND; Karen Conyngham, TX; Stephen Crawford, NH; Lewis Dingess, TX; Edward Dubovi, NY; William Edmiston, TX; Anita Edmondson, CA; Adam Eichelberger, SC; James England, ID; James Evermann, WA; Betsy Flores, VA; W. Kent Fowler, CA; Robert Fulton, OK; Donna Gatewood, IA; Michael Greenlee, NV; Keith Haffer, SD; Thomas Hairgrove, TX; Rod Hall, OK; Timothy Hanosh, NM; Percy Hawkes, UT; Carl Heckendorf, CO; Del Hensel, CO; Linda Hickam, MO; Floyd Horn, MD; Dennis Hughes, NE; David Hunter, MT; Annette Jones, CA; Paul Jones, AL; Bruce King, UT; Diane Kitchen, FL; John Lawrence, ME; James Leafstedt, SD; Howard Lehmkuhl, IA; Scott Leibsle, ID; Rick Linscott, ME; Pat Long, NE; Francine Lord, ON; Janet Maass, CO; Chuck Massengill, MO; Patrick McDonough, NY; Shelley Meihlenbacher, VT; Mendel Miller, SD; Richard Mock, NC; Cheryl Nelson, KY; Jewell Plumley, WV; Jeanne Rankin, MT; Herbert Richards, HI; Julia Ridpath, IA; Keith Roehr, CO; Mark Ruder, KS; Bill Sauble, NM; Kathryn Simmons, DC; Ben Smith, WA; Justin Smith, KS; Tom Smylie, CAN; Nick Striegel, CO; Manoel Tamassia, NJ; Rodney Taylor, NM; Robert Temple, OH; Charles Thoen, IA; Paul Virkler, NY; Brad Williams, TX; William Wilson, KS.

The Committee met on October 19, 2014 at the Westin Hotel in Kansas City, Missouri, from 12:30 to 5:30 p.m. There were 22 members and 48 guests present. Dr. Evermann welcomed the members and guests, and the speakers to the meeting. He introduced the Committee’s new Vice Chair, Dr. Patrick Long from Oregon and turned the meeting over to the new Chair, Dr. Chuck Massengill. Dr. Massengill thanked Dr. Evermann for his leadership and commitment to the Committee.

Carl Heckendorf, Colorado Department of Agriculture provided a report of the Trichomonas Subcommittee. This report is included at the end of the Committee report.

NAHMS Bison 2014 Study
Amy Delgado, Center for Epidemiology and Animal Health, USDA-APHIS-VS

Bison 2014, the first national study of the U.S. ranched-bison industry, is intended to increase the level of knowledge and understanding about the characteristics of U.S. ranched-bison operations. The study focuses on health and management practices in the U.S. bison industry. Data collection began with the mailing of a questionnaire to bison producers in September 2014. The study was initiated as a result of discussions between the
USDA’s Animal and Plant Health Inspection Service (APHIS) and representatives of the U.S. bison industry. Bison 2014 is being conducted by the USDA’s National Animal Health Monitoring System (NAHMS), with assistance from the National Agricultural Statistics Service (NASS). Industry members and other stakeholders provided input for the study process. This input was used to develop the study objectives: 1.) Provide a baseline description of the U.S. bison industry, including operation characteristics, such as inventory, size, and type; 2.) Describe current U.S. ranched-bison industry production practices and challenges, including identification, confinement and handling, animal care, and disease testing; 3.) Describe health management and biosecurity practices important for the productivity and health of ranched bison; and 4.) Describe producer-reported occurrence of select health problems and evaluate potentially associated risk factors. All producers who reported having bison on the 2012 National Agricultural Statistics Service (NASS) Census of Agriculture were eligible to participate in the study and received a questionnaire in the mail. As with other NAHMS studies, Bison 2014 is national in scope, collaborative in nature, and voluntary. The study is being conducted by NAHMS under its designation as a statistical unit under the Confidential Information Protection and Statistical Efficiency Act. Data entry and validation for accuracy and consistency are underway, and descriptive analyses will be performed. Study results are expected to be available and disseminated in the form of descriptive reports, conference presentations, information sheets, and journal articles beginning in late spring 2015. The contact person for information on the study is Dr. Margaret Parker, www.aphis.usda.gov/nahms.

**BVDV Subcommittee report**

Julia Ridpath, ARS

Dr. Ridpath reviewed the International bovine viral diarrhea virus (BVDV) Symposium which was held October 14 and 15 in Kansas City, Missouri. There were 15 presentations ranging from selection of novel vaccine strains to the future detection of in utero BVD persistently infected (PI). There will be another BVD symposium in two years.

**Trichromonas Assay Proficiency Test**

Tiffany Brigner, Rocky Mountain Regional Animal Health Laboratory

With the absence of Federal oversight or a National Trichomonas Standardized Proficiency, there is an interest from The Western States Livestock Health Association (WSLHA) to assess the consistency between laboratories in their ability to detect T. foetus in cattle. A group of laboratory diagnosticians present at the 2014 WSLHA meeting were tasked to conduct this assessment. Laboratory diagnosticians from California, Colorado, Kansas, New Mexico and Texas worked with Biomed Diagnostics to create a T.foetus polymerase chain reaction (PCR) quality control (QC) panel. State Veterinarians from Alabama, Arizona, Arkansas, California,
Colorado, Florida, Idaho, Kansas, Louisiana, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Texas, Utah, Washington and Wyoming were contacted regarding their level of interest in their state's laboratory participation. Ultimately 18 laboratories from 16 states purchased *T. foetus* QC panels consisting of 20 samples from Biomed Diagnostics. Laboratories had an option to purchase InPouch™ and/or Transit Tube panels. At the time of testing, laboratories were asked to also provide information such as temperature upon arrival, incubation time before processing, extraction method and PCR method. All pouches and tubes were inoculated with smegma to simulate a field sample. Ten of the 20 pouches or tubes were inoculated with concentrations of 11, 56, 112, 224 and 1120 *T. foetus* cells in duplicate and shipped overnight to receiving laboratories. Of the 11 laboratories that received pouches, six laboratories identified all positive pouches as PCR positive. Of the 11 laboratories that received tubes, five laboratories identified all positive tubes as PCR positive. This assessment has provided a unique opportunity for State Animal Health Officials and laboratory diagnosticians to come together to find areas of improvement in *T. foetus* detection.

**Coronaviral Infections of Domestic Animals**

Kelly Lager, ARS-USDA

The recent emergence of two coronaviruses demonstrates once again how dynamic the interaction of livestock, people, and Mother Nature can be. In May 2013, porcine epidemic diarrhea virus (PEDV) was detected in several U.S. swine herds in three different states. It was recognized as an acute disease in baby pigs causing severe diarrhea and almost 100% mortality. Within a year the disease had spread to 31 states and infected over half of the herds resulting in dramatic losses that rapidly affected the domestic and export market. In 2012, a new human coronavirus, Middle East Respiratory Syndrome Coronavirus (MERS CoV) was first identified in a cluster of people in Saudi Arabia. Since then, there have been almost 900 confirmed cases to date with a 40% case fatality rate. Current evidence implicates domestic camels as a potential source of virus for many of these cases. However, there are cases with no known camel contact suggesting there may additional transmission routes, some other source of virus, or sub-clinically infected people are transmitting the virus. Although PEDV was first identified about 40 years ago in Great Britain and Western Europe, the swine virus has never been detected in North American swine until May of 2013. The North American PEDVs are very similar to several Chinese isolates indicating these viruses are the progenitors of the American isolates. How this virus made it from China to the U.S. is still a mystery. Similarly, the emergence of MERS CoV is another mystery that represents a species jump of a previously unknown virus into man. Both events reinforce the critical need to be vigilant for emerging diseases. How these
recent warnings can be applied for the Cattle, Bison, and Camelid industries will be discussed.

MERS in the Middle East Update
Karen Conyngham, International Llama Registry

After being first reported in humans in 2012, Middle East Respiratory Syndrome Coronavirus (MERS-CoV) continued to be a problem in several countries in the Middle East this year, with the Kingdom of Saudi Arabia the hardest hit. As of October 8, 2014, the Saudi Ministry of Health reported 759 MERS cases, including 323 deaths, 427 recovered patients and nine patients still in treatment.

The complete MERS review can be obtained from Conyngham at: 72040.3361@compuserve.com

Update on the BVD CONSULT for BVD control
Bob Larson, Kansas State University

Bovine viral diarrhea virus (BVD) 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.bvdconsult.com which contains information about BVD from peer-reviewed articles as well as white papers and popular press articles.

Committee Business
The Committee approved a recommendation as follows:

RECOMMENDATION:
Creation of a USAHA Committee on Trichomoniasis in Cattle
Tritrichomonas foetus is an obligate parasite of the bovine reproductive tract that causes a highly contagious venereal disease with significant economic impact to the cattle industry. The importance of the disease is reflected by the dramatic increase in the number of states that have recently developed Trichomoniasis regulatory programs.

Effectively addressing Trichomoniasis in the cattle industry requires a national forum for sharing information and developing best management plans. The creation of a USAHA committee where cattle producers can work together with members of the scientific community as well as state and federal animal health officials to solve the problems faced by the industry is critical.

The Committee must contain a strong Scientific Advisory Subcommittee supported by the AAVLD.

Mission Statement

The purpose of the Trichomoniasis committee is:

1) Discuss scientific, laboratory, regulatory, commerce and political issues regarding T fetus and its effect on the cattle industry.

2) Evaluate interstate and intrastate regulatory issues.

3) Recommend effective disease control and management programs.

The Committee recommends Carl Heckendorf as Chair and Bud Dinges as Co-Chair.

The Committee forwarded two resolutions. One related to the biosecurity for imported fetal bovine serum and the second related to the harmonization of interstate Trichomoniasis regulations.
Heckendorf updated the committee on the progress that has been accomplished by the newly formed subcommittee. Monthly conference calls along with the USAHA and National Institute for Animal Agriculture (NIAA) Trichomoniasis forum has resulted in several areas of harmonization and agreement for interstate regulations. There were areas where disagreements still persist.

Areas of subcommittee agreement include a 60 day test, 18 month of age for bulls from virgin herds and PCR for the recommended test.

Areas where no consensus was achieved were on pooling of samples, quarantine regulations (notification of neighboring premises and subsequent release of quarantine) and sale of open cattle to non slaughter outlets.

A study on proficiency evaluation was performed and results were presented. A recommendation was made to establish a Committee on Trichomonias within the USAHA.

Dr. Ridpath reviewed the International bovine viral diarrhea virus (BVDV) Symposium which was held October 14 and 15 in Kansas City, Missouri. There were 15 presentations ranging from selection of novel vaccine strains to the future detection of in utero BVD persistently infected (PI). There will be another BVD symposium in two years.
The Committee met on October 20, 2014 at the Sheraton Hotel in Kansas City, Missouri, from 1:00 to 6:00 p.m. There were 45 committee members and 28 guests present. The meeting was chaired by Andy Schwartz and vice chair Katie Flynn. The mission statement was reviewed and the Committee determined changes were not necessary. Responses to the 2013 resolutions were discussed.

Time-Specific Papers:
Don Knowles, USDA-ARS, Animal Disease Research Unit, Washington State University, presented a time-specific paper titled Merging Pathogen Surveillance and Research; Stealth Persistence of an Ema Superfamily Variant of Theileria Equi. Additionally, Peter Timoney, Gluck Equine Research Center, University of Kentucky, presented a time-specific paper titled How Significant a Threat is Surra as a Disease in Horses? The papers, in their entirety, are included at the end of this report.

Contagious Equine Metritis PCR Technology
Juanita Grouse, National Veterinary Services Laboratory
The National Veterinary Services Laboratory (NVSL) currently utilizes a real-time polymerase chain reaction (PCR) for confirmation of contagious equine metritis (CEM) suspect isolates. A recent evaluation of the PCR with
CEM positive semen samples indicates the PCR is insufficiently sensitive compared to culture for use in diagnostic samples. The NVSL is currently at early stages of work on a new PCR for CEM including evaluation of extraction methods. In addition, the NVSL is actively acquiring and banking samples for later validation testing of either a new PCR or any other published or commercial PCRs that may have sensitivity that can approach that of culture and test breeding. Other laboratories and companies are also in various stages of test development and validation. The scarcity of positive samples from naturally infected horses with differing strains of *Taylorella* is a significant barrier to validating a PCR for testing of clinical samples. The time frame of this development and validation is likely to be several years.

**Equine Piroplasmosis Strain Typing**  
Juanita Grouse, National Veterinary Services Laboratory

Drawing on previous experience in next-generation sequencing of other organisms, National Veterinary Services Laboratory (NVSL) opted to use this approach to genotype *Theileria equi*. NVSL has successfully sequenced a cell culture derived isolate, and on the basis of that developed some “benchmarks” for sample preparation to optimize cost and efficiency of whole genome sequencing. Several challenges must be overcome, namely, concentrating *T. equi* organisms and/or depleting horse deoxyribonucleic acid (DNA) in order to get sufficient target genetic material without overwhelming the system with host DNA. NVSL has archived approximately 600 blood samples previously positive by nested PCR to be sequenced in order to build a database. Diversity in sequences will be compared to epidemiological data and other published studies.

**EHV-1 Biosecurity at Rodeos: Lessons Learned**  
Carl Heckendorf, Colorado Department of Agriculture

During the spring of 2014 a number of horses involved with barrel racing events developed equine herpes virus-1 (EHV-1) and equine herpesvirus myeloencephalopathy (EHM). Minnesota and Wisconsin were the first states to report these cases. Iowa and Kansas also reported cases that were related to barrel racing events. A number of barrel horses died or were euthanized.

At the same time many high school and junior rodeo contestants were competing in rodeos throughout the country to qualify for their National Finals. Colorado had two horses that were involved with these events develop EHM. One horse was euthanized and the other recovered. Colorado was scheduled to have the State High School Rodeo Finals eight days after the first EHM horse was euthanized.

The Board of Directors of the Colorado High School Rodeo Association voted to proceed with the Finals Rodeo. An EHV-1 Business Continuity Plan and the Biosecurity Tool Kit from Colorado and California respectively were implemented. The procedure for the rodeo horses was as follows:

- Communication prior to the event
• All entries were electronic with contact information and emails
• Bi-daily (BID) temperatures on horses one week prior to the rodeo were logged
• Vet check in at rodeo (local veterinarian and the rodeo veterinarian were heavily involved)
  o two day health certificate
  o Temperatures taken at the gate
  o Horse health declaration checked as well as contact information while at the rodeo
  o Temperature log inspected
• NO DOGS
• Alternate Stalls and Trailer parks
• Contestant instructions on biosecurity
• BID temperature and log with monitoring while at the event
• Temperature daily for one week following the event

The result of the rodeo was that there were no sick horses on arrival, at the rodeo, or one week after the rodeo. While we cannot say that we prevented any EHV-1 cases, we can say that we helped decrease the panic and hysteria with planning and education.

National EIA Situation Report
Angela Pelzel-McCluskey, USDA-APHIS, Veterinary Services (VS)

In calendar year (CY) 2013 there were 38 equine infectious anemia (EIA) positives reported on 23 premises in nine states. Of interest in 2013 was a fairly large number (12) of positives on one premise in Nebraska. The recent CY 2014 cluster of cases associated with iatrogenic transmission in unsanctioned race horses in California is noted.

Current federal authority is limited to restricting movement of EIA reactors and providing laboratory approval to conduct EIA testing. There is a guidance document (2007 Uniform Methods and Rules (UM&R) outlining control measures and a document (VS memo 555.7) providing for approval of EIA research facilities and another (VS memo 555.16) provides for approval of EIA laboratories and their requirements. This last memo is currently under revision and the following changes are being considered: the removal of references to “economic need” as a basis for approval, inclusion of a requirement for all positives samples to be forwarded to National Veterinary Services Laboratory (NVSL) for confirmation, definition of and requirement to use official forms, increased emphasis on reporting requirements and summary data submission, and clarification of inspection procedures and revision of the inspection checklist.

APHIS has solicited and received feedback from States, Tribes, industry, and other stakeholders on the proposed rule’s concepts since 2011. At the June 2014 American Horse Council meeting and on a subsequent National Assembly call, APHIS indicated it was reconsidering publishing the proposed EIA rule and wished to explore non-regulatory solutions to address States’
needs. Since then, many State animal health officials have called for publication of the rule. The Stakeholders attending the September 2014 Equine Sector meeting had a robust discussion about the proposed EIA rule; there was general support to convene a working group or task force to discuss the goals of the EIA program and the proposed regulation and identify regulatory and non-regulatory options to achieve these goals. VS committed to receive additional input and feedback from stakeholders at this USAHA meeting and to convene the proposed working group.

**Quarter Horse Racing EIA/EP Investigation Lessons Learned**

Katie Flynn, California Department of Food and Agriculture (CDFA); Andy Schwartz, Texas Animal Health Commission (TAHC)

The Animal Health Branch of the California Department of Food and Agriculture and the Texas Animal Health Commission continue to investigate Equine Infectious Anemia (EIA) and Equine Piroplasmosis (EP) in the Quarter Horse (QH) Racing Population. In California since 2012, a total of thirty four (34) horses have been confirmed positive for EIA and twenty (20) horses have been confirmed positive for *Theileria equi* the causative agent of EP. A total of ten horses were dually infected with EIA and EP. The California investigation has involved a total of 24 premises and 353 exposed horses. The average age of infected positive horses was 4.6 years of age. Although difficult to verify, there is evidence suggesting some of the horses participated in unsanctioned racing. Cultural practices indicate that young horses run in unsanctioned races prior to racing at sanctioned tracks. Participation in sanctioned racing is documented for fourteen (14) of the positive horses. Sanctioned racing varies from graded stakes to claiming races to fair racing circuit. A review of the racing performance records via Equibase.com indicated a potential decrease in performance in recent starts for some of the positive horses. However, reduced performance may be due to many other factors. Racing history cannot be verified for six (6) horses due to challenges in verification of horse identity as a result of change of ownership and difficulty reading lip tattoos. Epidemiologic investigations indicate the majority of the positive had potential exposure to high risk practices such as sharing of needles and other medical equipment or the use of contaminated blood products. Additionally, field investigators identified a potential source of disease agent transmission as the common practice of inserting a contaminated needle into a multi dose vial (i.e. vitamins).

Texas has required a negative EIA test at change of ownership and for attendance at any equine event (including racetracks) since 1997, and a requirement for a negative *Theileria* equi (T. equi) test to enter a racing facility since 2011. In the period of 2012–2014, inclusive, we’ve found 18 racing QH’s positive for EP, and 12 positive for EIA. Three were dual infections. Of the 18 positive for EP, treatment with imidocarb and subsequent negative retests allowed the quarantine release of eight horses. A TAHC rule currently out for public comment would require a negative EP
test at all horse racing events, not limited to facilities licensed by the Texas Racing Commission.

Challenges noted during the California and Texas Racing Quarter Horse investigations include animal identification, limited owner documentation, lack of records for fair racing circuit, illegal movements, language barriers, the lack of understanding of sanctioned racing culture, and length of quarantine. Illegible tattoos and lack of registration papers made animal identification a challenge. Language barriers and hesitation to talk to government officials hindered animal identification and case investigations. Without a knowledge or insight into the illegal unsanctioned (bush track) racing culture, the movement of these horses and the biosecurity practices are unknown. For cases where tattoos were available, the American Quarter Horse Association (AQHA) Registry verifies tattoo and provides the registered name of horse. An Equibase.com search by official name provides the owner/trainer information and racing performance records which can be utilized to determine exposure links via trainers or premises. Track officials assisted in tracing exposed horses by providing shipping logs of horses entering and exiting sanctioned tracks. However, the California fair racing circuit had limited records for assistance and the majority of the positive horses raced on the fair circuit. Interstate movement records in California; specifically border crossing reports, assist in identifying racing quarter horses entering without required EIA tests. The unsanctioned racing population has links to racing in Mexico and there is a likelihood that horses are moving across the Mexican border illegally. Quarantine of exposed racing quarter horses until the retest is difficult as owners and trainers rely on horse’s racing to make a living.

Equine Infectious Anemia Discussion
Sara Ahola, Colorado Department of Agriculture

After providing an update of the Equine Infectious Anemia (EIA) Subcommittee activities, Dr. Ahola led a discussion on EIA. Dr. Kent Fowler, summarized the EIA discussions at the September 18, 2014 Equine Industry APHIS stakeholder meeting. Key points discussed included current EIA positives in racing Quarter Horses, deficiencies in the current program and the desire for federal publication of an EIA rule for comments. Dr. Fowler mentioned that during the stakeholder meeting, the American Horse Council and American Association of Equine Practitioners agreed to review their respective 2012 position statements opposing publication of an EIA rule. Mr. R.J Layher from the American Horse Council provided an update on the AHC activities since the Stakeholder Meeting regarding the EIA rule. Mr. Layher stated that the AHC’s Health and Regulatory Committee recently met to discuss the topic of EIA rule and the current position of AHC is: AHC is not opposed to USDA publishing an EIA rule. Ahola mentioned the proposed resolution of an EIA workgroup to discuss EIA disease control.
Equine Disease Communication Center Update
Wendy Vaala, American Association of Equine Practitioners Board

This update gives the current status of the National Equine Health Plan and Equine Disease Communication Center task force. We have made progress toward making the Equine Disease Communication Center (EDCC) a reality.

Linda Mittel and Peter Timoney are working on setting up the disease information page. This will likely require creating updated information for each of the listed diseases. They will need assistance of the task force to get this completed.

The draft of the communication protocol has been sent to the United States Equestrian Federation (USEF). Once operational the EDCC number will be answered by the call center. Organizing the specific responses for the call center will require some on-site meetings to agree on the information that can be released by the call center operators for various scenarios.

Josie Traub-Dargatz has arranged to try an automated phishing software to search for cases of the neurologic form of equine herpes virus infection. If this works it may be a way to track the social media for chatter about disease outbreaks.

Those state veterinarians helping formulate the communication protocol have agreed in concept and support the EDCC as a way to help get out the facts about disease outbreaks. There has been a proposal to beta test the system with a small number of state veterinarians. This will include the call center and posting of new information on the website but without any reporting to horse organizations or the media. To initiate the other functions of the EDCC will require hiring a communication specialist once funding becomes available.

The American Association of Equine Practitioners (AAEP) Foundation Board has accepted:
1.) Formation of an advisory committee for the EDCC committee
2.) It also requests having the communication specialist hired as an AAEP employee so there is direct oversight and the position can provide assistance to AAEP for communications to members. This is an important step to have AAEP assume some ownership of EDCC operations.

Members of the EDCC task force that attended the American Horse Council meeting met with a new AHC steering committee for EDCC fund raising. Various ideas about how to raise the needed funding were discussed (the goal to set up operations is $100,000 annually for a minimum of three years operations). It was considered important to the have financial support from all parts of the horse industry. Possible mechanisms to raise funds include support from the various organizations based on the number of entries in shows and events as well as sponsorship from individuals or corporations.
Update on the National Animal Health Monitoring System (NAHMS)
Equine 2015 Study
Josie Traub-Dargatz, Colorado State University

In July 2015, the U.S. Department of Agriculture’s (USDA) National Animal Health Monitoring System (NAHMS) will launch its third national equine study. Equine 2015 will take an in-depth look at U.S. equine operations and provide the industry with new and valuable information regarding trends in the equine industry from 1998 to 2015.

For the study, NAHMS asked equine owners, industry stakeholders, and government officials to provide input and define the information needs of the equine industry. During this process, seven study objectives were identified:

- Estimate the occurrence of owner-reported lameness and describe practices associated with the management of lameness.
- Describe health and management practices associated with important equine infectious diseases.
- Describe animal health related costs of equine ownership.
- Evaluate control practices for gastrointestinal parasites.
- Evaluate horses for presence of ticks and describe tick-control practices used on equine operations.
- Collect equine sera along with equine demographic information in order to create a serum bank for future studies.

In July 2015, representatives from the USDA’s National Agricultural Statistics Service (NASS) will contact selected horse owners in 28 States (see map below). NASS representatives will conduct personal interviews with all participating operations that have one or more equids and qualify as a farm, as defined by the 2012 Agricultural Census conducted by NASS. For operations that choose to continue in the study and are eligible to do so, representatives from USDA’s Veterinary Services veterinary medical officer (VMO) will visit from September through December 2015 to administer a second questionnaire, perform an on-site biosecurity assessment, collect blood and fecal samples, perform a tick exam, and collect tick specimens.

Through the fall of 2014 a working group consisting of a point of contact from each of the six USDA, APHIS, VS Districts and the NAHMS Equine Core team will be refining the plans for implementation of the study and data collection tools. Questionnaires and the plan for collection and testing of biologic samples should be finalized by the spring of 2015. Training of the NASS data collectors and the USDA’s VMO’s will be performed prior to start of data collection.

1Horses, ponies, donkeys, mules, and other domestic equine species.
2The current definition of a farm is a place that could or does actually sell $1,000 of agricultural products annually or that has five or more equids (other than commercial enterprises such as race tracks).
Vesicular Stomatitis 2014 Update
Angela Pelzel McCluskey, USDA-APHIS-VS
A summary of the ongoing 2014 vesicular stomatitis (VS) outbreak in Texas and Colorado was presented including background on the disease, statistics on the current situation, and next steps for determining future management of the disease in the U.S. in light of OIE’s 2014 decision to remove the disease from the list of immediately notifiable animal diseases. To date, a total of three hundred eighty-eight (388) VSV-positive premises have been identified in two U.S. states, Colorado (326 premises) and Texas (62 premises). There have been 14 counties affected in Colorado (Adams, Arapahoe, Boulder, Broomfield, Douglas, El Paso, Fremont, Jefferson, Larimer, Logan, Morgan, Otero, Pueblo, and Weld Counties) and 13 counties affected in Texas (Bastrop, Falls, Guadalupe, Hidalgo, Jim Wells, Kinney, Lee, McLennan, Nueces, San Patricio, Travis, Val Verde, and Williamson Counties). Of the 388 total VSV-positive premises, 370 have been positive equine premises, 16 have been positive bovine premises, and two premises have had both cattle and horses positive. Positive premises are eligible for quarantine release 21 days after lesions have healed in all affected animals. At the time of this meeting, two hundred sixty-one (261) premises in Colorado have been released from quarantine and there are an additional forty-one (41) premises in Colorado on 21-day countdown to quarantine release. As of October 13, 2014, all confirmed VSV-positive premises in Texas have been released from quarantine. Weekly situation reports and maps from the incident are publicly available on the USDA-APHIS website.
Committee Business


Four Resolutions were brought before the committee for discussion, resolutions passed and forwarded to the Committee on Nominations and Resolutions. One Recommendation was presented and approved by the Committee.

Recommendation:

BACKGROUND INFORMATION:

Recent equine disease events in the United States highlighted the limited knowledge of the equine industry regarding equine regulatory diseases; specifically the scientific laboratory advances and changes in understanding of disease epidemiology related to equine herpesvirus myeloencephalopathy (EHM), equine infectious anemia (EIA), equine piroplasmosis (EP), equine viral arteritis (EVA) contagious equine metritis (CEM) and other regulatory diseases. Continued education and outreach to the equine industry on equine regulatory diseases is critical to protecting the health of U.S. equid population.

RECOMMENDATION:

The Infectious Diseases of Horses Committee requests the United States Animal Health Association (USAHA) Executive Committee host an Equine Infectious Disease Forum for equine industry stakeholders. Additionally, the IDOHC encourages USAHA to consider requesting National Institute of Animal Agriculture (NIAA) to co-host the meeting.
The USAHA Committee on Infectious Diseases of Horses, on the direction of then chairman Dr. Kent Fowler, established a subcommittee to focus on the specific topic of contagious equine metritis (CEM).

BACKGROUND

The subcommittee was charged with defining the current status of the recommendations made to USDA following completion of the 2007 CEM Program Review, as well as facilitating development of a reliable polymerase chain reaction (PCR) assay for detecting *Taylorella*

1. Volunteers serving on the CEM subcommittee are: Andy Schwartz, TX; Katie Flynn, CA; Kent Fowler, CA; Peter Timoney, KY; Adam Eichelberger, NY; Angela Pelzel-McCluskey, CO; Linda Schlater, IA; Mike Short, FL; Ellen Buck, MD; and Terry Hensley, TX.

Programmatic Recommendation Summary Findings

The committee conducted business via email, individual conversation, and structured teleconference calls. Regarding the status of the recommendations made by the program review team:

1. USDA has adopted the vast majority of the recommendations made.
2. The Laboratory and Diagnostic recommendations have been adopted and fully implemented by National Veterinary Services Laboratory (NVSL) via mandatory laboratory training and proficiency testing.
3. Programmatic recommendations were adopted by incorporating the recommendation into the contagious equine metritis (CEM) Guidance Document that each approved state agrees to abide by when seeking USDA’s approval, or through amendment in the applicable Code of Federal Regulations. Implementation of the programmatic recommendations is generally the responsibility of the approved state and more specifically the individual (regulatory official) identified as the program manager. There is concern that a means or system of determining, measuring and validating accountability that the program is managed and operates in full accordance with the guidelines isn’t functional today.
4. USDA has initiated a reporting system whereby states provide specific information to USDA’s *National Import Export Services* (NIES) staff quarterly; the data provided is relative to the importation, quarantine, and testing of each mare/stallion completing CEM Quarantine during the preceding quarter.
5. The USDA’s National Veterinary Services Laboratory and the University of Kentucky’s Gluck Equine Research Center do have PCR assays in different phases of
developmental research and the laboratories are sharing their comments, concerns, and findings with each other.

COMMENTS

Direct and indirect results of the committee’s findings give evidence that:

1. USDA does need to have a defined uniformed method of insuring each state approved to receive, quarantine, and determine the CEM disease status of equine imported from CEM Affected countries is following the defined guidelines to include receiving of the horses, identification, quarantine, sample collection, handling and submission, testing procedures and interpretation of results, post culture treatments, releasing quarantines, and a sufficient meaningful level of monitoring and supervision occurs associated with each individual activity.

2. While USDA has for over a year required approved states to submit reports (first monthly and then quarterly), the data is not made available to stakeholders in a useful or beneficial manner.

3. The committee’s understanding today is that USDA has begun devoting information technology (IT) resources to resolve this data management issue. It has been suggested that USDA revise the specific data being requested to include only data that will be beneficial and utilized in reporting.

4. It isn’t yet clearly understood by committee members what process USDA utilizes to define or determine a country is not CEM Affected. Many committee members expressed concern that horses from CEM affected countries might be exported to third countries and subsequently imported into the United States without being subjected to completing post arrival CEM testing. Committee members believe this may be occurring with warm blood sport horses exporting to South America from European Union (E.U.) Member States, and then importing into U.S.

5. The Committee would like USDA to advise how a country is determined as not being affected with CEM. The subcommittee does believe consideration must be given that if a country doesn’t have CEM import requirements equivalent to or exceeding our own, then equine importing into the U.S. from those countries should not be considered as originating from a Non-CEM Affected countries.

Facilitating Development/Adoption of PCR Findings

1. Both the NVSL and the University of Kentucky’s Gluck Equine Research Center have teams assigned and continue their work towards developing a polymerase chain reaction (PCR) assay for direct examination and detection of Taylorella equigenitalis and other CEM like organisms from swabs.
2. Neither the NVSL team or the Gluck team is able to give a time frame as to when development may be complete and the assays becoming routinely available through their laboratories.

3. A challenge the development teams face with development of the assay is limited availability of positive specimens.

4. In addition to development of their own assays, both laboratories have and are willing to evaluate other comparable PCRs be it commercial, published or unpublished against their own developments.

**COMMENTS**

1. States that have operational CEM Programs can assist in this developmental research by providing swabs to the laboratories from equine found to be positive or thought to be an elevated risk of being infected.

2. USAHA’s Committee on Infectious Diseases of Horses (IDOHC) can assist by facilitating the researching laboratories efforts to be able to acquire swabs from known positive horses and horses in endemic areas of the world.

**2015 - SUBCOMMITTEE’S FUTURE**

1. The subcommittee was created, its’ members assigned, and has functioned with specific goals defined.

2. Is there need, benefit or purpose for this committee to remain in place for calendar year 2015?
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. The majority of regulatory testing is being done though disease investigations and international export with some interstate testing occurring.

According to the March 2014, National EP Situation Report, there have been more than 247,000 U.S. horses tested for EP since November 2009, with approximately 41,000 tested in 2013-2014. Since 2009 there have been 219 horses determined to be positive for EP, with 30 detected in the past 12 months, (excludes the horses detected as positive during the investigation of the 2009 Texas ranch outbreak). All but two of the positive EP horses have been in one of three high risk categories; illegally imported horses, horses legally imported prior to August 2005 using the complement fixation (CF) test and those involved in racing, primarily Quarter Horse racing.

During the past year the EP Subcommittee held two meetings which took place via conference calls. The primary discussion points included the information above and continued areas of interest and concern below:

- **Ongoing surveillance**
  - There is some concern that surveillance has been slowly decreasing since 2009. The majority of EP testing is being done through race track entry requirements, export requirements or individual state entry requirements. The states that currently have some type of regulatory interstate entry requirements are Georgia, Florida, North Carolina, Michigan, Pennsylvania and Washington. Race tracks that require some form of entry testing for EP are located in California, Texas and New Mexico.
  - Texas is considering implementing EP testing requirements on non-sanctioned tracks and training facilities. Many of the positive EP horses have been detected in association with these premises. Several other states indicated interest in the proposed Texas rule, with consideration of implementing similar requirements.

- **Tick Research and Surveillance**
There is a need for more tick research, comprehensive tick surveys and development of a tick submission reporting system and central repository for historical and ongoing tick collection information. Currently, there is no central database for the compilation of tick collection information in the U.S. There was significant discussion on the need for consolidation of information for a more comprehensive understanding of the current range and species of ticks within the U.S.

Angela James presented a recent publication concerning the *T. equi* competent vector, *Amblyomma cajennense*. While *A. cajennense* is currently documented to be established in South Texas the publication titled *Current and Potential Distribution Of the Cayenne Tick, Amblyomma cajennense, in the Continental United States*, indicates that the potential range of “highly suitable” habit for *A. cajennense* includes all or part of South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Texas, California and Arizona.

- **Strain Typing of *Theileria equi***
  - Research is ongoing at USDA, ARS, Pullman and National Veterinary Services Laboratory (NVSL) to develop strain typing of the *T. equi* organisms to assist with understanding of the organism as well as epidemiological investigations.

- **New strain of *T. equi* detected**
  - USDA, ARS, Pullman, has found a novel, Mexican strain of *T. equi*. The new strain is less virulent than the current strain detected in the U.S. The significance of the new strain is unknown and research is continuing.
REPORT OF THE COMMITTEE

REPORT OF THE SUBCOMMITTEE ON EQUINE HERPESVIRUS -1  
Katie Flynn, Chair  
California Department of Food and Agriculture

In 2014, the United States Animal Health Association, Committee on Infectious Disease of Horses established an equine herpesvirus-1 (EHV-1) subcommittee to develop a guidance document based on the relevant current scientific information and field experience of the committee members related to the EHV-1 regulatory mitigation.

During Equine Herpesvirus Myeloencephalopathy (EHM) incidents, the State Animal Health Official's goal is to prevent the spread of the disease agent, specifically EHV-1. Science-based disease control protocols, adapted to the specific incident, ensure compliance and minimize the impact on equine movement while controlling disease spread. In 2014, the EHV-1 Subcommittee began development of the EHM Incident Guidance Document for State Animal Health Officials (SAHO). A conclusion of the subcommittee was that there is no single protocol that can be applied to all EHM incidents as there are multiple factors that must be considered when determining the optimal disease containment response.

The intent of the consensus document is to provide SAHOs, with the science based control options to be considered during an EHM incident. To date, four sections related to definitions, testing guidance, quarantine placement and quarantine release have been completed. The subcommittee plans to complete four additional sections, including the use of EHV-1 vaccination, biosecurity, reporting of investigation findings and use of communication during and after at EHV-1 incident. The intent is to modify the guidance document; as the remaining four sections are completed and/or as new scientific research is available.

The EHV-1 Subcommittee focused on latest field experience and scientific data to develop the most appropriate guidance to reduce disease agent spread while allowing for as much business continuity as can safely be in place. Summary of topics addressed in the Guidance Document:

1. Diagnostic Testing: Due to advances in diagnostic technologies polymerase chain reaction (PCR) has become the diagnostic test of choice due to its high analytical sensitivity and specificity as well as rapid test result availability. To optimally assess the state of infection in the horse, a Realtime PCR or a Nested PCR tests is recommended on both nasal swabs and uncoagulated blood samples. Differentiation of the neuropathogenic (G2254) from non-neuropathogenic (A2254) strains based on DNA polymerase gene testing may be beneficial tool for planning for outbreak response and the application of appropriate biosecurity measures. The optimal window for nasal swab sampling is at onset of clinical signs e.g. onset of fever and/or neurologic signs. Since EHV-1 is considered to be endemic within the horse population, random testing of normal
horses for EHV-1 by PCR assay can and likely will detect horses positive for EHV-1 and may represent transient presence of virus; or viral levels that are not sufficient to pose a significant risk of transmission of infection. In general, testing of non-clinical horses is not recommended during an investigation of an EHM Incident. However, if testing of non-clinical horses is being considered then the response to the test results should be considered before initiating the testing. Non-clinical EHV-1 infected horses based on nasal swab and/or buffy coat testing, currently represent a non-quantifiable but potential risk of transmitting virus to horses to which they are exposed. This is arguably more important if the viral DNA detected is of the neuropathogenic (G2254) genotype. Ultimately, the decision to test a population of horses should be based on evaluation of exposure risk, type and severity of clinical disease present, number of animals with disease and assessment of biosecurity measures in place.

2. Quarantine Placement: Science based criteria for quarantine protocols adapted to the specific equine herpesvirus myeloencephalopathy (EHM) incident ensure compliance and minimize the impact on equine movement while controlling disease spread. No single quarantine protocol can be applied to all EHM incidents as there are multiple factors that must be considered for optimal disease containment response. A risk assessment is critical to identify current disease transmission risk factors on the property. Assessment of risks associated with the index case includes the index EHM case’s amount of viral shedding and its ability to potentially expose other horses. An exposed horse is one which had direct or indirect contact with an EHM case within the previous 14 days. Highest risk among exposed horses are those with or recent history of direct nose to nose contact and moderate risk are those horses stabled within 30 feet of clinical case or shared transportation but with no nose to nose contact, or shared equipment or personnel with index EHM case. Disease transmission, as evidenced by newly identified clinical cases would warrant modification of the quarantine-site biosecurity protocols. Additionally, if spread occurs beyond index premises, then the quarantine should be extended to further sites.

3. Quarantine Release: Before implementing a quarantine, the criteria for quarantine release should be established using science-based criteria. There is no single quarantine release protocol that is applicable to all EHM incidents since there are multiple factors that must be considered when striving for optimal disease containment. Clinically affected horses should be assumed to be contagious, particularly via the respiratory route, for at least 14 days after resolution of fever or after the onset date of neurologic signs. Minimal monitoring or quarantine of exposed horses should be for a minimum of 14 days after removal and isolation of the EHM horse. If
the EHM case cannot be isolated then further criteria need to be assessed when considering quarantine release. Quarantines can be amended to release subpopulations of animals earlier if epidemiologic investigation, biosecurity assessment and or diagnostic testing indicate the risk is minimal from the release of a horse or group of horses. Release of quarantine shall be based on limited potential for spread of the disease agent. Quarantine release is recommended, if adequate biosecurity and monitoring has been maintained and if no new clinical cases (EHM or EHV-1 cases) are identified in the 21 days from the date of removal of EHM case or the 21 days from the resolution of the last febrile case or the 21 days from the onset of the last neurologic signs in a horse on the premises. Monitoring of the exposed population for any clinical signs compatible with EHV-1 infection includes twice daily temperature monitoring and direct observation for compatible clinical signs. Note, a 14-day quarantine release for exposed horses may be considered when there is immediate removal of the index EHM case and there is evidence of limited potential for disease agent spread due to adequate biosecurity and monitoring of horses. Testing of clinical horses for release of quarantine may shorten the quarantine period. A confirmed EHM case or EHV-1 case with two subsequent PCR negative nasal swab and/or buffy coat samples obtained seven days apart is considered to pose a minimal disease transmission risk, thus quarantine release is recommended.

4. Appendix: To date, the appendix section contains risk assessment tools for state animal health officials (SAHOs) to utilize during an EHM incident to assess exposed horses, premises biosecurity, and quarantine placement and release parameters.

The subcommittee reviewed current guidance documents for EHV-1 including the 2009 ACVIM EHV consensus statement and the American Association of Equine Practitioners EHV-1 Infection Control Guidelines (revised in March 2013). The subcommittee’s drafted document is relatively consistent with both of the aforementioned documents. The most notable variation is in the number of days for quarantine release without testing. The AAEP’s recommendation is 28 days from the last clinical case and American College of Veterinary Internal Medicine (ACVIM) references the AAEP guidance. However, the latest opinion of experts queried by subcommittee is the referenced 21-day time frame is most appropriate. Other minor variations include fever cutoff temperature (101 vs 101.5) and the requirement of testing of both nasal swab and whole uncoagulated blood samples.

In 2015, the EHV-1 Subcommittee will complete the remaining four sections of guidance document (use of EHV-1 vaccination, biosecurity, reporting of investigation findings and use of communication during and after at EHV-1 incident).

A special thanks to the hardworking EHV-1 Subcommittee members namely, Sara Ahola, CO; Rory Carolan, WA; Ann Dwyer, NY; Katie Flynn,
CA; Rusty Ford, KY; Kent Fowler, CA Carl Heckendorf, CO; Mike Herrin, OK; RJ Layher, DC; Eileen Ostlund, IA; Angela Pelzel-McCluskey, CO Keith Roehr, CO; Mike Short, FL; Andy Schwartz, TX Peter Timoney, KY; and Josie Traub-Dargatz, CO.
This past year the committee worked primarily on encouraging USDA to publish a proposed rule on equine infectious anemia (EIA) as requested in previous USAHA Committee on Infectious Diseases of Horses (IDOHC) resolutions. In July of 2014, USDA signaled that it was putting the publication of the proposed rule on hold and seeking non-regulatory solutions to such issues as EIA. As a result, the EIA subcommittee will bring forth a resolution to the IDOHC this year to create an EIA working group to address such issues as lack of standardization in laboratory oversight, testing of new populations previously untested, lack of regulation in interstate movement with regards to testing, and lack of oversight in sample submission. The working group would be comprised of state animal health officials, academia (EIA subject matter experts), national and private laboratory representatives, and industry stakeholders and be convened by USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS).

Current federal EIA regulations are limited to interstate movement of an EIA test-reactor and approval, denial, and withdrawal of EIA laboratories and diagnostic or research facilities. The USDA provides guidance to the States in a Uniform Methods and Rules (UMR) document. However, the UMR has no regulatory authority and as such are merely recommendations. Therefore the major regulatory actions to control EIA are carried out by the States. States’ rules, while encompassing a much broader scope of EIA concerns, vary considerably and lack uniformity among individual State control programs.

In addition to the above issues, there is a national concern with increased EIA case incidence in racing horses, especially in the unsanctioned racing sector. While historically prevalence has been low, an increase in cases in the last few years among “bush track” horses that ultimately may travel extensively during and beyond their racing careers should be of concern to all states and trading partners. In addition to the proposed resolution, this committee is working on an issues paper to be approved by the IDOHC and USAHA for sharing with industry partners to elucidate the current situation and garner support for the ultimate goal of a proposed rule from USDA.
Theileria equi is a tick-borne infection of equids. Animal reservoirs for transmission include all equid species. Similarly to Babesia caballi, T. equi infection in equids leads to fever, malaise and anemia in the acute phase and life-long persistence (1, 2). Persistence of T. equi in the horse provides a reservoir for tick-borne transmission and is characterized by a parasitemia of between $10^3$ to $10^6$ merozoites per ml of blood (3, 4). A characteristic of theileria is the lack of transovarial transmission; therefore ticks are not a generational reservoir. Although U. S. horses are considered free of theileria/babesia, recent detection of T. equi infections has increased efforts to assure control. Discerning how T. equi persists and emerges is a mandatory component of controlling infection and disease. Pathogens capable of life-long persistence in mammalian hosts are a notable challenge. Examples include arthropod-borne apicomplexan malaria, babesiosis in humans and cattle, and theileriosis in cattle and equids. Persistence and replication of causal pathogens within mammalian hosts, which in some cases include wildlife, provide opportunity for genomic evolution leading to changes in virulence, host range and detectability. In collaboration with the Animal Plant Health Inspection Service (APHIS), surveillance and research were combined and a new variant of T. equi was detected. Through evolutionary change this variant is undetectable by current surveillance tools. The discovery, evolutionary changes and variant characterization of this T. equi variant provides clues to the persistence and emergence of this globally important pathogen of equids.

References:
Surra is a non-contagious infectious disease that was first described in horses and camels in India as far back as 1880 (Evans, 1880). The causal agent has the widest geographical range of all the pathogenic trypanosome species, infecting domestic livestock and certain companion animal and mammalian wildlife species (Luckins, 1988; 1994). It is known to occur in many countries in Africa, Asia, the Middle East, as well as in certain countries in South and Central America. In general, surra tends to occur in tropical and sub-tropical areas of the world (Luckins, 1994). There is one report, however, of an outbreak involving camels in France. Since surra has never been recorded in the United States, USDA, APHIS, VS consider it a transboundary disease.

Surra is frequently not regarded as a disease of significance in countries in which it is non-endemic or in which it has never been known to occur. Contrary to this perception however, was the conclusion arrived at an OIE Regional Workshop for Asia, Far East and Oceania that was held in early 2014. Some 16 of the 20 participating countries that were surveyed considered surra the disease of greatest concern of the OIE non-listed equine diseases. Significant economic loss was attributed to this disease by countries in which the disease is endemic or has been recently introduced.

**Etiology**

The etiological agent of surra is *Trypanosoma evansi*, a hemoprotozoan parasite that is closely related to and possibly evolved from *T. brucei*, the cause of the tsetse fly transmitted disease of humans, “sleeping sickness” (Hoare, 1972). It has the distinction of being the first pathogenic trypanosome to be discovered (Evans, 1880). *T. evansi* is also closely related to *T. equiperdum*, the cause of dourine, a contagious venereally transmissible disease of horses.

**Host Range**

Surra can affect a range of species including but not necessarily exclusive of horses, donkeys, cattle, buffalo, sheep, goats, camels, llamas, dogs, cats and elephants (Sellon, 2007). The disease is seen most frequently in horses and camels, in which species it tends to occur in its most severe form.

**Modes of Transmission**

Surra is primarily transmitted in nature by bloodsucking insects and ticks, especially biting flies of the genera *Tabanus* and *Stomoxys* (Sellon, 2007). Transmission is also postulated to occur by vampire bats in regions/countries of the world in which these can be found. *Trypanosoma evansi* is transmitted mechanically not biologically from an infected to a naïve host through blood contamination of the mouthparts of the hematophagous insect or tick vector (Luckins, 1994). Conditions under which livestock or especially horses are
congregated in close proximity to one another are conducive for transmission of the disease. The opportunities for spread of surra are significantly greater in regions or areas of the world with a hot, humid climatic environment in which the biting fly population is likely to be abundant and reservoir hosts are present (da Silva, 2014). There is the potential for surra also to be transmitted iatrogenically, through the use of blood contaminated syringes, needles, surgical instruments or via the administration of a transfusion of blood or a blood product from an infected animal. It is believed that certain wildlife species e.g. capybaras or coatis, may act as reservoir hosts of *T. evansi*.

**Clinical Signs**

The incubation period of surra in horses is 1 to 2 weeks. Large numbers of *T. evansi* are initially present in the blood but are more difficult to detect at a later stage in the infection (Luckins, 1994). It has been recognized for many years that aside from camels, horses can experience disease of greater clinical severity than other species susceptible to infection with this parasite. It is known that introducing naïve horses into surra endemic areas often results in high case-fatality rates. Similarly, epidemics of the disease can result from the introduction of *T. evansi* into a previously free region through the movement of infected animals (Luckins, 1988). Three forms or phases of infection have been described in horses, subacute, acute and chronic (Sellon, 2007; Luckins, 1994). The principal clinical signs are fever, progressive anemia, anorexia, dehydration, lethargy, wasting in bodily condition, and evidence of neurologic involvement by way of hind limb ataxia, often leading to paralysis. Although infected horses frequently develop the acute form of the disease, some affected animals will evolve into the chronic form of the infection. Such individuals have intermittent fevers and may develop urticarial lesions on the ventral abdomen, dependent limb enema, petechial hemorrhages on mucous membranes, chronic wasting, progressive weakness and frequently, neurological signs and limb paralysis (Sellon, 2007; da Silva, 2014). High rates of abortion have been reported in some outbreaks of surra in naïve pregnant mares.

**Diagnosis**

Diagnosis of cases of *T. evansi* infection can be problematic since it can easily be mistaken for other causes of systemic and neurologic disease in the horse. In the early stages of surra, laboratory confirmation can be achieved by the microscopic observation of morphologically typical trypanosomes in blood or tissue fluids by means of the micro-hematocrit centrifugation test (Luckins, 1994; Sellon, 2007; Wernery *et al.*, 2001). Presently available diagnostic tests include the polymerase chain reaction (PCR) assay, card agglutination test (CATT), latex agglutination test, antigen and antibody-enzyme-linked immunosorbent assay (ELISA), complement fixation and the mouse inoculation test (Sellon 2007; da Silva, 2014; Wernery *et al.*, 2001). The PCR testing of blood is a specific and sensitive means of diagnosis but it may not always be reliable, especially in chronic cases of infection where the parasite is only present in the tissues (da Silva, 2014).
Treatment
Consistent with other infectious agents that can infect the horse, *T. evansi* stimulates an immune response in an infected individual. However, this response while it is unable to clear the parasite, controls and maintains the parasitemia at low levels, resulting in the infection becoming chronic (da Silva, 2014). A range of trypanocidal drugs have been used to treat horses affected with surra, with variable results (Luckins, 1994). Although some treatments are successful in mitigating the clinical severity of the disease, in many cases, they had not been found to effect clearance of *T. evansi* in infected animals (da Silva, 2014). Certain drugs e.g. quinapyramine, have been used prophylactically in endemic regions but their efficacy in preventing this infection remains to be established.

Prevention and Control
No vaccine is currently available against surra. Prevention and control of this disease is very difficult in countries/regions in which there are reservoir hosts to maintain the causal parasite. Control of surra essentially depends on identification and treatment of infected horses with the best available trypanocidal drugs, attempted reduction of vector populations through the use of appropriate insecticides and through the provision of vector-proof accommodation for horses, and the practice of good hygiene in horse stables (Luckins, 1994). It remains to be seen whether the prophylactic use of certain drugs offers a safe and economically feasible means of reducing the incidence of surra in countries/regions where the disease is endemic.

Summary
Surra is an insidious disease that can be readily confused with a range of other equine diseases, infectious and non-infectious, with which it can share many clinical similarities. The disease is known to be endemic in certain countries in the Western hemisphere. Since movement of horses takes place between the U.S. and some of those countries and vice versa, there is and will continue to be the potential risk of the introduction of surra as a result of one or more of these exchanges. Accordingly, it behooves federal and state regulatory officials, and equine veterinarians to become knowledgeable of this disease and the threat it continues to represent to the highly important U.S. equine industry. By being “forewarned and forearmed” hopefully, we will be able to maintain this country’s freedom from surra for the foreseeable future.

References

The Committee met on October 20, 2014 at the Sheraton Crown Center Hotel in Kansas City, Missouri from 1:00 to 4:00 p.m. There were 22 members and 15 nonmembers in attendance.

Presentations and Reports

USDA Report on the OIE’s 82nd General Session

Michael David, Deputy Administrator, USDA-APHIS-VS (on behalf of Dr. John Clifford)

Dr. David 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 “Criteria and Factors for use in establishing priority diseases of aquatic and terrestrial animals under official control programs”. There was also a second technical item on African swine fever. The OIE has four specialist commissions: Biological Standards (Laboratory); Scientific Commission for Animal Diseases; Terrestrial Animal Health Standards (Code); and Aquatic Animal Health Standards. The Scientific Commission develops strategies for disease control and surveillance and evaluates the disease status of countries for Foot-and-mouth Disease (FMD), contagious bovine pleuropneumonia (CBPP), Bovine spongiform encephalopathy (BSE), African horse sickness (AHS), peste des petits ruminants (PPR) and classical swine fever (CSF). This year, the Scientific Commission recognized the following countries’ FMD status: South Korea- free with vaccination; Argentina (Patagonia North) - free without vaccination; Brazil and Bolivia- various states and zones free with vaccination.
The Scientific Commission also recommended recognitions for BSE negligible risk for China, Bulgaria, Croatia, Estonia, Hungary, South Korea, Latvia, Luxemburg, Malta, Portugal, Romania and Slovakia. In addition, the Commission recognized Argentina, Canada and Singapore for freedom from CBPP and 70+ countries for historical freedom from AHS and 40+ countries for historical freedom from PPR.

The 82nd General Session discussed the world situation on FMD, PPR, *highly pathogenic avian influenza* (HPAI), ASF, *Middle East respiratory syndrome* (MERS) and swine enteric coronavirus *diseases* (SECD) (e.g. *porcine epidemic diarrhea* (PED)). The Code Commission discussed the chapters on antimicrobial resistance and decided to delist vesicular stomatitis and swine vesicular disease. The Code Commission also discussed other chapters relating to PPR, Newcastle disease, equine viral arteritis, high health status horses and *Brucella spp.*

The OIE identified animal welfare (AW) as a priority in 2001 recognizing the crucial link between AW and animal health. Member countries via the third Strategic Plan approved OIE to develop guidelines and established guiding principles on AW that are science-based and outcome focused. Currently, there are Code chapters for AW on killing animals for disease control purposes, slaughter of animals; transport by air, land and sea; use of animals in research and education; beef production and broiler production.

The Code Commission will draft future chapters on Salmonella, PRRS, *Taenia*, dairy welfare and production, scrapie and TB. New Code chapters or updates on existing chapters are developed when new science is available; to correct and error; or when a need has been identified. USDA, APHIS solicits input and participation on OIE chapters in various ways both internal and external. Industry associations such as National Chicken Council, National Turkey Federation, National Pork Producers Council and the Meat Export Federation provide input as well as producers and veterinarians. Associations such as the USAHA, American Association of Veterinary Laboratory Diagnosticians (AAVLD), and American Veterinary Medical Association (AVMA) also provide feedback and input.

Dr. David reported that USAHA through this committee provides comments in the Code chapter commenting process. This comment period will be commencing shortly and USAHA committee chairs will be forwarded relevant chapters by Ben Richey or Don Hoenig.

Dr. David reported that there is an OIE Aquaculture Conference in Vietnam in January 2015. The topic of the post-eradication phase for rinderpest was discussed. Dr. David reported that the issue is the commitment to destroy or safely store remaining stocks of rinderpest virus or vaccine with a minimal number of holding facilities.
Update on the OIE Biological Standards (Lab) Commission (BSC)
Beverly Schmitt, National Veterinary Services Laboratories (NVSL), USDA-APHIS

Dr. Schmitt told the group that the World Health Organization (OIE) BSC has six members who serve three-year terms. Those members are: Vincenzo Caporale (Italy) President; Hualan Chen (China) Vice President; Rodolfo Rivera (Uruguay) Vice President; Paul Townsend (UK); Peter Daniels (Australia) and herself. The BSC meets twice per year and also forms ad hoc groups to address various issues. The BSC approves OIE reference laboratories and collaborating centers; conducts the laboratory twinning project; sets international standards in the Manual of Diagnostic Tests and Vaccines for Terrestrial Animals; and has liaisons with other OIE Commissions.

The ad hoc groups that were active in 2013-2014 were the biosafety and biocontainment group which is developing standards for veterinary laboratories; the group on high throughput sequencing, bioinformatics and computational genomics; and the diseases of camelids group which is working on the epidemiology of MERS.

Dr. Schmitt told members that there are two new collaborating centers in the U.S. - the Sandia National Laboratory in Albuquerque, New Mexico and the Institute for Infectious Animal Diseases in College Station, Texas. The NVSL has applied to OIE to be a reference laboratory for antimicrobial resistance in partnership with the current Food and Drug Administration (FDA) collaborating center.

The BSC received 197 annual reports from reference laboratories (there are 199) and 42 annual reports from collaborating centers (there are 45). Since 2012, the BSC has a new on-line template to reference and collaborate center annual reports. Emphasis is being placed on ISO 172205 or equivalent accreditation for OIE reference laboratories.

Dr. Schmitt reported on the U.S. participation in the OIE twinning projects. The avian influenza (AI) and Newcastle disease twinning projects with Brazil and Chile are completed. A twinning project on epidemiology with China is underway and a project on FMD with Mongolia is approved and due to commence. The equine infectious anemia (EIA) project with Argentina still awaits funding. Other projects approved include: Infectious hematopoietic necrosis (IHN) with China; rabies with India; and crustacean/shrimp diseases with Indonesia.

The BSC Manual for Diagnostic Tests now has chapters with a fit-for-purpose table and a proposal is being considered to move away from prescribed and alternative tests.

The OIE/FAO Joint Advisor Committee on Rinderpest is focusing on sequestration of rinderpest virus (RPV) in a minimal number of laboratories. Four countries have sent proposals to be RPV holding facilities. NVSL has submitted a proposal.
FMD in South America: Current Status of Eradication Efforts and Where Do We Go from Here?
Conrad Estrada and Cesar Orozco, USDA, International Services (IS), Brazil and Bolivia

Dr. Estrada reported on the history of foot-and-mouth disease (FMD) in the Americas and on the FMD eradication efforts in South America. There have been nine FMD outbreaks in the U.S. with the last being in 1929. Canada had an outbreak in 1952 and Mexico from 1946-1954. FMD has never been detected in Central America but has been present numerous times in the Caribbean in the 1920s up until 1976 (Curacao). Dr. Estrada gave a thorough review of FMD in South America stating that the last case of FMD was in 2012 in Paraguay. He reviewed the 6-step progressive control pathway to FMD freedom from stage 0 (FMD risk not controlled, no reliable information) to stage 5 (0 circulation/incursions, withdraw vaccination). He showed the Committee several FMD status maps of South America that portrayed countries that were FMD-free, free with vaccination or with no recognized status. Dr. Orozco reported on the type O outbreak in Paraguay in 2010 and told the Committee that there have been three outbreaks in the last five years in South America; in Ecuador (2011), Venezuela (2011-?) and Paraguay (2012). He also showed a map of the countries and regions where FMD vaccination is being conducted and the types of vaccine being used.

Dr. Estrada returned to tell the Committee that the Animal Disease Control Act of 1947 authorized the Secretary of Agriculture to cooperate with foreign countries to carry out operations to eradicate, suppress, control or prevent communicable diseases of animals. This act resulted in agreement with Mexico (1947); Panama and Columbia for the Pan-American Highway (1971) and bilateral agreements with other South American countries in the 1970s for control and eradication of FMD. These bilateral programs include the following activities: surveillance and epidemiological studies; investigate and attend reports; collect diagnostic material; develop educational programs; and organize livestock owners’ groups. Funding for FMD eradication activities in South America dropped from 48.6 million in 2008 to $4.0 million in 2009. All cooperative agreement funding concluded between 2011 and 2014.

Dr. Estrada showed a map of the current location of APHIS International Services employees in South America. There is on-going cooperation with the Americas in FMD control/eradication including memorandum of understandings (MOUs) with Costa Rica and Nicaragua; providing classical swine fever (CSF) vaccine to Guatemala; a 3-day transboundary course in Peru in 2011; and incident command system (ICS) training (proposed).

Dr. Estrada outlined next steps for FMD eradication in South America which include: funding from member countries for the FMD vaccine bank; quality standards for vaccines and antigens; risk analyses to determine which antigens and vaccines to include in the bank; and updating of response plans. A meeting is planned in DC in early 2015 to discuss the Houston Declaration 2.0 on the eradication of FMD.
Dr. Estrada concluded that APHIS continues to be a strong partner in the eradication of FMD and surveillance for vesicular diseases in South America and that, although we’re getting close to eradication, there is still much unfinished work to be done.

**Recognition of Zoning for Foreign Animal Disease (FAD) in the U.S. and Canada**

Kelly Rhodes, National Import Export Services (NIES), USDA-APHIS-Veterinary Services

Dr. Rhodes reported on the background for the FAD zoning initiative and gave an overview of the guidance framework. She gave the definition of zoning to the Committee and reviewed the implications of zoning for disease control and eradication in an outbreak situation. She showed a graphic that demonstrated the differences in the Canadian and U.S. models for zoning in FAD control. She related that the rationale for the zoning initiative is the high volume of cross-border trade, the high potential for economic losses and in response to stakeholder interest. Initial meetings were held in 2007 and currently a draft guidance framework has been published. Dr. Rhodes reported that FAD zoning is one of 29 current initiatives under the Regulatory Cooperation Council, a presidential program launched in 2011.

The zoning arrangement was signed in October 2012 and declares the intent of each party to recognize the other’s decisions on zoning for control of FAD outbreaks and lays out basic conditions for zoning recognition.

The Guidance Framework was published in the Federal Register on May 13, 2014 and Canadian Food Inspection Agency (CFIA) published it on their agency website on June 11, 2014. The objectives are to establish an operational plan for zoning recognition; establish a structure for maintaining the arrangement; and engage a strategy to engage other stakeholders. She reviewed the essential definitions for partner country, affected country and area of control and then related the details of the 5-step process for implementation. She also reviewed the steps for Maintenance and Stakeholder Engagement and told the committee about the activities to publicize the plan.

She said that most feedback so far has been cautiously optimistic with a minority of commenters firmly opposed. A common theme is the need to partner with and closely consult with industry, provinces and states. Next steps will be forming a working group to address comments and developing a consultation plan for continued engagement with stakeholders.

**Update on APHIS-VS Regionalization Activities**

Kelly Rhodes, NIES, USDA-APHIS-Veterinary Services

Dr. Rhodes told the committee about regionalization evaluation services (RES) within the VS National Import Export Services. RES evaluates the animal health status of foreign regions and the risk of disease introduction via importation of animals and animal products into the U.S. RES also assists in the coordination of data to support the regionalization of the U.S. for export.
purposes. The import regionalization evaluation involves information gathering, a site visit to the region, recommendations and follow-up and rulemaking if warranted. There are eight factors described in 9 CRR 92.2 involved in entry assessment and she reviewed these for the committee. There are two evaluation types- animal health status (30 active; free from a specific disease, low risk for a disease of other status as defined in the rules) and commodity-based evaluations (six active, specific, risk-based mitigation measures). She showed the committee charts which detailed the current animal health status and commodity-based reviews and the countries involved.

Currently, RES is involved in reviewing data to support opening/retaining foreign markets for: swine, pork and pork products; cattle, beef, beef products and bovine blood products; ovine and caprine products; poultry and poultry products; horses, horse meat and genetic products; animal feed components; and brine shrimp eggs and other bait feeds.

**Codex Committee on Food Hygiene, Salmonella Guidelines for Beef and Pork Meat**

Mallory Gaines, National Cattleman’s Beef Association

Ms. Gaines informed the Committee on the Codex that the parameters document is being developed by the Codex Committee on Food Safety. It is very pre-harvest oriented which most agree is outside of their area of concern (should be post-harvest only) and she wanted to alert the committee that we may want to comment on this document in the future but not this year.

**Committee Business**

There were no resolutions proposed before the committee but several members favored discussing the FMD/South America funding issue with the Committee on Foreign and Emerging Diseases. Don Hoenig will move forward with this.

Dr. Hoenig reported that Bill Hartmann is willing to serve as the new chair. Don will propose his name to the USAHA president as well as the names of Mo Salman and Linda Glaser to be co-vice chairs. The Committee thanked Don and outgoing Vice Chair Rick Willer for their service.
REPORT OF THE COMMITTEE ON JOHNE’S DISEASE
Chair: Elisabeth Patton, WI
Vice Chair: David Smith, NY

John Adams, VA; Bruce Addison, MO; Paul Anderson, MN; Richard Breitmeyer, CA; Charles Brown II, WI; Todd Byrem, MI; Yung Fu Chang, NY; Michael Collins, WI; Thomas Conner, OH; Stephen Crawford, NH; Ria de Grassi, CA; Anita Edmondson, CA; William Fales, MO; Kathy Finnerty, MA; Keith Forbes, NV; Mallory Gaines, DC; Robert Gerlach, AK; William Hare, MI; William Hartmann, MN; Linda Hickam, MO; Donald Hoenig, ME; David Hunter, MT; Carla Huston, MS; Annette Jones, CA; Jamie Jonker, VA; Karen Jordan, NC; Susan Keller, ND; Gerald Kitto, 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; Jay Mattison, WI; Antone Mickelson, WA; Jeffrey Nelson, IA; Dustin Oedekoven, SD; Kenneth Olson, IL; Lanny Pace, MS; Elizabeth Parker, TX; Boyd Parr, SC; Elisabeth Patton, WI; Janet Payeur, IA; Kris Petrini, MN; Jewell Plumley, WV; Suelie Robbe-Austerman, IA; Paul Rodgers, WV; Allen Roussel, Jr., TX; Patricia Scharko, SC; Andy Schwartz, TX; Kathryn Simmons, DC; Marilyn Simunich, ID; Shri Singh, KY; David Smith, NY; Judy Stabel, IA; Scott Stuart, CO; Tahnee Szymanski, MT; Robert Temple, OH; Charles Thoen, IA; Brad Thurston, IN; James Watson, MS; Gary Weber, MD; Scott Wells, MN; Diana Whipple, IA; Robert Whitlock, PA; Ching Ching Wu, IN.

The Committee met on Sunday, October 19, 2014 at the Sheraton Hotel in Kansas City, Missouri, from 12:30 to 5:30 p.m. There were 17 members and 27 guests present.

USDA - Animal and Plant Health Inspection Service Update
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. The funding for Cattle Health continued in FY 2014 and as such, Johne’s disease is no longer a specified activity.

The National Veterinary Services Laboratories (NVSL) will continue to manage the proficiency tests for milk and serum enzyme linked immunosorbent assay (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.
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. Johne’s disease field activity on the State side may be funded as salaries using APHIS cooperative agreement dollars but the State must ensure that cattle health priority issues (surveillance goals, enforcement activities, etc.) are covered within the State.

APHIS will continue to enforce 9 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, NJWG Treasurer

Dr. Olson provided the report on the National Johne’s Working group financials for the past year.

**NMPF Updates**
Jamie Jonker, National Milk Producers’ Federation

Dr. Jonker updated the Committee on National Milk Producers’ Federation (NMPF) activities in relation to Johne’s Disease.

**NCBA- Johne’s Disease Presentation Overview**
Kathy Simmons, Chief Veterinarian NCBA

Johne’s disease has been documented in beef herds throughout the United States. Johne’s disease is estimated to occur in roughly eight percent of the beef cattle herds in this country. Johne’s disease is a herd problem that worsens with time reducing animal production and profit. Examples of the economic losses seen with Johne’s disease include decreased milk production, 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.

In the past year, the National Cattlemen’s Beef Association (NCBA) has continued to promote individual herd security against the disease and supported research and educational opportunities for mycobacterial diseases, like Johne’s disease, in cattle. Working through the Beef Quality Assurance (BQA) program and NCBA’s Herd Security working group in the Cattle Health and Well-being committee, NCBA has encouraged producers to adopt herd security measures to identify, manage and control Johne’s disease in their individual cattle herds.
NCBA is concerned with improving Johne’s disease control and management in beef cattle herds in the United States. Recently, NCBA supported a research proposal to USDA National Institute of Food and Agriculture (NIFA) for a coordinated agricultural project focusing on Mycobacterial Diseases in Animals--Johne’s disease and Bovine Tuberculosis Complex. The project involves five objectives: epidemiology/transmission of these diseases through modeling; development of new diagnostic testing procedures; improved understanding of the biology and pathogenesis of mycobacterial diseases; vaccine development and delivering education and extension materials to key stakeholders. Through our representation on the External Advisory Board for this project, NCBA was able to provide input regarding the outreach and educational piece of the project as well as to identify possible key research outcomes that would result in increased value for producers.

NCBA is committed to advancing education and outreach to promote optimal herd health security practices against diseases, such as Johne’s disease. Our efforts are concentrated through the work of the Herd Security Working Group of the NCBA Cattle Health and Well-being Committee as well as through the guidance provided by the Beef Quality Assurance program. NCBA continues to advocate for continued research into the mycobacterial diseases in order to advance our knowledge for the control and management of these diseases in beef cattle herds within the United States.

National Veterinary Services Laboratories 2014 Johne’s Serum and Milk ELISA Proficiency Tests Summary
Charles Lewis, Veterinary Medical Officer, NVSL

The 2014 Johne’s Milk ELISA Proficiency Test kits were distributed in February to 43 laboratories. A total of 47 kits were shipped to participating laboratories. Results were submitted from 68 participating individuals, with 55 individuals utilizing the IDEXX ELISA kit, 12 individuals utilizing the Prionics ELISA kit, and one individual using both ELISA kits. Each proficiency test kit contained 25 milk samples supplied by Eastern Laboratory Services that were evaluated at the NVSL prior to distribution. Each kit contained 19 positive samples and six negative samples. Results from the Prionics ELISA kit had 100% agreement among all samples. Results from the IDEXX ELISA kit had 100% agreement for 23 samples and 98% agreement for two remaining samples. NVSL approved 43 laboratories to perform the milk ELISA.

The 2014 Johne’s Serum ELISA Proficiency Test kits were distributed in late June to 78 laboratories. A total of 87 kits were shipped. Each proficiency test kit contained 20 serum samples with 15 positive and five negative samples contained within each kit. Results were submitted from 56 individuals using the IDEXX ELISA kit and 32 individuals using the Prionics ELISA kit. Preliminary results indicate 30 of 32 individuals received satisfactory scores using the Prionics ELISA kit and 56 of 56 individuals received satisfactory scores using the IDEXX ELISA kit. Final result
evaluations, laboratory approval, and report distribution will be concluded in late October or early November 2014 to all participating laboratories.

2014 Johne’s Disease Fecal Proficiency Test Report
Kevin Stokes, Microbiologist Mycobacteria/Brucella Section NVSL

A total of 59 laboratories participated in the 2014 Johne's Disease Fecal Proficiency Panel (seven Canadian, four European Union, one New Zealand, one Australian and 46 U.S.A. laboratories). Compared to 2013, the number of requesting laboratories increased for individual proficiency panels for direct polymerase chain reaction (PCR) and decreased for liquid and solid culture methods. Requests for pooled proficiency panels increased for direct PCR, and decreased for liquid and solid culture methods. A total of 168 panels were requested; results were not returned for six of them. Of that total, 105 individual panels and 63 pooled panels were shipped. Samples from one animal in the individual panel were deemed invalid due to less than 70% of the samples being called correctly. All laboratories that failed an individual panel were due to misclassifying a negative sample as positive. Three laboratories failed the pooled panel and all three were using direct PCR methods and misclassified a pool with a high shedding animal as negative.

MDA updates
Vivek Kapur, Penn State University

Dr. Kapur provided an update on the Mycobacterial Diseases of Animals (MDA) activities over the past year.

Synergistic Parameters in a Test-Cull Programme for Johne’s Disease in Cattle or Deer
Frank Griffin, Professor Immunology, University of Otago, Dunedin, New Zealand

Cost–effective programmes for the control or eradication of M. paratuberculosis (M.ptb) from herds of ruminants affected by Johne's disease have proved to be elusive. Our group has taken the view that multiple independent test parameters, used on a composite diagnostic platform, will ultimately be required to control disease and prevent infectious spread. This requires the use of immunodiagnostic tests in parallel with quantitative microbiological (qPCR) tests to target animals selectively for slaughter. Accepting that serological testing will produce false(-) results and not all diseased animals will be persistent shedders, other independent parameters can also be taken into account. In dairy herds, a secondary evaluation is included involving, the animal's condition-score and milk-yield. These are factored into the equation to identify false(-) animals which remain undetected in the primary diagnostic screening. Using these parameters in combination risk from disease can then be stratified and selective culling implemented to provide a control programme that is feasible and sustainable for farmers.
Protocol for Dairy Cows:
1. Whole herd test with ParalisaTM to identify all ELISA(+) animals (Score I, II, III)
2. Screen all animals for condition score and identify animals with Low condition as ‘At risk’ (Score I, II, III)
3. Retest ParalisaTM (+) and Low condition score animals using faecal qPCR* to identify Low, Moderate or High shedders (Score I, II, III)
4. Monitor individual cow milk production and identify animals with a significant drop in milk yield as ‘At risk’. Retest using faecal PCR (Score I, II, III)

Using modern robotics it has become feasible to test 100s of fecal samples from cattle, deer or sheep relatively inexpensively.

Using these parameters in combination it is possible to obtain a summative “risk score” to identify animals for immediate or future culling. The current composite criteria allow one to select for immediate culling animals who receive a threshold “risk score” (IIIIII and they are out!).

**Vaccination as a Tool for Accelerated Eradication of Mycobacterial Disease in Ruminants in a Context of Other Control Programs**
Gregers Jungersen, Professor Adaptive Immunology and Vaccinology, The National Veterinary Institute, Technical University, Denmark, Copenhagen

**Improving Rapid Detection and Culture in Mycobacterial Disease of Animals**
Tim Bull, Senior Research Fellow, St. Georges Hospital and Medical School, London, England

**Zoetis’ New ELISA test for Detection of Antibodies to *Mycobacterium Avium* ss Paratuberculosis**
Matthew Krecic, Senior Technical Services Manager, Zoetis

Zoetis, formerly Pfizer Animal Health, has launched a new ELISA test kit, SERELISA® ParaTB Ab Mono Indirect, licensed for the detection of antibodies to *Mycobacterium avium* ss paratuberculosis within the sera and plasma of cattle. Pivotal studies involving well-characterized Johne’s disease status herds submitted to the USDA for licensure are described. These studies yielded sensitivity of 90.0% (95% CI: 77.95-96.53%) and specificity of 99.6% (95% CI: 98.31-99.77%). SERELISA® ParaTB Ab Mono Indirect is for use by personnel at APHIS-approved Johne’s disease serologic laboratories.

**National Johne’s Working Group**
Discussed Best Management Practices in the current JD control program. Focus group survey results presented. The group discussed the potential for future survey to larger sampling of practitioners and producers as well as further evaluation of effectiveness of programs control measures.
Committee Business

One resolution entitled, “Assess Johne's Disease Fecal Check Test Performance” was approved by the Committee and forwarded to the Committee on Nominations and Resolutions.
Sara Ahola, CO; J Lee Alley, AL; Joan Arnoldi, WI; James Averill, MI; 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; Nancy Brown, KS; Jess Burner, TX; Jon Caspers, IA; Alan Clark, WI; Robert Cobb, GA; Matt Cochran, TX; Michael Coe, UT; Jim Collins, GA; Karen Conyngham, TX; Fred Cunningham, MS; Koren Custer, WV; Brandon Doss, AR; Anita Edmondson, CA; Adam Eichelberger, SC; James England, ID; J Amelita Facchiano, TX; Kathy Finnerty, MA; Betsy Flores, VA; Tony Forshey, OH; Robert Fourdraine, WI; W. Kent Fowler, CA; Tony Frazier, AL; Mallory Gaines, DC; Chelsea Good, MO; Alicia Gorczyca-Southerland, OK; Michael Greenlee, NV; Rod Hall, OK; Steven Halstead, MI; Neil Hammerschmidt, MD; William Hartmann, MN; Nephi Harvey, UT; Greg Hawkins, TX; Bill Hawks, DC; Jay Hawley, IN; Carl Heckendorf, CO; Julie Helm, SC; Kristi Henderson, IL; Bob Hillman, ID; Donald Hoenig, ME; Joseph Huff, CO; Dennis Hughes, NE; John Huntley, WA; Russell Iselt, TX; Regina Jensen, DE; Jamie Jonker, VA; Susan Keller, ND; Bradley Keough, KY; Bruce King, UT; Diane Kitchen, FL; Gerald Kitto, ND; T.R Lansford, TX; Maxwell Lea, Jr., LA; James Leafstedt, SD; Brad LeaMaster, OR; Mary Lis, CT; Jim Logan, WY; Laurent O'Gene Lollis, FL; Francine Lord, CAN; Mary Luedeker, TX; Gordon 'Cobie' Magness, SD; Kevin Maher, IA; Bret Marsh, IN; Stu Marsh, AZ; David Marshall, NC; Michael Martin, SC; Rose Massengill, MO; Jay Mattison, WI; Paul McGraw, WI; Thomas McKenna, MA; Shelley Mehlenbacher, VT; Ronald Miller, PA; Mendel Miller, SD; Ernie Morales, TX; Richard Odom, VA; Kenneth Olson, IL; Greg Onstott, MO; Elizabeth Parker, TX; Boyd Parr, SC; Alejandro Perera, MEX; Jewell Plumley, WV; Valerie Ragan, VA; John Ragan, MD; Jeanne Rankin, MT; Tom Ray, NC; Justin Roach, OK; Nancy Robinson, MO; Keith Roehr, CO; Larry Samples, PA; Bill Sauble, NM; A. David Scarfe, IL; Shawn Schafer, OH; Stacey Schwabenlander, MN; Andy Schwartz, TX; Charly Seale, TX; Laurie Seale, WI; Craig Shultz, PA; Richard Sibbel, IA; Kathryn Simmons, DC; David Smith, NY; Diane Stacy, LA; Robert Stout, KY; Nick Striegel, CO; Scott Stuart, CO; Paul Sundberg, IA; Tahnee Szymanski, MT; Manoel Tamassia, NJ; Beth Thompson, MN; Tracy Tomascik, TX; 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; Thach Winslow, WY; David Winters, TX; Cindy Wolf, MN; Marty Zaluski, MT; Glen Zebarth, MN; Ernest Zirkle, NJ.

The Committee met on October 21, 2014 at the Sheraton Hotel in Kansas City, Missouri, from 8:00 to 11:35 a.m. There were 70 members and 41 guests present, of which 28 requested to join the Committee. The USAHA
Committee guidelines were reviewed as well as a recap of the 2013 approved Resolution #26.


John Weimers, USDA-APHIS-VS

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. The Animal and Plant Health Inspection Service (APHIS), Veterinary Services unit (VS) 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.

In March, 2014, a year after publication of the Animal Disease Traceability (ADT) rule, APHIS Administrator Kevin Shea, in a message to APHIS Stakeholders, stated, “... we will now pursue appropriate penalties in situations where an individual repeatedly fails to comply with the regulatory requirements.”

APHIS-VS, continues to implement the monitoring and compliance efforts outlined in the ADT Monitoring and Compliance document introduced at the 2013 USAHA Livestock Identification Committee meeting. The guidelines address the need to continue to inform stakeholder of the regulatory requirements, initiate formal actions when appropriate through letters of information, document violations as they occur, and prepare and report cases to initiate IES investigation. APHIS encourages animal health officials to focus on the priorities: Official identification (ID), Interstate Certificate of Veterinary Inspections (ICVIs), and collection of ID at slaughter. **Traceability Performance Measures:**

The question is often asked, “Why does APHIS have performance measures for ADT. The ADT program is “outcome based”, not activity based. It is important to show that the funding for the program results in improvement. Without performance measurements, no improvement can be documented. The key to traceability is the timely retrieval of complete and accurate information.

APHIS is asking States to measure the time to answer specific questions:

1.) What State was a tag distributed to?
2.) Which producer was a tag distributed to?
3.) What State was the animal shipped from?
4.) What premises was the animal shipped from?
(1) and (2) are answered by searching records of tags distributed and applied.

(3) and (4) are answered by searching interstate movement documents. States are to complete trace exercises as part of the ADT cooperative agreements in order to help establish national baseline values for each activity to be calculated mid-2014. Repeated activity will reflect progress over time as States are able to retrieve records more timely and consistently in the future. APHIS also conducted supplemental test exercise for activities (2), (3), and (4) to help validate the data provided through cooperative agreement reports. A Traceability Performance Measures Working Group was created to provide guidance in the administration of future trace exercises to measure current capabilities.

Approved Livestock Facilities

The proposed rule to revise 9 CFR 71.20 which was discussed in the 2013 USAHA Livestock Identification Committee is now in clearance.

Brucellosis Calfhood Vaccination Identification

9 CFR 78.1 defines official vaccination eartag as:

"An APHIS approved identification eartag conforming to the alpha-numeric National Uniform Eartagging System which provides unique identification for each animal. The eartag shall have a “V” followed by two letters and four numbers. States which require more official vaccination eartags than the number of combinations available in the “V” series of tags shall use a “T” or “S” followed by two letters and four numbers. Duplicate reissue of official vaccination eartags shall not be made more often than once each 15 years.”

In addition, an official calfhood vaccinate is defined as follows:

“(a) Female cattle or female bison vaccinated while from four through 12 months of age by an APHIS representative, State representative, or accredited veterinarian with a reduced dose approved brucella vaccine containing at least 2.7 billion and not more than ten billion live cells per 2 mL dose of Brucella abortus Strain 19 vaccine or at the dosage indicated on the label instructions for other approved brucella vaccines; and (b) Permanently identified by a tattoo and by an official vaccination eartag in the right ear. However, if already identified with an official eartag prior to vaccination, an additional tag is not required. The tattoo must include the U.S. Registered Shield and “V”, preceded by the quarter of the year and followed by the last digit of the year of vaccination. Individual animal registered breed association registration brands or individual animal registered breed association registration tattoos may be substituted for official eartags.”

Although 840 Animal Identification Number (AIN) tags are not considered official calfhood vaccination tags, they may be used to meet the official identification for calfhood vaccinates. There is no color specified for these tags, although approved 840 manufacturers have been requested to reserve the color orange for button-button Radio-Frequency Identification (RFID) eartags for use by States that choose to wish to the use of orange 840 tags in lieu of official vaccination eartags. The tags can be obtained directly from the State or as otherwise directed by the State. Information imprinted on the
LIVESTOCK IDENTIFICATION

eartag, other than the required information established through the CFR is at
the discretion of the State. The USDA does not maintain or order orange
RFID tags.

**Data Transfer Standards Committee Update**
John Picanso, USDA-APHIS-VS

AAVLD/USAHA Subcommittee on Information Standards Charter and
Bylaws:

The subcommittee will endeavor to develop, or adopt existing, standards
for information interchange by systems and services related to regulatory
veterinary medicine as requested by its parent committee, the executive
committees of either AAVLD or USAHA, or the National Assembly of State
Animal Health Officials. Standards developed and/or adopted by the
subcommittee will address the external exchange of information between
systems, not with the internal representation of that information nor the user
interface(s) exposed by any compliant system(s).

**Working Use of ID Outside of ADT Requirements**
Robert Fourdraine, AgSource Cooperative Services

Since the introduction of the Animal Identification Number (AIN)
Numbering system and Animal Disease Traceability (ADT) rule, adoption of
the National Uniform Ear tagging System (NUES) and 840 numbering
systems in the dairy industry have steadily increased. The need for a unique
national identification number in the dairy industry has historically been
driven by animals submitted into the U.S. dairy genetic evaluation program
managed by the USDA Animal Improvement Programs Laboratory (AIPL). At
the start, the dairy industry used the NUES numbering system and/or unique
breed registry assigned numbers to identify animals. With introduction of
tamper evident tags in the 1990’s the dairy industry adopted the American
Identification numbering system. The American ID numbering system was a
first step towards being able to use one single number across multiple
industry uses such as milk recording, breed registration and participation in
the U.S. dairy genetics evaluation program. The American ID numbering
system was administered by the dairy industry and was adopted by USDA-
APHIS-VS as part of ADT on an interim basis.

Although American ID was well established, with the introduction of the
840 numbering system in 2008, the dairy industry started the switch from
using American identification numbers on tamperproof tags to tags approved
by USDA using the 840 AIN numbering system. Benefits were that the 840
numbering system could be used within the dairy industry and also used for
animal health purposes. Quickly finding their way into the U.S. Dairy genetic
evaluation, 840 AIN numbers generated milk recording and herd book
programs. While used on visible ID tags, the 840 numbering system also
found its use on Radio Frequency ID (RFI) tags.
As use of RFID tags and other visible ID tags with the 840 number continues to grow, examples of systems that are using 840 numbers on either visible or RFID tags are:

- parlor systems,
- herd management software,
- handheld data collection software,
- electronic milk recording systems,
- calf feeding systems,
- identification of cows sampled for genomic evaluations.

The use of the NUES tag still provides a cheap alternative for producers needing to obtain an official identifier and wish to participate in the dairy industry milk recording programs, however there is a structural problem in the dairy industry continuing the use of the NUES numbering system as the sole official identifier on an animal. The problem lies in the fact that the NUES numbering system is not unique because states can reuse numbers previously assigned. For a dairy cow to qualify for participation in the U.S. Dairy genetic evaluation program, the official ID number cannot be re-used. Animals assigned a re-used NUES number are rejected from the U.S. Dairy genetic evaluation program and must be re-identified with another ID tag that carries either an American ID, NUES, or 840 number.

The second problem identified is related to the use of the 840 numbers that are recorded incorrectly. Recording errors have led to duplicate numbers or use of numbers that have not been assigned yet. As the use of 840 numbers will continue to grow, a system to validate the allocation of 840 numbers would add a layer of error checking that would limit the chance for duplication or incorrect recording.

With the implementation of the next phase of ADT, i.e. phase out the use of the American ID numbering system as an official identifier, the move towards the 840 numbering system will continue to grow. As dairy technology providers will build more recording systems around the use of the 840 numbering system, maintaining the integrity of the numbering system will have to be addressed by industry to avoid future problems.

**Beef – How to Get the Industry to Move More Toward Electronic Identification (EID) Mentality.**

Mark Shaw, Micro Beef Technologies

For over thirty years, Micro Technologies has focused on animal identification evolving from the electronic barcode, to Radio Frequency Identification (RFID), to Process Verification, to an Activity Based Monitoring System -based on infrared. The drivers to advance beef initiatives have been acceptance, value, and program based initiatives.

Examples of the base requirements for collaboration and innovation are data bases built on simple architecture, technology to support the speed of commerce, reporting to support the needs of commerce, and the building of a basic starter program to attract progressive producers.
Pork Industry’s ID and PIN - Challenges with PEDv and Related Herd Management Issues
Patrick Webb, National Pork Board

The adoption of official identifiers in the pork industry has primarily come by regulation, education and various industry requirements. The benefits or value derived from adoption of official identification as a part of a valid pre-harvest traceability system can go unrecognized by producers. This can be attributed to a lack of understanding of the role that pre-harvest traceability and identification plays in day to day regulatory activities, commerce and trade. Adoption of official identification can contribute to profitability, efficiencies, marketability and differentiation. It isn’t necessarily related to a specific area, but is a combination of the ability to trade, enter interstate commerce or access markets.

The identification of swine in interstate commerce has been codified since the late 1980s, which has driven the use of official identification tags, devices or methods in the pork industry. Through the evolution of the U.S. Animal Identification Plan, National Animal Identification System and the Animal Disease Traceability Rule, the availability of the nationally standardized premises identification numbering system and Official Premises Identification Number Tag for breeding stock in harvest channels has provided opportunities to enhance pre-harvest traceability in the pork industry.

The official premises identification number (PIN) is the cornerstone of the swine ID program standards. This officially recognized site identifier provides benefits as a common denominator used for group/lot identification, official identification of animals in harvest channels, disease surveillance, emergency preparedness and response, business continuity and product attribution. The industry has had recent opportunities to demonstrate the value of PIN-related data-sharing for business continuity purposes, as well as the response to Porcine Epidemic Diarrhea Virus (PEDv) in the U.S. pork industry.

The industry adoption of USDA’s official PIN tags will enhance the traceability of breeding stock in harvest channels while benefitting disease surveillance for program and foreign animal diseases. The validated PIN imprinted on the tag provides the opportunity to develop the capacity to target sampling of sows and boars in harvest channels based on proximity to risk factors. The tag also provides benefit to the Pork Quality Assurance® Plus Program functioning as an accurate animal identification tool used within a production system to help facilitate herd health plans and for residue-avoidance protocols.
Sheep Perspective on “The Use of EID and Other Forms of Official ID to Increase the Profitability of Animal Operation Efficiencies, Marketability, Differentiation, with Regulatory Benefits

Cindy Wolf, University of Minnesota

Overview of the sheep and goat mandatory scrapie eradication program:
- For sheep and goats in commerce
- Required tagging influences compliance
- Highly effective in national scrapie eradication efforts
- Tags are used for management purposes
- But does the program add value to the species?

A well-established marketing group uses Electronic Identification (EID) to:
- Automatically sort lambs twice a month for processing at target weights
- Automatically sort lambs on feed that have stalled out and should be processed due to diminished uneconomical weight gains
- All ewe performance records
- All lamb performance records
- Use data to conduct inter-farm comparisons to modify on-farm management

Example of on-farm application savings:
- Takes nine seconds per lamb to weigh, sort and record
- Saves two hours on data entry for every 400 lambs
- Virtually no errors
- ‘Computer’ sorts lambs into management groups (based on weight, sex, breed cross) at weaning
- Use integrated technology to sort ewes into six breeding groups
- Two people and system sort 700 ewes into six breeding groups in < 3 hours, and the record of which animal is where is generated
- Save at least 40 hours per year in data entry and manual lambing recording
- All sorting and weighing done by 1-2 people vs. 2-3
- Tightened up lamb market weights, reduced number of outlier lambs, can now ID slow growing lambs for early slaughter
- < 2 year payback on handheld recorder and software due to labor savings and data integrity
- Payback on drafting crate estimated to be 4-5 years depending on how much data you wish to gather and number of sheep being managed

Results from Marketing Group:
- Eleven producers in marketing group now using integrated system, started with one producer in 2008
- Has improved flock profitability by using data to track ewe performance, marketing lambs at ideal weights, identifying lambs’ level of performance, reduced labor, improved data integrity
First few years of use integrated system resulted in higher than usual level of culling which has now evened out
Satisfies mandatory Scrapie program tagging requirements

Equine Use of ID
Kent Fowler, California Department of Food and Agriculture

Under the new traceability rule, equids moving interstate must be officially identified prior to interstate movement, with a few exemptions. Official identification for equids include one or more of the following: a) description; including, but not limited to, name, age, breed, color, gender, distinctive markings, and unique and permanent forms of identification when present (i.e., brands, scars, cowlicks, tattoos, blemishes or biometric measurements); b) electronic identification; microchips that comply with International Standards Organisation (ISO) 11784/11785 or non-ISO electronic identification implanted into the equine prior to February 26, 2014; c) digital photographs; sufficient to accurately identify the individual equine.

The gold standard for equine “official” Identification (ID) is the ISO compliant microchip. With current manufactured microchips, there is a very high degree of readability and if placed properly in the middle third of the neck in the nuchal ligament on the left side of the horse, it is unlikely to migrate. This information is, of course, only as good as the database that it is placed into. Current sources holding the data include the Jockey Club, breed registries, private microchip companies and private animal identification companies. There is currently also crossover into pet microchip database systems. The microchip “official” ID has great value in recovering stolen horses, accurate and positive identification in sample collection and accurate linking of management and productions records on horse farms. The Federation Equestrian International (FEI) links the implanted microchip with the international competition passport.

With increased global livestock movement, the disease risk is greater to the United States (U.S.) horse population. Horse diseases considered high risk include, but are not exclusive to, equine piroplasmosis, contagious equine metritis, dourine, glanders, equine infectious anemia, African horse sickness, equine viral arteritis and Venezuelan equine encephalomyelitis.

There is an immediate need to establish a standard method of permanent identification and traceability for all horses imported into the U.S. A lack of a reliable and traceable permanent identification system for horses imported into the U.S. makes it difficult to conduct trace-back of animals that are potentially positive or exposed to an infectious disease. A 2014 Investigative Enforcement Services (IES) investigation in California led to the detection of an Equine Piroplasmosis positive Spanish Purebred horse with a microchip originating in Spain. The lack of microchip recording and electronic capture on import records at the time of import, delayed the investigation of potential exposed horses as the microchip had to be traced through manufacturers to verify Spanish origin of the horse. Recent equine disease events involving horses imported to the U.S. demonstrate the risk of
importation of various diseases. Traceability of these animals is a critical element in the protection of the U.S. horse population.

**Export Market Use of ID to Easily Obtain Access to Animal History**

C. Gordon Thornhill, TK Exporters, Inc.

T.K. Exports, Inc. (TKE) is a full service company dedicated to the export of live animals to international destinations. For the past 32 years, TKE has shipped U.S. and Uruguayan animals to some 45 countries world-wide. These animals have been used mainly to improve meat and milk production by clients in their respective countries. For many years, these livestock shipments from the USA were very sporadic. For the last 8-10 years, these exports have grown in volume tremendously. This increase in numbers of animals exported is mainly due to the decrease in agricultural subsidies provided by the European Union.

For many years the European Union (E.U.) offered incentives for farmers to export their excess animals. These excess animals could be purchased cheaper than the cost to raise them in the importing country. So livestock industries never really developed in the many countries of the Middle East and North Africa. Today, as economies grow and the demand for better food increases, coupled with increased costs for imported foodstuffs, many countries have started developing their own sources of meat and milk. This move for food independence has led to the greater development of livestock and has increased the demand for quality breeding stock.

Today, the United States has become a major player to supply countries with animals that either begin or improve meat and dairy production. Important markets for U.S. animals have always been our neighboring countries of Mexico and Canada, but today, markets such as Turkey, Russia, Kazakhstan, Jordan, Iraq and Egypt (to name a few) have become importers of Dairy and Beef animals for reproduction purposes. Even the demand for smaller ruminants and pigs has increased in demand in markets such as China, the Philippines, and other countries. Of course, we enjoy our traditional markets of Mexico and Canada, but there are many new, non-traditional markets for U.S. live animals which have increased the number of animals exported by two fold in the last five years.

The increased numbers of animals being exported has placed pressure on our exporting systems here. One of the biggest obstacles is the lack of a national identification program for U.S. animals. This causes serious problems for our health authorities and for those of us who have to put large numbers of animals together since the exporter is required to provide the supporting health and production information demanded by importing countries. So both exporters and the USDA-APHIS have had to re-think many of the rules and procedures used to gather and verify information about the animals we export.

The use of Electronic Identification (EID) is something TKE began around 2008. As our business increased from 3-4000 animals exported per year to over 20,000 animals, we quickly implemented the EID system for our
animals. For many years, we bought animals per our clients’ demands in the “SPOT” market. However, as our business grew, we found it more and more difficult to supply animals on a monthly basis without having an inventory of animals available at all times. Having one unique number to track our inventory became paramount. As the export market demand increased the benefits and reasons for using unique identifying of animals has increased as well. One very important reason is that many countries require multiple blood tests for animals before they are exported. Some of these have to be done 30 days or more ahead of the actual official isolation and quarantine of the animals. We have found that using the old system of permanent ID’s (metal tags) to be very difficult to manage and cumbersome to keep up with. With the implementation of using EID’s and metal tags in every animal that we buy, which are inserted at the time we first test the animal, enables us to track multiple data on each animal easefully. So, the EID becomes the uniqueness we need and the metal tags become the backup identification for animals that lose their tags. We use one of several data bases to record information. Hopefully, this will be reduced to one in the near future so that animals can be tracked more easily than what they are now.

Exporters do many jobs in the U.S. that counterparts in other countries do not have to do. In the E.U. for instance, the breed associations can provide information on the parentage of the animal being exported and the exporter or the farmer only needs to provide the number of the animal being exported. In the U.S., less than 10% of the animals in our population have their data recorded in a national data base. While many dairies record information, they do not share this with any association or national data base. So the U.S. exporter has to find, obtain and compile this information for his clients.

Another important reason for EID’s, is that U.S. animals move around. Very few reside a life time in one place. Most folks do not understand how large dairies operate. Calves born today, move tomorrow to a calf ranch. Perhaps in another 8-10 weeks, they may move to another place which is the grower unit. In some cases, the female may move again to another unit (Heifer Grower) where she is inseminated and remains until about seven months of pregnancy before moving back to the dairy. So, having a unique number that can be tracked is essential to this operation. Keeping up with the animal, its growth and breeding information is useful information to any operation.

Lastly, there is the sheer numbers of animals that are in most of the modern dairies. Statistics tell us that the U.S.A. dairies are decreasing but the number of animals on each of the remaining dairies is increasing. So the use of computers, scanners, and PDA’s are essential. EID allows for the entering of all the IDs of animals into an electronic system quickly and efficiently with a high amount of accuracy.

For TKE, EID has also been a huge money saver; not only for our company personnel but for the fees we pay the USDA, too. Exporters pay User Fees to the USDA-APHIS for services. These fees can be rather high if
the federal vets have to spend much time to check papers and ID animals. Paperwork fees are based on time with a cap or maximum for each certificate issued. However, the animal identifying process is based on time. So the longer it takes, the more the fee. TKE has reduced these fees in half by using EID. From the first time we used EID’s for a ship, I believe we have decreased the user fees by $10,000, which is about $5 per animal, typically.

TKE believes that a national ID system would help the export process immensely. We hope that in the future, we will be able to use some ultra-high frequency tags to record the testing, the sorting, loading and unloading processes performed for export. This would eliminate the human error factor which is present in the process. Since most of our shipments go to multiple clients, the loading and unloading of the ship is always a flashpoint for mistakes in shipping wrong animals and sorting animals incorrectly to the different buyers. Therefore, we look forward to developing new and more efficient ways of doing the export process that will increase the accuracy and quality of the animal. We believe EID’s are the key to improving the process.

**Case Example of a Disease Outbreak Outside the U.S. Where the Utility of Animal ID Made a Real Difference, or ID Absence Created Challenges**

**John Belfrage, USDA-APHIS-CEAH**

The December 2003 discovery of a bovine spongiform encephalopathy (BSE) dairy cow in Washington State was a prime example of where identification (ID) was extremely helpful and where there were significant gaps in being able to use ID in tracing. The fact that the Holstein cow had come from Canada, where we had all the cattle from the origin farm identified, had available shipping documents, and additional identification, was an excellent start to performing the necessary tracing to find all the cattle of interest.

The BSE-affected cow was slaughtered and diagnosed right at Christmas. Using a combination of ID, a brand, and deoxyribonucleic acid (DNA) validation, the cow was traced to the Index dairy near Mabton, Washington. Based on the Canadian ID and shipping documents, the originating premises in Canada was also located within a day or two. It was quickly determined that the Canadian premises had undergone a dispersal sale of 113 head of Holsteins in 2001. We found that 82 head were destined for the United States, of which 81 actually entered the country. Another 17 head of heifers from the same Canadian premises were also potentially sent to the United States.

Canadian ID and other ID such as Dairy Records Management Systems (DHIA) ID were used to trace and locate as many of these 98 head of cattle in the United States. In the end, we were able to positively locate 46 head, but could not definitively locate 52 head of these cattle.

There were a number of reasons for the failure of ID in this instance. Almost all the dairies had computerized data on every cow in their herd; however, we only found one dairy that actually put the Official Canadian ID into their database. For that matter, the only ID in almost all these databases
was only the herd management tags. Also, official ID was not recorded at sales yards. Additionally, there was potential for lost Official ID and, in one case, a dairyman said he cut out all other ID and was not aware it was illegal to do so with Official ID. While we are just beginning to develop ID retirement at slaughter, at that time there was no retirement taking place and we could not account for any of cows culled for slaughter. Finally, the bull calf born to the affected cow just before she was diagnosed was sent to a calf ranch and had no ID at all.

Largely because Official IDs were not put into databases, sales documents, or retired at slaughter, we had to physically examine all ID on 75,000 cattle on 51 premises, slaughter 255 cows that either were or could have been Canadian origin cattle, and slaughter 449 unidentified calves. In the end, we positively identified 14 of the 25 high-risk Canadian cows, two of the heifer calves from the affected cow, seven of the 17 heifers from the Canadian origin premises, and 29 of the 81 cows imported into the United States. While we did not definitively find 52 of the 81 cows, based on local cull rates and the extra cows slaughtered, we felt confident that these cows not found were no longer alive. Also none of the slaughtered cattle other than the affected cow had any BSE positive tests.

In all likelihood, recording of Official or even DHIA ID would have given us more information where these 52 cows ended up. Also, we likely would have been able to verify that most, if not all, of those cows were culled for slaughter or located the remainder elsewhere.


Tom Frey, Creston Livestock Auction Market

Tom Frey, owner of Creston Livestock Auction, Inc. in Creston, Iowa and Livestock Marketing Association Executive Committee member spoke about Animal Disease Traceability from a livestock market perspective.

LMA’s more than 800 members represent 77 percent of the regularly selling livestock markets across the United States. These markets serve as the junction between buyers and sellers by selling livestock on commission. Livestock markets consider themselves a partner in ADT, as they are often the location animals are identified before or, in some case, after moving interstate.

Markets continue to appreciate some of the flexibilities worked into the ADT rule, such as the ability to move cattle directly to slaughter with a backtag rather than an official identification device. Additionally, markets greatly appreciate and utilize the ability for cattle to move across state lines directly to an approved livestock facility (i.e. livestock market with USDA approval) prior to being identified and without a health certificate if moved on an owner shipper statement. The term owner shipper statement is defined in the regulation and, in many cases, an existing document, such as a tag in slip, meets the requirements. This provides livestock markets the flexibility to
receive cattle from out-of-state customers and then help them meet the identification requirements of the ADT rule once the cattle arrive.

However, flexibility has also brought some confusion to the ADT rule, especially when considering some ADT decisions vary by state and other state-specific identification, documentation, and disease-specific requirements still apply.

Some of the concerns causing confusion in the country include low awareness of requirements amongst producers and varying levels of education provided by the states.

Tom discussed frustrations many markets have been having with the dairy steer component of the rule. In many areas, these animals are unlikely to come into the market with official identification. Many have difficulty justifying treating dairy steers differently than other beef animals. Even though ADT does not require dairy steer tags to be individually listed on health certificates, many state import requirements do require this. Handling these smaller animals a second time to read tags is frustrating to many as it risks animal injury and additional shrink, while also increasing the need for employee time and, in some cases, leading to long hours processing animals following the sale.

Tom also touched on the role of technology in ADT. One key component is the need for technology to work at the speed of commerce. Technology can also be cost prohibitive. Some states have used cooperative agreement or state money to kick start technology use.

Consistency in enforcement is key. Tom questioned how ADT requirements will be consistently enforced to ensure identification of all covered animals regardless of method of sale. He expressed concerns that enforcing only at markets could push producers out of this method of selling and harm the common goal of compliance.

Tom concluded by encouraged continued education and clarity of what enforcement will look like. Tom expressed enthusiasm about exploring opportunities with technology where appropriate. LMA also is supportive of USDA’s current approach of focusing on smooth implementation of the federal rule, focusing on cattle 18 months of age or older, rather than expanding to feeder cattle.

Report from the Resolution #26 Working Group (Web-based solution for interstate movement of livestock)
Chelsea Good. Livestock Marketing Association

Chelsea Good updated the committee on progress made towards USAHA Resolution #26, passed in October 2013, calling for a Web-based solution that would allow all interested parties to access movement requirements for livestock moved interstate. Chelsea was speaking as a member of the joint USAHA-NIAA leadership team working on this project. Her update included a funding announcement and timeline moving forward.

As background, there is a great deal of confusion about what is required to legally move livestock from one state to another. This is a result of an ADT
rule that includes state decisions (e.g. brands as official identification) and
differing state livestock importation, movement documentation, and disease-
specific requirements (e.g. Tich. testing). Currently veterinarians or
producers often call the state veterinarian office to ask what is required to
move livestock. However, there is limited weekend availability in many cases
and human error can create issues if requirements are not properly conveyed
or fully understood.

In response to USAHA Resolution #26, USDA’s National Animal Health
Information Technology Board (NAHITB) created a sub group that analyzed
options and provided a report recommending a dynamic, web-based solution.
This concept has been discussed favorably by partner groups (NASAHO,
USDA, Industry, and NIAA). A leadership team has been developed including
industry, USDA, and state animal health officials. USAHA and NIAA have
been designated as the appropriate co-host organizations to keep the project
on track.

The desired system will be maintained as a Web-accessible, centralized
database that ideally also has mobile accessibility and can be printed for
those desiring a hard copy resource. When using the online resource, the
user defines the shipment of livestock through a series of prompts or
questions about things such as species, age, gender, etc. The system then
retrieves the movement requirements specific for those animals. These
requirements would be displayed in plain language and require almost no
user interpretation.

Benefits of this system include increased compliance with federal and
state requirements and reduced state veterinary staff time answering import
questions. From a user standpoint, the system is always accessible in one
place, 24 hours a day and 7 days a week. The plain language, written results
will also reduce human error.

Chelsea announced that USDA funding has approved for initial creation
and startup of the system. This will be paired with industry sponsors to be
solicited for a 5-year commitment for sustaining the system.

The plan is for tool creation and maintenance to be contracted to the
best suited entity. A request for Proposals (RFP) is currently being
developed. Businesses will then submit proposals and the winner of contract
would aim to create solution for launch in October 2015. The contract would
include an annual maintenance fee to keep system current and functional.

It is through this USDA, state, and industry partnership that the goals set
out in USAHA Resolution 26 can be achieved with the creation of a Web-
based solution that would allow all interested parties to access movement
requirements for livestock moved interstate.
Committee Business

Called to order by new Committee Chair Bill Brown. There was no old business.

New business resulted in a motion and unanimous approval of the following resolution that was also passed by the Committee on Infectious Diseases of Horses.

No further action occurred during the business meeting. The meeting adjourned at 11:35 a.m.
REPORT OF THE USAHA/AAVLD COMMITTEE ON NATIONAL ANIMAL HEALTH LABORATORY NETWORK

Chair: Barbara Powers, CO
Vice Chair: Harry Snelson, NC

Helen Acland, PA; John Adaska, CA; Bruce Akey, TX; Gary Anderson, KS; A. Catherine Barr, TX; Bill Barton, ID; Tim Baszlzer, WA; Tammy Beckham, TX; Steven Bolin, MI; Richard Breitmeyer, CA; James Britt, AR; Sandra Bushmich, CT; Beverley Byrum, OH; Craig Carter, KY; Estela Cornaglia, QC; Marie Culhane, MN; Sherrill Davison, PA; Barbara Determin, IA; François Elvinger, VA; Mallory Gaines, DC; Joseph Garvin, VA; Patrick Halbur, IA; Steven Halstead, MI; Timothy Hanosh, NM; Bob Hillman, ID; Lindsey Holmstrom, TX; Stephen Hooser, IN; Holly Hughes-Garza, TX; Pamela Hulinger, 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, MA; Dustin Oedekoven, SD; Kristy Pabilonia, CO; Lanny Pace, MS; Elizabeth Parker, TX; Roger Parker, TX; Amar Patil, NJ; Jewell Plumley, WV; Robert Poppenga, CA; Barbara Powers, CO; M. Gatz Riddell, Jr., AL; Keith Roehr, CO; Jeremiah Saliki, GA; Kathryn Simmons, DC; Marilyn Simunich, ID; Harry Snelson, NC; Bruce Stewart-Brown, MD; Rodney Taylor, NM; David Zeman, SD.

The Committee met on October 19, 2014 at the Sheraton Hotel in Kansas City, Missouri, from 1:00 to 2:30 p.m. There were 25 members and 19 guests present.

National Animal Health Laboratory Network (NAHLN) Funding
Brad Mollet, Capital Consul

The Federal Budget requested $30 million in the Farm Bill. The NAHLN received authorization for $15 million. NAHLN was also funded at approximately $3 million through USDA-National Institute of Food and Agriculture (NIFA) and about $7 million through USDA-Animal and Plant Health Inspection Service (APHIS) (FY2014). For FY 2015, sent a letter requesting a line item for NAHLN (120 organizations signed onto the letter). Supporters will continue to push for $30 million mandatory funding.

NAHLN Overview
Sarah Tomlinson, USDA-APHIS-VS

NAHLN Strategic Plan

The NAHLN Strategic plan was updated this year. It includes five strategic priorities, as follows:

- Implement new NAHLN structure
- Emerging Disease identification
- Standardize data capture and electronic messaging
- Integrate with and support animal health community initiatives
- Ensure a coordinated effort to meet resource needs for NAHLN
In addition, VS has Conducted a SWOT analysis (Strengths, Weaknesses, Opportunities, Threats).

NAHLN structure update

Four steps have been identified to the transition plan:

- Self-assessment – lab assessment of which level they believe best fit the established criteria. It is unknown as to how much money will be available to support each level. Assessment has been completed
  - Level 1: 23 labs
- External Review – APHIS and NIFA will review the self-assessments. Completion date: November 2014
- Needs evaluation – assessment of the number of labs needed at each level. Requested that CEAH share the needs assessment with the USAHA/AVLD Joint NAHLN committee among others for review prior to initializing. Completion date: January 2015
- Recommendations for Lab Distribution

IT updates

Swine Enteric Coronavirus Diseases (SECD) has helped NAHLN move ahead. Laboratories can now receive messages for SECD, classical swine fever (CSF), and avian influenza (AI). Still need pseudorabies and Scrapie capability, though.

NAHLN is using Emergency Management Response Services (EMRS) to manage field data. NAHLN can now electronically receive data from the labs and move it to EMRS.

AgConnect Update

Lindsey Holstrom, Texas A&M University

AgConnect collects, integrates, shares data based on permissions. Currently, there is an EPS project for syndromic analysis at the field level. There are plans for expansion to multiple states.

NAHLN Summary 2014 and 2015 Plans

Sarah Tomlinson

NAHLN provides support for surveillance testing. The NAHLN portal promotes sharing information between NAHLN labs and NAHLN program staff. A Methods Technical working group is in place to:

- provide methods comparison network;
- reviewed a number of test dossiers; and
- review pen-side studies – FMD test looks good. Specificity > 95% for all species and tissue types. There is a need to decide how it might be used.

NAHLN has conducted educational webinars and tabletop exercises. Plans for next year include:

- restructuring the network;
- codification of the NAHLN;
methods group needs to evaluate action steps for emerging diseases;
ASF/FMD pilot will begin this year;
Work on feral swine surveillance with Wildlife Services;
Antimicrobial Resistance White House plan;
National List of Reportable Animal Diseases;
Aquaculture currently in Phase I;
  o  Phase II – include non-NAHLN labs (private labs)
  o  Phase III – incorporate more aquaculture diagnostics
Role in EPS working with AgCONNECT™.

Committee Business

One resolution was discussed regarding Equine Infectious Anemia. Laboratories doing EIA testing are subject to AAVLD or A2LA credentials as evidence of meeting and exceeding the standards required by VS thus VS inspection is redundant. The VS memo requires VS to conduct annual inspections. This resolution was considered, rewritten, moved, seconded and approved.

The Committee considered the mission statement but proposed no changes.

A Recommendation was discussed and approved as follows:

Recommendation

Subject matter: Inspections of APHIS and National Poultry Improvement Plan (NPIP) Testing Laboratories with NAHLN, AAVLD and/or A2LA Credentials

Background:

National Animal Health Laboratory Network (NAHLN) member laboratories, the American Association of Veterinary Laboratory Diagnosticians (AAVLD) and American Association for Laboratory Accreditation (A2LA) accredited veterinary diagnostic laboratories are required to have robust quality assurance programs. Criteria for NAHLN membership include AAVLD, or equivalent accreditation inspections that far exceed the inspections required by the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) for laboratories approved to conduct APHIS and NPIP testing. Requiring NAHLN member laboratories, AAVLD, and A2LA accredited Laboratories to be subject to additional USDA-APHIS-VS inspections in order to conduct testing creates redundancy and wastes limited personnel and financial resources of both VS and the accredited laboratory.

Recommendation:

The AAVLD urges the USDA-APHIS-VS to consider concurrent NAHLN membership and/or AAVLD or A2LA credentials and passing of relevant proficiency tests as evidence of meeting and exceeding the standards required by USDA-APHIS-VS for laboratories approval.
REPORT OF THE COMMITTEE

to conduct APHIS and National Poultry Improvement Plan (NPIP) testing and thus eliminating the need for an additional separate laboratory inspection by USDA-APHIS-VS.
REPORT OF THE COMMITTEE ON NOMINATIONS AND RESOLUTIONS

Chair: David Meeker, VA

J Lee Alley, AL; Philip Bradshaw, IL; Richard Breitmeyer, CA; Jones Bryan, SC; Clarence Campbell, FL; Joe Finley, TX; Robert Gerlach, AK; Thomas Hagerty, MN; Steven Halstead, MI; Bob Hillman, ID; Donald Hoenig, ME; Maxwell Lea, Jr., LA; James Leafstedt, SD; Donald Lein, NY; Bret Marsh, IN; David Marshall, NC Michael Marshall, UT; Richard McCapes, CA; Lee Myers, GA; John Ragan, MD; Glenn Rea, OR; Michael Short, FL; Nick Striegel, CO; Scott Stuart, CO; Manoel Tamassia, NJ; H. Wesley Towers, DE; Max Van Buskirk, PA; Richard Willer, HI; Larry Williams, NE; Ernest Zirkle, NJ.

Nominations

OFFICERS

PRESIDENT…………………………………………………………Bruce L. King, Axtell, UT
PRESIDENT-ELECT……………………………………. David D. Schmitt, Des Moines, IA
FIRST VICE-PRESIDENT…………………..……..……..…… Boyd H. Parr, Columbia, SC
SECOND VICE-PRESIDENT…………………..……..……..…… Barbara C. Determan, Early, IA
THIRD VICE-PRESIDENT…………………..……..……..…… Kristin M. Haas, Montpelier, VT
TREASURER………………………………………………….. Annette M. Jones, Sacramento, CA

DISTRICT DELEGATES

NORTHEAST……………………………………. S. “Buzz” Klopp, DE; Belinda Thompson, NY
NORTH CENTRAL………………………………………………….. Louis Neuder, MI
SOUTH…………………………………………… L. “Gene” Lollis, FL; A. Gregario Rosales, AL
WEST…………………………………………………………. Bill Sauble, NM; H. M. Richards, III, HI

Resolutions

RESOLUTION NUMBER: 1 APPROVED
SOURCE: USAHA/AAVLD COMMITTEE ON ANIMAL EMERGENCY MANAGEMENT
SUBJECT MATTER: RADIOLOGICAL INCIDENT RESPONSE AND RESOURCES

BACKGROUND INFORMATION:

With more than 100 fixed nuclear facilities nationwide, states must be prepared to assist citizens in the event of a site emergency. Public health and other partners will look to animal/agricultural responders for resources needed for pets and service animals. State animal/agriculture emergency
planners have identified a severe lack of these resources and therefore a serious gap in our national animal response capability.

Since October, 2006, the Pet Evacuation and Transportation Standards (PETS) Act has required local and state emergency plans to include citizens with pets and service animals before, during, and after disasters of all types. Citizens evacuated during a radiation emergency event arriving at reception centers with their pets and service animals will require triage, radiation monitoring, external decontamination, and post-decontamination services and support. Trained personnel, standardized protocols and equipment (including personal protective equipment) must be in place to provide these services. Because only a very limited number of persons have received animal decontamination training at both state and federal levels, resources would be immediately overwhelmed in a disaster.

The Department of Health and Human Services and National Disaster Management System (HHS/NDMS) have proven experience at the development and maintenance of personnel resources such as the National Veterinary Response Team (NVRT) to assist states. We believe HHS/NDMS/NVRT provides the ideal solution to fill this critical response gap by development of the following resources: caches of equipment to include mobile animal decontamination portals, personnel teams with current training in animal decontamination techniques, and delivery of guidance and standardized training that can build local response capability to assist animal/agricultural and public health emergency responders and citizens at local, state and federal levels.

**RESOLUTION:**

The United States Animal Health Association urges the Department of Health and Human Services to develop and maintain personnel, equipment, and training resources, especially those needed for pet and service animal decontamination, to supplement state animal response in radiation emergencies and all-hazards events.

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**RESOLUTION NUMBER: 2 APPROVED**

**SOURCE: USAHA/AAVLD COMMITTEE ON ANIMAL EMERGENCY MANAGEMENT**

**SUBJECT MATTER: VETERINARY LICENSE RECIPROCITY IN EMERGENCIES**

**BACKGROUND INFORMATION:**

Large-scale animal emergency disasters can occur during events such as hurricanes, floods, fires, and disease outbreaks. These events have often exhausted in-state resources requiring states to reach out to other states and national organizations to assist in animal emergency response and recovery efforts. The veterinary community has organized itself sufficiently in recent
years to respond to such requests for assistance. A limiting factor in fulfilling requests for assistance is the lack of a standardized means of addressing reciprocal licensure during emergencies. Inconsistencies in states’ licensing board processes as well as refusal of some boards to recognize out-of-state licenses during emergencies has led to delays in providing assistance when critically needed.

Nationally, there are two professional and legal means for addressing this issue. First, the Emergency Management Assistance Compact (EMAC) is a congressionally ratified mutual aid compact that legally establishes a national system to facilitate the deployment of resources across state lines during an emergency or disaster. To date, all fifty states, the District of Columbia, Puerto Rico, Guam, and the United States Virgin Islands are EMAC members. EMAC is state law; therefore, in most cases, a licensing board does not supersede state law. The state emergency management agencies (EMAs) within the EMAC Member States are responsible for the implementation of EMAC. Second, request of licensed veterinary professionals via non-EMAC processes such as Memoranda of Agreement (MOA) between state emergency management and recognized entities or organizations allows for specific requirements for deployment to be outlined in advance which streamlines the license reciprocity processes.

These means are both effective and protective due to the national veterinary licensure examination and continuing education requirements in place to ensure continuity and standardization of the practice of veterinary medicine in the United States.

RESOLUTION:
The United States Animal Health Association urges the American Association of Veterinary State Boards to develop and distribute to Veterinary State Boards a position statement in support of reciprocal veterinary medical licensure as outlined under state emergency management laws, regulations, and guidelines.

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RESOLUTION NUMBER: 3  APPROVED
SOURCE: USAHA/AAVLD COMMITTEE ON ENVIRONMENT AND TOXICOLOGY
SUBJECT MATTER: REPORTABLE TOXICOSES

BACKGROUND INFORMATION:
Following the observation that animal disease diagnostic laboratory Toxicology sections provide analytical services that often cross state lines, this Committee found that a vast majority of states (42 of 50) have no requirement for reporting toxicoses or toxicants that could be of a food safety or animal population concern. Laboratories certified by accrediting bodies generally have “Client Confidentiality” policies that prevent the release of
testing data to third parties unless authorized by the owner/submitting party or required by law. This Committee has reports of cases where the reporting of toxicoses or toxicants could have been important from an animal health or food safety standpoint but a lack of requirement for reporting has resulted in non-reporting. This Committee also recognizes that the required reporting of all toxicants identified by a Toxicology laboratory would be overwhelming, because all compounds can be potentially toxic.

RESOLUTION:

The United States Animal Health Association requests all members of the National Assembly of State Animal Health Officials include toxicoses/toxicants as part of their required reportable diseases. This required reporting should be inclusive of cases of toxicoses, identification of adulterated products, and cases in which toxicants could contaminate the feed or food supply. The Committee recommends that the wording for these reportable conditions be written such that it would not require the reporting of all measured chemicals found by the laboratory (e.g. the reporting of every measured nitrate test whether of clinical concern or not).

The Committee recommends that the following could serve as a template for inclusion in a state’s reportable disease list:

Cases of toxicoses, large mortalities of unknown cause, or identification of adulterants/toxicants that have the potential to be a public health, animal health or food safety threat must be reported.

The Committee believes that such timely reporting will serve to increase the protection of animal and public health.

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RESOLUTION NUMBER: 4, 12 AND 24 COMBINED APPROVED AS AMENDED

SOURCE: COMMITTEE ON IMPORT-EXPORT; COMMITTEE ON TRANSMISSIBLE DISEASES OF SWINE; COMMITTEE ON FOREIGN AND EMERGING DISEASES

SUBJECT MATTER: NEED FOR UNITED STATES DEPARTMENT OF AGRICULTURE, ANIMAL AND PLANT HEALTH INSPECTION SERVICES RISK ASSESSMENT AND RULEMAKING PRIOR TO ALLOWING IMPORTS FROM COUNTRIES WITH AFRICAN SWINE FEVER

BACKGROUND INFORMATION:

For the last few years African Swine Fever (ASF) has spread from Russia to Eastern European countries. This is a deadly disease of swine for which there is no vaccine available and little hope of a vaccine being developed in the near future. Other than killing the infected animals and applying sanitary measures, there are no tools to control the disease. Many of the cases have been in feral swine, but ASF has also been found in
commercial herds in countries with significant commercial production, such as Poland and Lithuania.

Recent media reports indicate the United States (U.S.) is preparing to accept importation of meat from Lithuania. The media reports focused on the United States Department of Agriculture (USDA), Food Safety Inspection Service’s audit of Lithuania’s food safety system to determine equivalence with the U.S. system. The U.S. industry supports equivalence audits as a means of assuring the food safety of meat and meat products in international trade. Equivalent food safety systems, however, do not address the risk of transmitting a foreign animal disease such as ASF via trade in meat and meat products. That requires a risk assessment by the USDA, Animal and Plant Health Inspection Service which to our knowledge has not been done.

The introduction of ASF into the U.S. swine herd would be economically devastating to the U.S. pork industry and other commodities including corn and soybeans. It would cost USDA and the public millions, if not billions, of dollars in disease control expenditures and indemnity payments for infected animals, with little hope of eradication. Export markets would likely be lost immediately, sending prices into an unprecedented downward spiral.

RESOLUTION:

The United States Animal Health Association requests that United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS) conduct a risk assessment of any country that has African Swine Fever (ASF) - in domestic, wild, or feral swine - which currently exports or seeks to export swine, porcine genetic material, pork or pork products into the United States (U.S.). USDA-APHIS shall apply this risk assessment as the basis for independent rulemaking as opposed to amendment of current regulations that pertain to other Foreign Animal Diseases. Such rulemaking would include a proposed rule and a comment period. Only after such rulemaking and consideration of comments should imports be considered. If, during rulemaking, USDA-APHIS recommends development of an ASF Free Compartment within such a country, it is requested that producers in the Compartment be required to follow and document the same biosecurity practices as would U.S. producers in the case of an ASF outbreak. These biosecurity practices are outlined in the Secure Pork Supply Plan (http://www.securepork.org/plan-components.php).

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RESOLUTION NUMBER:   5 NOT APPROVED
SOURCE:  COMMITTEE ON IMPORT- EXPORT
SUBJECT MATTER:  IMPORTATION OF FETAL BOVINE SERUM

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RESOLUTION NUMBER: 6 AND 11 COMBINED APPROVED
SOURCE: COMMITTEE ON IMPORT-EXPORT; COMMITTEE ON BLUETONGUE AND RELATED ORBIVIRUSES
SUBJECT MATTER: BLUETONGUE, NATIONAL STRATEGY FOR ANIMAL EXPORTS

BACKGROUND INFORMATION:

The importance of bluetongue and related orbivirus infections to the United States livestock industry was the focus of a recent United States Department of Agriculture (USDA) Gap Analysis workshop available at: http://www.ars.usda.gov/SP2UserFiles/Program/103/OrbivirusGapAnalysisWorkshopFinalFeb2014.pdf. The global range of bluetongue virus has expanded recently, notably:

- The discovery since 1998 of at least ten new serotypes of bluetongue virus in the Southeast indicates that previously exotic viruses now are entering the United States, likely from the Caribbean Basin. Some of these viruses have now spread beyond the southeastern United States.

- The emergence of numerous serotypes of bluetongue virus into Europe since 1998 has been associated with extensive clinical disease in both sheep and cattle. Climate change is widely accepted to have played a role in the spread of bluetongue viruses into Europe through its impact on the insect vector, particularly in the Mediterranean Basin.

Endemic bluetongue virus infection has resulted in the imposition of non tariff trade barriers to the international export of ruminant livestock from the United States. At present, there is no coordinated surveillance for bluetongue virus in the United States to detect potential introductions of new virus serotypes or document their spread. Without comprehensive surveillance it will be difficult or impossible for the United States to develop an internationally accepted regionalization strategy to facilitate livestock exports.

RESOLUTION:

Given the historic and ongoing negative impact of endemic bluetongue virus infection to the export of ruminant livestock from the United States, the United States Animal Health Association requests that the United States Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services, develop, educate and facilitate a national strategy for animal exports, possibly through regionalization supported by a national surveillance program as prescribed by the World Organization for Animal Health’s (OIE) Terrestrial Animal Health Code chapter 8.3.

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RESOLUTION NUMBER: 7 APPROVED AS AMENDED
SOURCE: USAHA/AAVLD COMMITTEE ON AQUACULTURE
SUBJECT MATTER: USE OF THE LACEY ACT TO REGULATE ANIMAL PATHOGENS

BACKGROUND INFORMATION:
In the 2014 United States Congress, two bills (S.1153 & H.R.996) were introduced that will, if passed into law, undoubtedly create numerous problems not only for the movement of aquacultured animals within the United States (U.S.) but also for the movement of all species of domesticated livestock.

Currently the United States Fish and Wildlife Service’s (USFWS) authority is limited to the control over a few aquatic animal diseases under Title 50 regulations. Under the National Aquatic Animal Health Plan (NAAHP) many believe that this authority should be rescinded by Congress and given to United States Department of Agriculture (USDA), which has authority over all other animal diseases and is the internationally recognized competent authority by the International Office of Epizootics (OIE – World Organization of Animal Health). S.1153 and H.R. 996 seek to dramatically expand USFWS’ disease authority over all animal diseases, including aquatic animal diseases, by giving USFWS the ability to arbitrarily list any nonnative pathogen or parasite as an injurious species, hence creating two competing competent authorities. Furthermore, these acts eliminate various safeguards that Congress put into the Injurious Species Act, such as complying with the Administrative Procedures Act, thereby allowing the USFWS to more quickly list a species as injurious, without adequate review by the United States Animal Health Association (USAHA), industry, and others. An example of what would occur with the passage of S.1153 and H.R. 996 is illustrated by USFWS’ recently publishing in the Federal Register the agency’s intent to list all amphibians infected with the Chytrid fungus as injurious species (see USAHA Resolution #8, 2010).

The seriousness of the problems that enactment of these bills will create for animal agriculture cannot be overstated. For instance, with the authority thus granted, USFWS could list Chytrid fungus as an injurious species, even though the USDA, Animal and Plant Health Inspection Service has refused to restrict the movement of animals infected with this organism because Chytrid fungus has been in the U.S. for over 80 years and is already widely distributed. If this organism was to be listed by the USFWS as an injurious species, however, then any interstate shipment of aquatic animals, such as a semi-truck shipment of live fish with an inadvertent hitchhiker such as a single infected tadpole, would expose the shipper to felony prosecution under the Lacey Act, where the minimum fine would be $100,000. The USFWS could also list a nonnative cattle or swine disease organism as injurious, if the disease organism could also infect deer or elk and hence was considered a “nonnative wildlife taxa.” Such a listing would subject any interstate shipper
REPORT OF THE COMMITTEE

of infected cattle or swine to the same felony Lacey Act prosecution as stated above. Such authority would also cover infected dead product being shipped interstate.

The extended authority that would be granted to the USFWS by passage of these bills would, unfortunately, open America’s farmers to unnecessary regulations and litigation and severely limit our farmers’ ability to conduct business.

The USDA is the competent federal agency with regulatory oversight over domestic animal diseases. The previous memorandum of understanding between the three agencies i.e. National Oceanographic and Atmospheric Administration [NOAA], USFWS, and USDA provides guidance and cooperation among the different agencies and gives stakeholders the knowledge and assurance of each agency’s sphere of influence. This understanding has also been restated in the National Aquatic Animal Health Plan (2008). This cooperation is critical and has been strongly supported by the USAHA.

RESOLUTION:

The United States Animal Health Association (USAHA) strongly opposes the passage of S.1153 and H.R. 996 and any similarly worded bills that seek to allow the United States Fish and Wildlife Service to use the injurious species provisions of the Lacey Act to regulate animal pathogens. Further, the USAHA strongly encourages the United States Department of Agriculture, Animal and Plant Health Inspection Service, United States Fish and Wildlife Service, National Oceanic and Atmospheric Administration, and the Association of Fish and Wildlife Agencies to clearly determine the appropriate agency or agencies for regulatory oversight of wildlife diseases and the appropriate agency for domestic animal diseases, without regulatory duplication.

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RESOLUTION NUMBER:   8 APPROVED
SOURCE:  COMMITTEE ON JOHNE’S DISEASE
SUBJECT MATTER:  ASSESS JOHNE’S DISEASE FECAL CHECK TEST PERFORMANCE

BACKGROUND INFORMATION:

The United States Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services, National Veterinary Services Laboratory’s Johne’s Disease fecal check test is a valuable resource to cattle producers, veterinarians, diagnostic laboratories, and animal health agencies. Most samples included in the Johne’s Disease fecal check test are characterized as high fecal shedders and non-infected cattle, but most fecal shedders in infected herds shed low numbers of organisms. Variation in precision of results from the Johne’s Disease fecal check test from
laboratories passing fecal check tests has been observed, in addition to variation in sensitivity of fecal tests used. This has led to concerns about interpretation of results from Johne’s Disease fecal testing among laboratories passing the Johne’s Disease fecal check test.

The Mycobacterial Diseases of Animals - Multistate Initiative brings together leading scientists, industry representatives, and regulatory officials with a shared vision of improving food security through a reduction in losses from two of the most important diseases of livestock—bovine tuberculosis and Johne’s Disease. This group would provide the appropriate expertise for leading a review of the current evaluation and reporting processes.

RESOLUTION:

The United States Animal Health Association (USAHA) requests that the United States Department of Agriculture, Animal and Plant Health Inspection Service sponsor the Mycobacterial Diseases of Animals Multi-State Initiative to create a working group to evaluate the current Johne’s Disease fecal check test and propose a plan by the 2015 USAHA Committee on Johne’s Disease meeting to improve and report assessment of laboratory performance.

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RESOLUTION NUMBER: 9 APPROVED
SOURCE: COMMITTEE ON INFECTIOUS DISEASES OF CATTLE, BISON, AND CAMELIDS
SUBJECT MATTER: IMPORTATION OF FETAL BOVINE SERUM

BACKGROUND INFORMATION:

Concerns about the current and expected future shortage of North American origin fetal bovine serum is leading to strong concern over importation of contaminating viruses including pestivirus in fetal bovine serum. Current testing is based on decades-old technology which does not adequately detect new and emerging viruses.

RESOLUTION:

The United States Animal Health Association strongly encourages the United States Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services to revise Title 9 Code of Federal Regulations Section 113.53 standards as they apply to fetal bovine serum testing to make changes requiring the use of appropriately sensitive technology and addressing country of origin labeling.

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RESOLUTION NUMBER: 10 APPROVED AS AMENDED
SOURCE: COMMITTEE ON INFECTIOUS DISEASES OF CATTLE, BISON, AND CAMELIDS
SUBJECT MATTER: GENERAL STANDARDS FOR TRICHOMONIASIS INTERSTATE MOVEMENT REQUIREMENTS OF BULLS

BACKGROUND INFORMATION:
As of August 2014, trichomoniasis regulations for interstate movement of bulls have been adopted by 28 states. Because rules have been created in collaboration with state animal health officials, private veterinarians, producers, and industry groups much variability exists in requirements between states.

This variability creates confusion and additional expense when bulls are transported interstate. However, a collaborative movement towards consensus on key components has been built on the following: a) the age of virgin bull that can be exempted from testing, b) the length of time that a bull can travel on a negative test, and c) the number of tests and type of test.

RESOLUTION:
The United States Animal Health Association urges state animal health officials that bulls not known to originate from trichomoniasis positive herds be accepted by importing states under the following conditions:

1. Virgin bulls up to 18 months of age be exempted from trichomoniasis testing requirements.
2. A negative trichomoniasis test is valid for 60 days after collection if the bull is held separate from females.
3. A single, negative DNA amplification-based test of samples collected by a United States Department of Agriculture Category II Accredited Veterinarian certified by the state of origin to collect trichomoniasis samples for interstate movement.

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RESOLUTION NUMBER: 11 COMBINED WITH 6
SOURCE: COMMITTEE ON BLUETONGUE AND RELATED ORBIVIRUSES
SUBJECT MATTER: BLUETONGUE, NATIONAL STRATEGY FOR ANIMAL EXPORTS

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RESOLUTION NUMBER: 12 COMBINED WITH 4 AND 24  
SOURCE: COMMITTEE ON TRANSMISSIBLE DISEASES OF SWINE  
SUBJECT MATTER: NEED FOR UNITED STATES DEPARTMENT OF AGRICULTURE, ANIMAL AND PLANT HEALTH INSPECTION SERVICES RISK ASSESSMENT AND RULEMAKING PRIOR TO ALLOWING IMPORTS FROM COUNTRIES WITH AFRICAN SWINE FEVER

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RESOLUTION NUMBER: 13 APPROVED  
SOURCE: COMMITTEE ON INFECTIOUS DISEASES OF HORSES  
SUBJECT MATTER: EQUINE VETERINARY ACCREDITATION MODULES

BACKGROUND INFORMATION:
Recent equine disease events in the United States (U.S.) highlighted the limited working knowledge of equine practitioners regarding equine regulatory diseases; specifically the scientific laboratory advances and changes in the understanding of disease epidemiology related to equine herpes virus myeloencephalopathy, equine infectious anemia, equine piroplasmosis, equine viral arteritis, and contagious equine metritis. Knowledge of diagnostic technologies and appropriate testing is critical to the protection of the U.S. equid population. Continued education and outreach to private practitioners on equine regulatory diseases is imperative.

The mission of the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), National Veterinary Accreditation Program (NVAP) is to ensure the health of the nation’s livestock and animal populations through educating private practitioners across the U.S. Accredited private practitioners are essential protectors of equine health. Recent changes in the USDA-APHIS-VS-NVAP require supplemental training for maintenance of accreditation. Private practitioners must complete USDA-APHIS-VS-NVAP approved supplemental training. Currently equine specific modules are limited to “International Movement of Horses and Slaughter Horse Transport.” The addition of equine regulatory disease modules for private practitioners enables equine veterinarians to remain current and ensures continued protection of the U.S. equid 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 develop National Veterinary Accreditation Program (NVAP) Equine Disease Modules to address the current science and epidemiology of equine regulatory diseases.
of interest, including but not limited to, equine herpes virus myeloencephalopathy, equine infectious anemia, equine piroplasmosis, equine viral arteritis, and contagious equine metritis. Additionally, the USAHA encourages USDA-APHIS-VS-NVAP to collaborate with the USDA-APHIS equine specialists and state animal health officials in equine disease module development.

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RESOLUTION NUMBER: 14 APPROVED
SOURCE: COMMITTEE ON INFECTIOUS DISEASE OF HORSES
SUBJECT MATTER: ENHANCEMENTS TO STATES’ CONTAGIOUS EQUINE METRITIS POST-ENTRY QUARANTINE AND TESTING PROGRAMS

BACKGROUND INFORMATION:

The United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), initiated a review of the United States’ Contagious Equine Metritis (CEM) import program in 2007. Included in the Program Review Team’s report to USDA were comments describing deficiencies in regulatory oversight and accountability of programs in states approved by USDA allowing importation, quarantine and testing of equids originating from countries categorized by USDA as CEM Affected. Furthermore, the reviewer’s did include specific and detailed recommendations that would correct identified deficiencies with regulatory program oversight and other areas.

The 2009 CEM incident in the United States 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 in 2009. The conference experts concluded that inadequate regulatory oversight of a CEM facility was likely a factor contributing to the outbreak. During this same USAHA conference the Committee on Infectious Diseases of Horses adopted language in a resolution urging that the recommendations included in the program review be implemented. The February 2013 VS Guidance Document 13406.1 with the incorporated Code of Federal Regulations provides standards which each state approved to import horses for CEM Quarantine must adhere as well as setting the minimal facility quarantine, testing, and treatment requirements.

To date, the method USDA utilizes to assess the infrastructure and applicability of each approved state’s individual programs when importing horses from CEM affected countries remains unclear. The review team’s report recommended the USDA Program Coordinator devise a system of auditing states approved to conduct CEM quarantines. To date, no auditing system to insure state programs are operating in accordance with and fully meeting the defined standard has been implemented. To avoid additional failures in the program that put our domestic populations at increased risk of
disease, a credible and measurable means of auditing approved states to insure all facilities within that state meet the established quarantine and program testing standards of each CEM Quarantine Facility is necessary and should be evaluated annually. A component included in the evaluation should be defining the routine regulatory oversight instituted and practiced in each approved state.

The success or failure of this CEM import program is solely dependent on proper implementation of the prescribed quarantine, animal management and testing procedures. Proper implementation is achievable only if knowledgeable, technically trained and qualified individuals provide day-to-day regulatory program oversight.

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:

1. Define specific benchmarks for annual evaluation of each approved state’s Contagious Equine Metritis (CEM) Import Quarantine Program. USAHA requests USDA-APHIS-VS develop a standard Annual CEM Import Quarantine State Report Form and Annual Facility Inspection Report Form. The Annual State Report includes an assessment of the state’s infrastructure for CEM oversight and the standard operating procedures utilized by CEM import quarantine facilities. The individual facility inspection report should, at a minimum, include evaluation of housing, horse handling, equine care practices, movement within the facility, record keeping, biosecurity practices of facility employees and veterinarians, and knowledge and training related to reproductive anatomy, sample collection, or handling protocols.

2. Develop protocols for suspending or revoking state approval or individual facility approval when there is a failure to meet the established program standards.

3. Require approved states to have trained qualified personnel, who have completed the USDA’s CEM training course to manage the state’s CEM Program.

4. Work with CEM state coordinators to review and modify the CEM quarantine facilities’ data reporting protocols and to develop a searchable data repository which can produce industry requested summary reports.

5. Provide an annual report of the CEM Import Program to the state animal health officials and equine stakeholders.
RESOLUTION NUMBER:  15  APPROVED
SOURCE:  COMMITTEE ON INFECTIOUS DISEASES OF HORSES
SUBJECT MATTER:  DEVELOPMENT OF EQUINE INFECTIOUS ANEMIA
WORKING GROUP

BACKGROUND INFORMATION:
Equine infectious anemia (EIA) has historically been controlled in the United States by the individual states with support of their equine industries. States have instituted regulations to require testing for entry, movement and/or co-mingling, and quarantine of test-positive equids. Annually, approximately 2 million equid samples are tested for EIA, and over the last three years 0.01 percent of the samples were reported as positive. The true prevalence of the infection is not known as there is a significant untested population and in general the only tested animals are those moving interstate or otherwise in accordance with state laws. In recent years, many of the reported cases have been from states with historically low numbers of cases, and a substantial proportion of those positives were in equids not previously tested for EIA; specifically a higher risk population of unsanctioned racing Quarter Horses.

Changes to the federal Equine Infectious Anemia Control program are needed, as the traditional methods have reached a plateau for disease detection. Additionally, recently identified deficiencies in the federal EIA program include, but are not limited to, lack of laboratory oversight, lack of standardization for private practitioners requesting official tests, lack of uniformity in state procedures for managing EIA positive horses, and lack of uniformity in surveillance testing for EIA. Addressing the identified issues is important to the protection of equine health in the United States. Stakeholder and animal health official input is necessary to explore regulatory and non-regulatory options for EIA disease control.

RESOLUTION:
The United States Animal Health Association (USAHA) urges the United States Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services to convene a working group to discuss and develop recommendations for advancing Equine Infectious Anemia (EIA) disease control and the publication of a proposed EIA rule. The USAHA recommends the EIA working group include state animal health officials, academia (EIA subject matter experts), national and private laboratory representatives, American Association of Veterinary Laboratory Diagnosticians representatives, and industry stakeholders.

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RESOLUTION NUMBER: 16 AND 23 COMBINED
APPROVED
SOURCE: COMMITTEE ON INFECTIOUS DISEASE OF HORSES;
COMMITTEE ON LIVESTOCK IDENTIFICATION
SUBJECT MATTER: RECORD AND ELECTRONICALLY CAPTURE
RADIO FREQUENCY IDENTIFICATION ON IMPORTED HORSES

BACKGROUND INFORMATION:
With increased global livestock movement there is an increase in disease
risk to the United States’ (U.S.) horse population. Horse diseases considered
high risk include, but are not exclusive to, equine piroplasmosis, contagious
equine metritis, dourine, glanders, equine infectious anemia, African horse
sickness, equine viral arteritis and Venezuelan equine encephalomyelitis.
A lack of a reliable and traceable permanent identification system for
horses imported into the U.S. makes it difficult to conduct trace back of animals
that are potentially positive or exposed to an infectious disease. There is an
immediate need to establish a standard method of permanent identification
and traceability for all horses imported into the U.S. A 2014 United States
Department of Agriculture, Animal and Plant Health Inspection Service,
Veterinary Services, Investigative and Enforcement Services investigation in
California led to the detection of an Equine Piroplasmosis positive Spanish
Purebred Horse with a microchip originating in Spain. The lack of microchip
recording and electronic capture on import records at the time of importation
delayed the investigation of potentially exposed horses as the microchip had to
be traced through manufacturers to verify the origin of the horse. Recent
equine disease events involving horses imported to the U.S. demonstrate the
risk of importation of various diseases. Therefore, traceability of these animals
is a critical element in the protection of the U.S. horse 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 revise the Code of Federal
Regulations to require all equids imported into, or returning to, the United
States (U.S.) be identified with an implanted radio frequency identification
(RFID) microchip that complies with the International Organization for
Standardization 11784 and 11785 standards (134.2 kHz), unless already
implanted with a readable 125 kHz microchip. Universal RFID readers should
be present at all import centers and border stations to read both 125 and
134.2 kHz microchips. Additionally, the USAHA urges USDA-APHIS-VS to, at
the time of equid importation into the U.S., record microchips of imported
horses and electronically capture microchip data in a searchable database
accessible to animal health officials during a disease investigation.

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REPORT OF THE COMMITTEE

RESOLUTION NUMBER: 17  APPROVED
SOURCE: COMMITTEE ON SCRAPIE
SUBJECT MATTER: PROPOSED SCRAPIE RULE

BACKGROUND INFORMATION:
While the Scrapie Eradication Program has been extremely successful in decreasing the prevalence of scrapie in the United States, eradication has not yet been achieved in sheep or goats. Improved traceability and surveillance are needed to detect the last remaining cases of scrapie, proving to our trading partners that the United States is scrapie-free thus adding approximately $50 million in export value. Mandatory identification of sheep has allowed slaughter surveillance to be the key in reducing the prevalence of scrapie in sheep by 85 percent. Slaughter surveillance of goats has been problematic because currently only 50% of mature goats are officially identified at slaughter, making it challenging to conduct effective surveillance.

A draft proposed rule to amend 9 Code of Federal Regulations Parts 54 and 79 has been in clearance for six years. This proposed rule would address standards for official identification and traceability for goats as well as other gaps in the regulation. To succeed in the eradication of scrapie, it is imperative that this rule be promptly published for comment and finalized.

RESOLUTION:
The United States Animal Health Association urges the Secretary of Agriculture to give publication of the scrapie proposed rule the priority necessary for it to be published and finalized in federal fiscal year 2015. This proposed rule, which provides for improved traceability for goats and addresses other gaps in the current regulation, is a critically important element needed to achieve scrapie eradication in the United States.

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RESOLUTION NUMBER: 18  APPROVED
SOURCE: COMMITTEE ON BRUCELLOSIS
SUBJECT MATTER: BRUCELLOSIS ERADICATION PROGRAM GOALS, OBJECTIVES, AND PRIORITIES

BACKGROUND INFORMATION:
Even though the Brucellosis Eradication Program has succeeded in eradicating brucellosis from the United States (U.S.) domestic cattle and bison herds, eradication has not been achieved in all species and continued surveillance and response is needed to detect any resurgence or reintroduction of the disease and to prove to our trading partners that the U.S. is free.

In 2009, the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS)
Issued a concept paper outlining a new direction for the Bovine Brucellosis Program. Associated new regulations have not yet been delivered. In addition to rulemaking, the concept paper stated that federal animal health officials would be responsible for developing program standards, surveillance plans, and other policy documents to meet the performance standards stated in the regulations. Many of these federal activities, including rulemaking, have not been accomplished because in part there have been no goals established for completion of these objectives.

The USDA-APHIS-VS implemented its reorganization in early November 2013. Under this new USDA-APHIS-VS organization it is unclear as to what the USDA-APHIS-VS brucellosis program objectives and priorities are for 2015 and beyond and how USDA-APHIS-VS will accomplish its activities as outlined in the 2009 brucellosis plan. The United States Animal Health Association supports the cattle commodity concept because it provides the flexibility to work on multiple issues more easily than before. Existing animal disease eradication programs, including brucellosis eradication, must have clearly stated annual goals that provide cooperators with the methods to complete the eradication efforts and enter into a surveillance mode as has been done with the other 16 animal diseases that are now foreign to the United States.

RESOLUTION:

The United States Animal Health Association urges the Secretary of Agriculture of the United States to publish the proposed Brucellosis rule to provide stakeholders with annual program goals, objectives, and priorities for the brucellosis eradication program so the original program goal of eradication can be achieved and the eradication program completed.

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RESOLUTION NUMBER: 19  APPROVED
SOURCE: COMMITTEE ON BRUCELLOSIS
SUBJECT MATTER: BRUCELLOSIS IN THE GREATER YELLOWSTONE AREA

BACKGROUND INFORMATION:

The State and Federal governments and the livestock industries have spent billions of dollars since 1935 to eradicate *Brucella abortus* infection from livestock in the United States. The presence of *B. abortus* in the United States has a significant economic impact on the livestock industry and may have an impact on international trade.

The only known remaining focus of brucellosis caused by *B. abortus* in the United States is in the bison and elk in the Greater Yellowstone Area (GYA) and all signatory parties to the original Greater Yellowstone Interagency Brucellosis Committee (GYIBC) Memorandum of Understanding (MOU) (Secretaries of the United States Department of Agriculture (USDA))
and United States Department of the Interior, and the Governors of the states of Montana, Idaho, and Wyoming), which created the GYIBC, agreed to a shared objective to eliminate \textit{B. abortus} from the GYA. With the expansion of this disease in elk populations remote from feedgrounds and the resulting transmission to livestock, a plan to eliminate \textit{B. abortus} from bison and elk in Yellowstone National Park, Grand Teton National Park, and the National Elk Refuge, and other areas of the GYA, consistent with the objectives of the original GYIBC MOU, is urgently needed.

After more than a decade of work on an environmental impact statement concerning remote vaccination of bison in Yellowstone National Park using biobullets, the Park chose a “no action” alternative, in part due to potential inadequacies of the use of biobullets to deliver RB51 vaccine to bison in the Park setting.

Recent Brucella research conducted by USDA, Agricultural Research Service scientists has demonstrated statistically reduced abortions and colonization in bison following a single annual RB51 booster vaccination. Additionally, USDA, Animal and Plant Health Inspection Service personnel are testing prototypes of a new darting system designed specifically for delivering lyophilized RB51 vaccine to bison in a free range setting.

Results of vaccine efficacy studies conducted on captive bison in containment are not necessarily indicative of results that would be achieved in a field study.

\textbf{RESOLUTION:}

The United States Animal Health Association strongly urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service; USDA, Agricultural Research Service; United States Department of the Interior, National Park Service; and the State of Montana, to initiate a multi-year field trial to evaluate delivery methods and efficacy of RB51 vaccination on Yellowstone bison. Even preliminary results of such a field trial will indicate the efficacy of remotely delivered, boostered, RB51 vaccination in free-ranging Yellowstone bison and determine its utility as a tool to eliminate \textit{Brucella abortus} from the bison population.

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\textbf{RESOLUTION NUMBER: 20 NOT APPROVED}

\textbf{SOURCE: COMMITTEE ON BRUCELLOSIS}

\textbf{SUBJECT MATTER: BRUCELLA OVIS TESTING IN RAMS}

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RESOLUTION NUMBER: 21  APPROVED  
SOURCE: COMMITTEE ON BRUCELLOSIS  
SUBJECT MATTER: VALIDATION OF THE BRUCELLA RING TEST FOR LARGE DAIRIES

BACKGROUND INFORMATION: 
With the increase in average herd size of United States dairies and the loss of the indirect Enzyme Linked Immunosorbent Assay for brucellosis milk surveillance, states that deem it necessary to continue brucellosis milk surveillance testing are faced with logistical and financial challenges to ensure the validity of their surveillance protocol. At present, the Brucella Ring Test (BRT) is the only test available for detection of antibodies to Brucella sp. in bulk milk tank samples. It is, however, only validated for samples up to 1500 head.

RESOLUTION: 
The United States Animal Health Association (USAHA) urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS) to direct the National Veterinary Services Laboratories (NVSL) to pursue validation of the Brucella Ring Test (BRT) for Brucella abortus and Brucella suis for a sample size up to 5000 head in order to accommodate the increasing average herd size of United States dairies. The USAHA further urges USDA-APHIS, Veterinary Services, NVSL to investigate other tests should such validation of the BRT not be possible.

RESOLUTION NUMBER: 22  APPROVED  
SOURCE: COMMITTEE ON BRUCELLOSIS  
SUBJECT MATTER: BRUCELLOSIS TESTING IN FARMED CERVIDAE

BACKGROUND INFORMATION: 
Over the last 50 years during the eradication of bovine brucellosis in cattle in the United States, only the elk and bison in the Greater Yellowstone Area (GYA) have been an impediment to the eradication. Whitetail deer, mule deer, and elk in the other 47 brucellosis free states have never been identified as being either a reservoir for the disease or a public health risk in regard to being infected with Brucella abortus or transmitting the agent. The elk in the GYA are not privately owned or controlled, and it is presently illegal to trap, possess, or transport these free-ranging elk privately. Therefore they cannot legally enter animal commerce channels and are not an issue in regard to interstate shipment of brucellosis-infected elk.

Currently, when shipping interstate, a negative Brucella abortus blood test must be performed which will then allow thirty days to transport the animal. Should a delay occur beyond the 30 days the animal must be retested.
RESOLUTION:
The United States Animal Health Association (USAHA) urges state regulatory officials to extend the number of days to accept a negative brucellosis test of farmed cervidae from 30 days to 45 days when the herd of origin is located outside of a state's Brucellosis Designated Surveillance Areas. Furthermore, USAHA urges the United States Department of Agriculture, Animal and Plant Health Inspection Service to incorporate this recommendation into rule as the agency develops the upcoming federal program for cervids.

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RESOLUTION NUMBER:  23 COMBINED WITH 16
SOURCE:  COMMITTEE ON LIVESTOCK IDENTIFICATION
SUBJECT MATTER:  RECORD AND ELECTRONICALLY CAPTURE RADIO FREQUENCY IDENTIFICATION ON IMPORTED HORSES

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RESOLUTION NUMBER:  24 COMBINED WITH 4 AND 12
SOURCE:  COMMITTEE ON FOREIGN AND EMERGING DISEASES
SUBJECT MATTER:  NEED FOR UNITED STATES DEPARTMENT OF AGRICULTURE, ANIMAL AND PLANT HEALTH INSPECTION SERVICE RULEMAKING PRIOR TO ALLOWING IMPORTS FROM COUNTRIES WITH AFRICAN SWINE FEVER

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RESOLUTION NUMBER:  25 APPROVED
SOURCE:  COMMITTEE ON PUBLIC HEALTH AND RABIES
SUBJECT MATTER:  INCREASED FISCAL YEAR 2016 FUNDING FOR THE UNITED STATES DEPARTMENT OF AGRICULTURE, ANIMAL AND PLANT HEALTH INSPECTION SERVICE, WILDLIFE SERVICES ORAL RABIES VACCINATION PROGRAM

BACKGROUND INFORMATION:
Rabies programs in the United States that have integrated oral rabies vaccine (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 in 2011 eliminated raccoon rabies on Long Island, New York. Successful contingency programs have moved toward Texas gray fox rabies elimination. 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 United States Department of
Agriculture (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 continue investigation into the control of skunk rabies. Additional funding is needed to address outbreaks and provide emergency response. The USDA, Animal and Plant Health Inspection Service, Wildlife Services, ORV program continues to reduce transmission of rabies to wildlife, livestock, domestic pets 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. The United Nations Food and Agriculture Organization believes that terrestrial rabies and foot-and-mouth disease should be the next global disease targets for eradication.

RESOLUTION:
The United States Animal Health Association requests the Congress to appropriate $28 million for program management and contingency actions at the state level in the Fiscal Year 2016 budget line item for the United States Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services, Oral Rabies Vaccine Program.

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RESOLUTION NUMBER:   26  APPROVED
SOURCE:  COMMITTEE ON BIOLOGICS AND BIOTECHNOLOGY
SUBJECT MATTER:  MANUFACTURING OF VETERINARY BIOLOGICALS WITHOUT Licensure

BACKGROUND INFORMATION:
The United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), Center for Veterinary Biologics (CVB), has the licensing and enforcement responsibilities for the Virus-Serum-Toxin Act (VST Act) to assure that veterinary biological products distributed in the United States are pure, safe, potent, and effective.

The VST Act requires USDA to provide by regulation an exemption from licensure requirements for biological products made by a veterinarian for use within that veterinarian’s practice. USDA-APHIS has promulgated such a regulation at 9 Code of Federal Regulations (CFR) § 107.1(a). Veterinary biologics that fall under this provision are not manufactured in a USDA-APHIS-VS-CVB licensed establishment and have not been reviewed by USDA-APHIS-VS-CVB for safety or efficacy. Some commercial enterprises have undertaken to contract with veterinarians to manufacture and supply
unlicensed vaccine products as their “agents.” Millions of doses of unlicensed and unregulated vaccines have been administered to food animals under this arrangement, thus exponentially increasing the risk and potential impact from a manufacturing error by the unlicensed manufacturer.

In order to correct this practice, USDA-APHIS published a proposed rule to amend the 9CFR 107.1 regulation in July 2012 [77 Federal Register 42195, July 18, 2012]. The effect of the proposed rule would be to guide such outsourced biologicals into the USDA-APHIS-VS-CVB approval process where safety and efficacy are evaluated and manufacturing is overseen, while preserving the intent of the exemption. The proposed rule has not been finalized. With this action, USDA-APHIS has signaled to those who wish to responsibly interact with the agency that this market activity is inappropriate and being eliminated. In individual interactions, USDA-APHIS-VS-CVB has advised biologics manufacturers not to approach the market in this manner, as it is being eliminated. However, there are companies that continue to operate in this manner.

RESOLUTION:

The United States Animal Health Association urges the United States Department of Agriculture, Animal and Plant Health Inspection Service to finalize proposed rule 77 Federal Register 42195, July 18, 2012 regarding the exemption to licensure of veterinary biologics.

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RESOLUTION NUMBER: 27 NOT APPROVED
SOURCE: COMMITTEE ON BIOLOGICS AND BIOTECHNOLOGY
SUBJECT MATTER: STANDARDS FOR FETAL BOVINE SERUM

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RESOLUTION NUMBER: 28 APPROVED
SOURCE: COMMITTEE ON CAPTIVE WILDLIFE AND ALTERNATIVE LIVESTOCK
SUBJECT MATTER: EPIDEMIOLOGY OF CHRONIC WASTING DISEASE IN FARmed CERVIDS

BACKGROUND INFORMATION:

Chronic wasting disease (CWD) has been recognized in wild cervids since the 1980s and in farmed cervid herds in the United States since 1997. Since 2012, CWD has been detected in herds monitored longer than the five years required by the United States Department of Agriculture’s National Herd Certification Program.

Availability of complete epidemiological information is critical for evaluating the effectiveness of science-based disease control programs; however, very little information is available on CWD epidemiology in the 65
affected farmed cervid herds. Analysis of data from herds with CWD will improve risk assessment; and potentially identify factors contributing to the detection of CWD in herds monitored longer than five years, enhance mitigation strategies to reduce the likelihood of CWD in farmed cervids, and facilitate its earliest detection when it is present.

RESOLUTION:

The United States Animal Health Association (USAHA) requests the United States Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services to work cooperatively with the states to assemble, analyze, summarize, and make available to the Committee on Captive Wildlife and Alternative Livestock at the USAHA meeting in 2015, all pertinent information from epidemiological investigations of Chronic Wasting Disease (CWD) in farmed and free-ranging cervid herds. Specific information requested includes but is not limited to: prevalence of CWD in positive herds; demography of positive and negative animals in infected herds; results from all tissues that were tested; proximity of affected herd to wild and/or farmed cervid herds with CWD; duration of monitoring prior to detection of the first case, including numbers of animals in the herd, numbers tested and numbers not tested; results of trace-forward and trace-back investigations; and all other pertinent data that will enhance risk assessment of CWD in farmed cervids and identification of effective mitigation measures.

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RESOLUTION NUMBER: 29 APPROVED
SOURCE: COMMITTEE ON TUBERCULOSIS
SUBJECT MATTER: APPROVAL OF LELYSTAD TUBERCULINS FOR USE IN THE BOVIGAM® ASSAY

BACKGROUND INFORMATION:

The Bovigam® assay is currently approved by the United States Department of Agriculture, Animal and Plant Health Inspection Service for the diagnosis of Mycobacterium bovis in cattle. The Bovigam assay is used as a confirmatory test for caudal fold test tuberculin responders. The assay currently uses CSL tuberculin.

The Tuberculosis Scientific Advisory Sub-Committee (TB SAS) recently reviewed documentation on field trial comparisons of CSL tuberculin and Lelystad tuberculin in the Bovigam® assay. The comparisons showed that the assay sensitivity in confirmed M. bovis infected cattle was 73.8% and 45.2% for Lelystad and CSL tuberculins, respectively. This difference was statistically significant. Assay specificity in presumed M. bovis negative cattle was 96.9% and 95.1%, respectively for Lelystad and CSL tuberculins. This difference was not statistically significant.
In 2012, the TB SAS also reviewed similar data that demonstrated increased sensitivity of the Bovigam® when Lelystad tuberculin was used compared to CSL tuberculin.

Conclusions of the 2014 report from the TB SAS indicated that it would be appropriate to use Lelystad tuberculins in the stimulation phase of the Bovigam® assay.

**RESOLUTION:**

The United States Animal Health Association requests the United States Department of Agriculture, Animal and Plant Health Inspection Service to license the Bovigam® assay so that Lelystad tuberculins may be used in the stimulation phase of the assay as part of official tuberculosis program procedures.

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**RESOLUTION NUMBER: 30**

**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 (U.S.). Attempts to determine the prevalence of brucellosis and tuberculosis in U.S. goats and sheep found two reports. In 1999 a South Texas herd of goats and one sheep were diagnosed with *Brucella melitensis*. USDA currently lists the status of the U.S. as “Free” of *B. melitensis* for diseases reportable to the World Health Organization (OIE). Tuberculosis was diagnosed 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 testing. A resolution from the United States Animal Health Association (USAHA) 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 supported no test requirements for sheep and 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 Assistant District Directors to develop appropriate brucellosis and tuberculosis surveillance and testing requirements for sheep and goats while still protecting public health.

USDA, Animal and Plant Health Inspection Service, Veterinary Services responded with information concerning data of sheep and goats tested for brucellosis and tuberculosis from 2009 through 2013 from 30 States. None of the 30 states reporting detected a case of brucellosis or tuberculosis in a sheep or goat during this time period. On average, 4,850 animals were tested for brucellosis and 2,295 animals were tested for tuberculosis each year. Brucellosis and tuberculosis are both federally reportable diseases, and neither has been reported by any of the 50 states or territories in sheep and goats in the last 15 years at least.

Testing for brucellosis and tuberculosis in sheep and goats is a significant impediment to interstate commerce without establishing a proven health risk.

RESOLUTION:

The United States Animal Health Association urges the United States Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services to officially declare domestic sheep and goats in the United States to be free of brucellosis and tuberculosis and further asks states that require testing of brucellosis and tuberculosis in sheep and goats to rescind these requirements.

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RESOLUTION NUMBER: 31 APPROVED
SOURCE: COMMITTEE ON SHEEP AND GOATS
SUBJECT MATTER: BRUCELLA OVIS TESTING OF RAMS

BACKGROUND INFORMATION:

Many states require a negative Brucella ovis Enzyme Linked Immunosorbert Assay (ELISA) test for rams being imported from other states and countries. Likewise, many grazing associations and ram sales require a negative test. In spite of attempts to standardize the ELISA test reagents, antigens, dilutions, low positive controls, and protocols, many laboratories continue to get B. ovis ELISA test results that are called “indeterminate” or may be interpreted as “positive” at one laboratory and “negative” on the same animal’s sample at another laboratory. There is, at times lack of consistency or agreement between laboratories on the B. ovis
ELISA test. The United States Department of Agriculture, Animal and Plant Health Inspection Service, National Veterinary Services Laboratory had earlier suggested standardized test protocols, but there is still lack of consistency between laboratories on applied test protocols. These discrepancies create inconvenience and added expense for producers, lack of producer and veterinary practitioner confidence and trust in the laboratories, and leave regulatory personnel with many questions about proper disposition of test positive and “indeterminate” rams.

RESOLUTION:

The United States Animal Health Association (USAHA) urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service, National Veterinary Services Laboratory and the USDA, Agricultural Research Service (ARS) to review the protocols for enzyme linked immunosorbent assay (ELISA) \textit{Brucella ovis} testing (test reagents, antigens, dilutions, low positive control) among laboratories conducting the ELISA test and develop an explanation for the “indeterminate” and discrepant results between labs.

USAHA also urges USDA-ARS and USDA-APHIS-NVSL to develop strict, standard testing protocols for all laboratories for the \textit{B. ovis} ELISA test. We further urge American Association of Veterinary Laboratory Diagnosticians and state diagnostic laboratories to adhere to these standard testing protocols.

USAHA further urges USDA-ARS to develop an accurate and consistent \textit{Brucella ovis} confirmatory test for samples with “indeterminate” results to help facilitate prudent regulatory and sheep management decisions.

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RESOLUTION NUMBER: 32 APPROVED
SOURCE: COMMITTEE ON SHEEP AND GOATS
SUBJECT MATTER: Q-FEVER (\textit{COXIELLA BURNETTI}) FOR SHEEP AND GOATS AND FOR HUMANS IN THE UNITED STATES

BACKGROUND INFORMATION:

Q-Fever is a zoonotic disease caused by the bacterium \textit{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 \textit{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.*

2013 action-: 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.

2014 action- USAHA S&G Comm urges USDA One Health Office to collaborate with CDC to gather the data on the impact of *Coxiella Burnetti* on human health and the relationship of that to the incidence of disease in animals. This information would be invaluable to support the advancement of the licensure of human and animal vaccines in the USA.

**RESOLUTION:**

In priority order:

First, 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.

Second, the USAHA encourages the Food and Drug Administration to facilitate the licensure of a safe and effective Q-Fever (*Coxiella burnetti*) vaccine for humans.

Third, the USAHA 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 Canada, the European Union, and Australia.

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REPORT OF THE COMMITTEE ON PARASITIC DISEASES

Chair: Dee Ellis, TX
Vice Chair: David Winters, TX

Gary Anderson, KS; Bob Bokma, MD; Corrie Brown, GA; Matt Cochran, TX; Joseph Corn, GA; Mark Davidson, MD; Barbara Determan, IA; Anita Edmondson, CA; Dee Ellis, TX; Richard Gerhold, TN; Chester Gipson, MD; Thomas Hairgrove, TX; Larry Hawkins, MO; Greg Hawkins, TX; Terry Hensley, TX; Linda Hickam, MO; Bob Hillman, ID; Thomas Holt, FL; Charlotte Krugler, SC; Linda Logan, TX; Francine Lord, CAN; Travis Lowe, KS; Mary Luedeker, TX; David Marshall, NC; Terry McElwain, WA; Daniel Mead, GA; Eric Mohlman, NE; Ernie Morales, TX; Don Notter, KY; James Novy, TX; Boyd Parr, SC; Alejandro Perera, MEX; David Pyburn, IA; Shawn Schafer, OH; Irene Schiller, CHE; Andy Schwartz, TX; Charly Seale, TX; David Smith, NY; Robert Stout, KY; Paul Ugstad, NC; Arnaldo Vaquer, VA; Sherrilyn Wainwright, ITA; James Watson, MS; David Winters, TX.

The Committee met on October 22, 2014 at the Sheraton Hotel in Kansas City, Missouri, from 8:00 a.m. to 12:00 p.m. There were 16 members and 37 guests present.

Developing Transgenic (Genetically Modified), Male-only, Screwworm Strains

Steven R. Skoda, USDA-ARS

Eradicating screwworms from mainland North America using the sterile insect technique is an unprecedented achievement saving livestock producers at least $1.6 billion annually; reinfestation is prevented by maintaining a permanent barrier at the Panama/Colombia border. It has long been recognized that developing a genetic sexing, male-only strain has great potential for containing costs and improving the quality of released sterile males. The development of transgenic techniques for several insect species other than Drosophila, including screwworms, has excited interest toward genetically engineering repressible, lethal, female-specific genetic systems for screwworms. Five genetic sexing screwworm strains have been developed (via collaboration between Agricultural Research Service (ARS) and North Carolina State University), expressing single-component, late-acting, tetracycline repressible female lethal genetic system and are being examined to determine their utility in the eradication program. We have measured several fitness parameters that influence production: biological yield, egg hatch, and longevity and several lines are comparable with the parental strain. Along with other tests necessary to gain regulatory approval we will perform a proof-of-principle population reduction experiment in large field cage. We have also begun development of a two-component, early-acting, tetracycline repressible, female lethal genetic system. Early expression of tTA in the embryo leads to activation of expression of a cell death gene, which leads to death of the embryo. Only females die as the cell
death gene contains the sex-specifically spliced New World screwworm (NWS) transformer (tra) intron. This would lead to significant savings in diet costs (up to 50%, ≥$500,000/year at current rearing levels) and/or increase the production capacity of the plant.

**Puerto Rico Fever Tick Research**

Beto Perez DeLeon, USDA-ARS

Dr. DeLeon provided the update on Puerto Rico fever tick research.

**Amblyomma Ticks in the U.S. Virgin Islands**

Francisco Collazo-Mattei, USDA-ARS

On November 6, 2013 an adult male *Amblyomma variegatum* tick was found on a routine visit to a premise located on the western end of the island of St. Croix. This premises had a previous history of tropical Bont tick (TBT) during prior infestations on the island. A total number of 105 animals have been quarantined in this single farm. Wildlife surveillance conducted by Southeastern Cooperative Wildlife Disease Study (SCWDS) found no TBT on mongoose trapped on the index premises and adjacent properties to the index premises. As of October 2014 no new affected farms have been reported. The index farm is under treatment and continual surveillance as of October 2014.

**U.S. Equine Piroplasmosis Report**

Angela Pelzel, USDA-APHIS-VS

Since November 2009, more than 268,604 domestic U.S. horses have been tested for equine piroplasmosis (EP) through active surveillance and movement testing with 143,372 horses tested at approved National Animal Health Laboratory Network (NAHLN) laboratories and 125,232 horses tested at National Veterinary Services Laboratories (NVSL). To date, 247 EP-positive horses (237 *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. Natural tick-borne transmission on the ranch was documented to have occurred over at least 20 years. Of the 247 positive horses identified through active surveillance, 198 were Quarter Horse racehorses, 13 were Thoroughbred racehorses, one was a Quarter Horse roping horse, three were identified during an illegal importation investigation, and 32 were horses previously imported to the United States before August 2005 under the complement fixation test. 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.

So far in 2014, 22,395 domestic U.S. horses were tested for EP with the identification of 31 horses positive for *T. equi*. Twenty-five (25) of those positive horses were Quarter Horse racehorses with ties to unsanctioned racing and/or Mexico, three positives were identified during an investigation.
of horses illegally imported from Mexico, and three horses were previously imported from EP-endemic regions before the implementation of the cELISA import test in 2005. Additionally, of the 25 *T. equi*-positive Quarter Horse racehorses found, eight of those horses were dually infected with both *T. equi* and equine infectious anemia (EIA). Epidemiology investigations conducted have implicated iatrogenic transmission (needle/syringe reuse, blood transfusions, contamination of multi-use drug vials, etc.) as the primary method of transmission in these cases.

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. In February 2013, APHIS-VS established a policy to release horses previously infected with *T. equi* which had completed the official treatment program, been proven cleared of the organism by a series of methods over time, and were test negative on all available diagnostics. Of the 247 positive horses identified, 154 have either died or been euthanized, 18 have been exported, and 41 have been enrolled in the treatment research program. Twenty-two (22) of the horses enrolled in the treatment program have met all of the test-negative requirements and have been released from quarantine. From the Texas ranch outbreak, 163 horses were enrolled in the treatment research program and have completed treatment with 132 horses having met all test-negative requirements and are eligible for release. Successful results from the treatment research program were previously 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.

**Texas Equine Piro report**

Andy Schwartz, Texas Animal Health Commission

Following the diagnosis of Equine Piroplasmosis (EP) in 2009 on the Texas index premises, ranch management set a goal establishing a Remuda free of the disease. Positive horses, totaling 175, were treated with imidocarb dipropionate. Post-treatment Polymerase Chain Reaction (PCR) results were negative for all but six horses. These animals were treated again, and found negative on subsequent PCR tests. Treated horses and unaffected horses were commingled, and all horses were retested annually on cELISA, complement fixation (CF), and PCR. None of the apparently unaffected horses have seroconverted. Twenty three (23) of the treated horses remain positive on cELISA. Only one of the 175 treated horses reverted to PCR positive. The plan to speed progress toward a test negative herd is selectively re-treating eight horses, those with the highest titers on cELISA and those with a titer no longer diminishing over time.

Since 2009, a total of 121 EP positive horses have been disclosed in Texas, not related to the index ranch. Of this total, 36 positives were found through testing horses in Kenedy and Kleburg counties. Horses in these
counties were deemed to be at high risk for EP due to the presence of *Amblyomma cajennense*, a tick proven to be a competent vector for the disease. Horses in additional counties in the southern tip of the state will be tested as resources allow.

The remaining 85 positive horses were disclosed through movement testing and epidemiological investigations. The majority of these positives, 73 in all, were racing Quarter Horses. These horses are thought to have been infected through the use of contaminated needles and blood products administered by trainers. Three were dually infected with the Equine Infectious Anemia (EIA) virus.

To address the issue of EP risk in the racehorse population, the Texas Animal Health Commission established a rule in 2011 requiring a 12 month negative test for *Theileria equi* on horses entering race facilities. Proposed changes to this rule would require negative EP test at all horse racing venues, not limited to facilities licensed by the Texas Racing Commission. The Texas racing industry has requested Thoroughbreds be exempted from this requirement as only two positives have been found, both in 2010.

Horses being smuggled into Texas from Mexico remain a disease threat. In 2012, officials seized ten adult horses and four yearlings. All the adults tested positive for EP. In 2014, four more adult horses were seized. Again, all were test positive for EP. Information gathered in the investigation led to the discovery of additional positive horses in California. The horses involved in this investigation were Spanish Purebred, indicating a possible increased disease risk in this breed.

*Theileria equi* Genotyping
Nita Grause, USDA-APHIS-VS

Drawing on previous experience in next-gen sequencing of other organisms, National Veterinary Services Laboratories (NVSL) opted to use this approach to genotype *Theileria equi*. NVSL has successfully sequenced a cell culture derived isolate, and on the basis of that developed some “benchmarks” for sample preparation to optimize cost and efficiency of whole genome sequencing. Several challenges must be overcome, namely, concentrating *T. equi* organisms and/or depleting horse deoxyribonucleic acid (DNA) in order to get sufficient target genetic material without overwhelming the system with host DNA. NVSL has archived approximately 600 blood samples previously positive by nested PCR to be sequenced in order to build a database. Diversity in sequences will be compared to epidemiological data and other published studies.

SCWDS Wildlife Sampling Report
Joe Corn, 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, Ames, Iowa, gave a report on SCWDS Exotic Arthropod Surveys. The
SCWDS, in collaboration with the USDA-APHIS-VS, conducts surveys for exotic arthropods on free-ranging wildlife in the Southeastern United States and Caribbean region. Current and upcoming programs include surveys for the tropical bont tick on wildlife in St. Croix, U.S. Virgin Islands and Vieques, Puerto Rico; surveys for cattle fever ticks on small mammals and mesomammals in the Cattle Fever Tick Quarantine Area in Texas; surveys for *Culicoides* vectors of bluetongue virus and epizootic hemorrhagic disease virus in the Southeast United States; and surveys for cattle fever ticks on feral swine in the Cattle Fever Tick Quarantine Area. Recent surveys have not detected the tropical bont tick on wildlife in St. Croix, and have not detected cattle fever ticks on small mammals and mesomammals in Texas. Surveys for *Culicoides* have detected new state records for 11 *Culicoides* species in 15 states.

**Cattle Tick Genome Sequencing Project**  
Felix Guerrero, USDA-ARS

The cattle tick, *Rhipicephalus (Boophilus) microplus*, is regarded as the most economically important ectoparasite of livestock worldwide. In addition to direct effects associated with its obligate blood feeding, *R. microplus* is an invasive species that also serves as vector of the pathogens that cause bovine babesiosis and anaplasmosis. *R. microplus* ranks sixth among the most pesticide resistant arthropods globally. With the belief that the tick’s genome held the key to discovery of sustainable tick control technologies, we initiated the cattle tick genome sequencing project in 2003. Initial focus was upon determining the size and characterization of the genome and profiling the transcriptome. In 2005, the genome was discovered to be almost three times the size of the human genome, consisting of ~70% repetitive DNA. This essentially stalled the genome sequencing component of the project until long-read sequencing technologies then at the research stage commercially matured. From 2005-2009, we focused upon obtaining the transcriptomes of larvae, adult tick gut, ovary, synganglia, and Haller’s Organ. In 2010, a reassociation kinetics-based approach was developed to remove the highly repetitive fraction of the genomic DNA, enriching for the unique and low copy fractions. Sequencing was performed on this fraction, adding to information on the transcriptome and the associated exon-intron structures. In 2012-2013, an approach was designed and implemented; using Pac Bio supplemented with Illumina reads of the Cot-selected genomic DNA, to complete the sequencing of the cattle tick genome to approximately a 10X coverage. A customized bioinformatic approach is presently underway to quality filter, error correct, and assembles the Sanger-, Illumina-, 454-, and Pac Bio-based sequence datasets. Our project enabled the application of reverse vaccinology to identify molecules for testing as candidate antigens to elicit a highly effective and protective immune response against *R. microplus* infestation in immunized animals. Vaccine discovery research efforts produced patented technology that is available for transfer and development.
Amblyomma Cajennense U.S. Distribution
Angela Pelzel, USDA-APHIS-VS

The Cayenne tick, *Amblyomma cajennense* Fabricius, is a widely distributed tick species found in many different ecosystems such as semi-arid grasslands and tropical humid deciduous forest. Infestations of cattle by these ticks can lead to weight loss, decreased milk production, starvation, and secondary infections. The Cayenne tick was proven to be a vector of *Theileria equi*, a causative agent of equine piroplasmosis (EP), among horses based on experimental transmission studies. This tick is a common pest of humans in South America and in Texas. The Cayenne tick transmits Rocky Mountain spotted fever, human ehrlichiosis, Venezuelan equine encephalomyelitis virus, Q fever, and *Rickettsia amblyomii*. *Ehrlichia* species and *Borrelia lonestari* have been detected in ticks collected in southern Texas.

In response to detection of *T. equi* in horses on a ranch in southern Texas and identification of a potentially new tick vector of naturally-transmissible EP, we conducted this study of the Cayenne tick (Appendix Figure 01). The goals of our study were to: 1.) define the current geographical distribution of the Cayenne tick, both globally and in the United States, 2.) define suitable habitat for the Cayenne tick in the United States beyond its current distribution in southern Texas, and 3.) evaluate the spatial relationship between habitat in the United States that supports the Cayenne tick and the locations of various animal populations that are suitable hosts of the tick. Our working hypothesis was stated as follows: “Suitable habitat for the Cayenne tick does not extend above 30 degrees north latitude in the continental United States. We acquired tick identification datasets from veterinary diagnostic laboratories, and queried a tick geodatabase created by USDA-APHIS-VS for Cayenne tick identification records. We also acquired Cayenne tick data sets from the Texas Veterinary Medical Diagnostic Laboratory (TVMDL) and from the Southwestern Cooperative Wildlife Disease Survey (SCWDS). A spatial overlay analysis was used to combine habitat data layers and create a map that classified U.S. habitat into three mutually exclusive classes: 1.) high suitability, 2.) moderate suitability, and 3.) low suitability.

There were a total of 9,994 records in the tick geodatabase for which the submitted specimen had been identified as the Cayenne tick. The TVMDL shared 234 Cayenne tick records for inclusion in the tick geodatabase, and we received seven Cayenne tick records from the SCWDS Research Group. The regions classified as “high suitability” covered large portions of the coastal-southern United States and included the States of South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana and Texas. Some regions in California and Arizona also were classified as “high suitability.” There was substantial overlap between high suitability habitat in southern States and
most counties in those States that are populated by high numbers of horses and beef cattle.

We concluded that suitable habitat for the Cayenne tick does extend above 30 degrees north latitude in the continental United States. The Cayenne tick species already appears to be established in southern Texas, and establishment of the Cayenne tick beyond its current range in southern Texas appears plausible. The overlap of economically important livestock populations and high suitability habitat should raise concerns of Cayenne tick’s potential to transmit disease to livestock populations.

**Vesicular Stomatitis National Report**  
Angela Pelzel, USDA-APHIS-VS

A summary of the ongoing 2014 vesicular stomatitis (VS) outbreak in Texas and Colorado was presented including background on the disease, statistics on the current situation, and next steps for determining future management of the disease in the U.S. in light of OIE’s 2014 decision to remove the disease from the list of immediately notifiable animal diseases. To date, a total of three hundred eighty-eight (388) VSV-positive premises have been identified in two U.S. states, Colorado (326 premises) and Texas (62 premises). There have been 14 counties affected in Colorado (Adams, Arapahoe, Boulder, Broomfield, Douglas, El Paso, Fremont, Jefferson, Larimer, Logan, Morgan, Otero, Pueblo, and Weld Counties) and 13 counties affected in Texas (Bastrop, Falls, Guadalupe, Hidalgo, Jim Wells, Kinney, Lee, McLennan, Nueces, San Patricio, Travis, Val Verde, and Williamson Counties). Of the 388 total VSV-positive premises, 370 have been positive equine premises, 16 have been positive bovine premises, and two premises have had both cattle and horses positive. Positive premises are eligible for quarantine release 21 days after lesions have healed in all affected animals. At the time of this meeting, two hundred sixty-one (261) premises in Colorado have been released from quarantine and there are an additional forty-one (41) premises in Colorado on 21-day countdown to quarantine release. As of October 13, 2014, all confirmed VSV-positive premises in Texas have been released from quarantine. Weekly situation reports and maps from the incident are publically available on the USDA-APHIS website.

**Texas Vesicular Stomatitis Report**  
T.R. Lansford, Texas Animal Health Commission

The 2104 national index case of vesicular stomatitis virus infection (VSV) was diagnosed in equine in Kinney County, Texas, on May 23, 2014. Historical VSV outbreaks have begun in southwest Texas and progress northward and westward across Texas and into other western states. The 2014 VSV outbreak did not follow that pattern. The next cases of VSV were disclosed more than 300 miles away in the Lower Rio Grande River Valley of Texas, followed by cases located west northwest of Corpus Christi. The outbreak progressed into central Texas with the majority of the cases occurring just east of Austin in Bastrop and Travis counties. The final infected
case was diagnosed on August 28. The final quarantine was released on October 13, 2014. In total, 13 Texas counties had positive premises during the 2014 outbreak.

Texas Animal Health Commission (TAHC) and United States Department of Agriculture, Veterinary Services (USDA-VS) Foreign Animal Disease Diagnosticians (FADDs) investigated 126 cases of vesicular lesions since May 23, 2014. Investigations were performed not only on equine, but cattle, sheep, goats, and hogs as well. Sixty-two (62) premises were found to have animals infected with VSV. Of the 62 premises, 58 were found to have infected equine and four were found to have infected cattle. A total of 89 horses and eight head of cattle were disclosed as a result of these investigations.

**Colorado Vesicular Stomatitis Report**
Keith Roehr, Colorado Department of Agriculture

Vesicular Stomatitis in Colorado is a cyclically, endemic, foreign animal disease. This report provides epidemiologic information on the Colorado 2014 Vesicular Stomatitis Outbreak. Included are notable variations in clinical signs of disease in confirmed cases, geographic distribution, reports on case numbers and species affected. In light of the potential delisting of Vesicular Stomatitis in 2015, I have shared some generalized thoughts in potential changes in the focus of state’s equine response:

- Focus on accredited veterinarians completing in equine field case work
- Positive cases would still be quarantined
- Cost of testing could be borne by the horse owner
  - Colorado State could be approved to do horse case testing, FADDL still test bovine cases

**USDA-ARS KBUSLIRL Tick/Biting Fly Research**
Beto Perez de Leon, USDA-ARS

Dr. Perez DeLeon provided an overview of all research activities at the USDA-ARS Knipling-Bushland U.S. Livestock Insects Research Laboratory (KBSUSLIRL) Research Center headquartered in Kerrville, Texas.
The Texas Cattle Fever Tick Eradication Program (CFTEP) reported a total of 11 infested premises in the Free Area of Texas and 17 infested premises in the Permanent Quarantine Zone on September 30, 2014.

The tick activity level varies along the length of the Permanent Quarantine Zone. In recent years the bulk of the new infestations have been found in Starr and Zapata counties. In May of 2014 an infested pasture was discovered in the Free Area of Cameron County. This 6,000 acre pasture is leased land owned by the Brownsville Ship Channel. Adjacent to this property is the Bahia Grande Fish and Wildlife Services (FWS) Wildlife Refuge.

Later in the summer of 2014, two Cameron County cattle owners reported suspected fever tick infestations on their properties. The CFTEP confirmed fever tick infestations at both locations. By late summer 2014 fever ticks had be identified in the free area of Cameron County at three locations-- near the Quarantine zone, four miles north and eight miles north of the Quarantine zone. By the end of FY 2014 a 220,000 acre temporary blanket quarantine had been established and manned by a joint Texas Animal Health Commission (TAHC) and USDA Task Force. An additional three infested pastures were identified by September 30, 2014.
Early speculation is that free-ranging exotic Nilgai Antelope are using the FWS Wildlife refuges to move from infested areas in Mexico into the free areas of Texas.

Additionally in FY 2014:

The CFTEP worked with USDA, State and Industry partners to develop and deploy a tick vaccine in the Permanent Quarantine Zone. The vaccine project was significantly delayed by residual adjuvant droplets found at the necropsy of the animals used in the pen test. The vaccine was reformulated with a water-based adjuvant and was scheduled for a field safety trial early in FY2015.

**Cameron County Temporary Fever Tick Quarantine update**

Dee Ellis, TAHC

The Cameron County Temporary Quarantine Zone (blanket) was created October 8, in far southern Texas. There are currently six infested premises in the blanket zone which is in the eastern part of Cameron County north of the permanent quarantine zone which borders the Brownsville ship channel. The blanket zone comprises approximately 223,000 acres and runs to the north up to Willacy County and is bordered on the east by the Laguna Madre. There are two newly infested premises found in October just outside the northern border of the blanket and the pastures will range into southern Willacy County. Epidemiologic studies are underway to determine the risk of fever ticks into the “Free area” in portions of Cameron and Willacy County which may ultimately require amendment or enlargement of the blanket boundaries. Free ranging nilgai are considered to be part of the problem and more studies are needed related to the biology of the species, its range and possible treatment options in the wild. An Incident Command system of organization is being used, and is being managed by USDA-VS and Texas Animal Health Commission (TAHC) personnel in partnership to accommodate necessary movements of horses and cattle, servicing hunter surveillance 24/7 and evaluating all premises with susceptible species within the blanket.

**Committee Business**

There were no resolutions considered. One recommendation was proposed and passed in support of the creation of a new USAHA Bovine Trichomoniasis committee and also creation of a supporting AAVLD Scientific Advisory Committee. The text of the Recommendation passed in entirety is included below.

**Recommendation:**

**Creation of a USAHA Committee on Trichomoniasis in Cattle**

*Trichomonas foetus* is an obligate parasite of the bovine reproductive tract that causes a highly contagious venereal disease with significant economic impact to the cattle industry. The importance of the disease is reflected by the dramatic increase in the number of states that have recently developed Trichomoniasis regulatory programs.
Effectively addressing Trichomoniasis in the cattle industry requires a national forum for sharing information and developing best management plans. The creation of a USAHA committee where cattle producers can work together with members of the scientific community as well as state and federal animal health officials to solve the problems faced by the industry is critical.

The Committee must contain a strong Scientific Advisory Subcommittee supported by the AAVLD.

Mission Statement
The purpose of the Trichomoniasis committee is:
1) Discuss scientific, laboratory, regulatory, commerce and political issues regarding T fetus and its effect on the cattle industry.
2) Evaluate interstate and intrastate regulatory issues.
3) Recommend effective disease control and management programs.
REPORT OF THE COMMITTEE ON PHARMACEUTICALS  
Chair: Christine Hoang, IL  
Vice Chair: Liz Wagstrom, DC 

Tom Burkgren, IA; Stephen Crawford, NH; Barbara Determan, IA; William Fales, MO; Timothy Goldsmith, MN; Eric Gonder, NC; Kristi Henderson, IL; Rick Hill, IA; Christine Hoang, IL; Donald Hoenig, ME; Jennifer Koeman, CAN; David Marshall, NC; Shelley Mehlenbacher, VT; M. Gatz Riddell, Jr., AL; Craig Shultz, PA; Liz Wagstrom, DC; Brad Williams, TX; Ellen Mary Wilson, NM.

The Committee met on October 21, 2014 at the Sheraton Hotel in Kansas City, Missouri, from 8-11:30 a.m. There were eight members and seven guests present.

USDA Response for Antimicrobial Resistance and National Antimicrobial Resistance Monitoring System (NARMs) Update
Eileen Thacker  
USDA-Agricultural Research Service (ARS)  

There is an increased recognition of the importance of antimicrobial resistance (AMR), and is a major priority in the One Health movement. Thacker gave a summary of federal programs addressing AMR:

- **Interagency Task Force on Antimicrobial Resistance**  
  o Surveillance  
  o Prevention/Control of Resistance  
  o Research  
  o Product Development  

- **NARMS**  
  o CDC/FDA/USDA  
  o Transitioning to FSIS Cecal Sampling  
  o Working to get more timely and improved format for reports  
  o Potential for Whole Genome Sequencing to provide more/more granular data  
  o ARS Food Safety – NP 108 Research Program provides advisory function to NARMS for interpretation of data and analysis of unique isolates  

- **White House Executive Order – Combatting Antimicrobial Resistance (CARB)**  
  o Stewardship  
  o Lab Networks + Data Collection  
  o Develop Diagnostics and New Products  
  o Research  
  o International Collaboration  

- **President’s Council of Advisors on Science and Technology (PCAST)**  
  o Surveillance
On-Farm NARMS Research Reports
Eileen Thacker, USDA-ARS

Dr. Thacker gave an overview of the on-farm pilot projects for dairy, beef, poultry and swine that USDA-ARS had coordinated. They were largely proof of concept that on-farm data could be collected. The actual data belongs to the scientists that ARS provided grant money, and the hope is that it will be published in peer reviewed publications.

Initiatives and Data on Antimicrobial Drug Use and Resistance on Livestock Facilities
Dave Dargatz, Center for Epidemiology and Animal Health, USDA-Animal and Plant Health Inspection Service (APHIS),

Dr. Dargatz gave an overview of the history of National Animal Health Monitoring System.
- Periodic, statistically based with goal of representing at least 70% of the operations and 70% of the animals
- Types of data collected on antibiotic use have varied over time and between commodities
- Data is shifting to being more granular with the hope to estimate number of animals receiving some treatment rather than percent of operations

- Summary of the Collaboration for Animal Health and Food Safety Epidemiology (CAHFSE) pilot study
  - 2005-2007, 54 swine farms in 5 states
  - Provided data on prevalence of pathogens, resistance profiles
  - Did collect some use data
  - Did not collect carcass data

- Augmentation of NAHMS studies
  - Apley, et al. paper utilized NAHMS data and a veterinary survey to estimate antimicrobial use in feed of swine.

Veterinary Feed Directive (VFD)
Harry Snelson, American Association of Swine Veterinarians

Dr. Snelson gave an overview of current requirements and discussed potential changes along with an expansion of VFD. He identified areas of concern including refills.
- Overview of current requirements
- Discussion of potential changes and expansion of VFD
- Areas of concern identified
  - Refills/standing orders
  - On farm mixing and top dressing
Is farm distributor and client?
  o Medicated milk replacers

National Residue Program
Charles Pixley, USDA-FSIS
  • Overview of Residue Program
    o Move to multi-residue method allows for samples to be tested for over 50 compounds
    o Scheduled testing of sample of animals that have passed ante-mortem
    o Inspector generated in plant
  • Preliminary FY2014 results
    o Scheduled tests over 6000 samples tested for over 500,000 analytes – 9 carcasses with 11 violations (less than 0.2% violations)
    o Inspector Generated over 210,000 samples tested – 1097 carcasses, 1355 violations (0.52% violations)

Committee Business
  The Committee discussed the increasing importance of USDA in the area of antimicrobial resistance and the collection of data on antimicrobial use and felt strongly that the committee should continue. They also recommend that Tim Goldsmith become vice-chair of the Committee.
The Committee on Program met on Saturday, October 18, 2014 at 6:00 p.m. at the Sheraton Hotel in Kansas City, Missouri. There were 30 members and two staff in attendance. Bruce King 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

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.

King 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, with additional comments from Don Hoenig.

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, and requests directed internally to the executive committee or committee on government relations.
Boyd Parr asked chairs to be thinking of issues for the 2015 Committee on Government Relations, to be held likely in March. He encouraged chairs to continue thinking of issues during their committee meetings, and leading up to the spring meeting. While all chairs are invited, there is limited space, so issues will be prioritized for these meetings.

Crawford led some discussion on the proposed strategic plan, highlighting some areas particularly relevant to committees such as review of committee structure and numbers, as well as scheduling for the annual meeting.

Crawford presented the following chairs with a plaque recognizing them for their service for five years, or as they step down:
- Nick Striegel, Animal Emergency Management
- Lisa Becton, Animal Health Surveillance and Information Systems
- Kevin Snekvik, Aquaculture
- Gail Golab, Animal Welfare
- Jim Logan, Brucellosis
- Mike Gilsdorf, Diagnostic Laboratory and Veterinary Workforce Development
- Don Hoenig, International Standards
- Elisabeth Patton, Johne’s Disease
- Christine Hoang, Pharmaceuticals
- Sandi Norman, Public Health and Rabies

There was time for a few questions from chairs. With no further business the meeting was adjourned.
The Committee met on October 21, 2014 at the Sheraton Hotel in Kansas City, Missouri, from 1:00 to 5:30 p.m. There were 24 members and 29 guests present. Dr. Norman welcomed members and guests and provided introductory comments. The published agenda was modified to accommodate an update on Ebola virus.

Presentations and Reports

Ebola Virus Update
Casey Barton-Behravesh, Centers for Disease Control and Prevention

Dr. Barton-Behravesh’s presentation was via telephone. She reviewed the current situation of Ebola virus in West Africa and in the United States. There is a collaborative effort between Centers for Disease Control and Prevention (CDC), United States Department of Agriculture (USDA), and the American Veterinary Medical Association (AVMA) to develop guidelines for handling animals that may be exposed to Ebola virus. Four work groups have been established. These are Companion Animal, Livestock, Zoos, and Personal Protective Equipment. Dr. Barton-Behravesh indicated that testing for animals is not readily available at this time. Any testing needs prior authorization by CDC. At this time, it is not thought that pets are at risk for Ebola virus in the United States.
Evaluation of Current Rabies Exposure Policies: Comparing the anamnestic responses in currently vaccinated vs. out-of-date dogs and cats
Mike Moore, Rabies Laboratory, Kansas State University

The disposition of vaccinated dogs and cats exposed or potentially exposed to rabies varies significantly depending on the temporal status of their rabies vaccination history. The *Compendium of Animal Rabies Prevention and Control* recommends a rabies booster and a 45 day observation period for dogs and cats that are currently vaccinated. Dogs and cats that are not vaccinated are euthanized or placed in strict isolation for six months. We believe both of these recommendations are sound scientific approaches. The challenging cases are the dogs and cats that are overdue for a booster. These animals are usually relegated to the “euthanize” or “six month quarantine” category. Many times this is done out of fear for public safety or interpretation of laws written by non-scientists. We compare the anamnestic responses of current and overdue dogs and make a case for the change in the disposition of overdue dogs and cats to mirror that of current animals.

The Global Economic Burden of Rabies
Stephanie Shwiff, Aaron Anderson, National Wildlife Research Center, USDA-APHIS Wildlife Services (WS)

Although canine rabies has been eliminated from industrialized countries, infected dogs remain the primary source of human and livestock exposures in Asia, Africa and much of South America. Human deaths are the most important direct economic impact of canine rabies, followed by livestock losses and the cost of post-exposure prophylaxis (PEP), while expenses associated with dog vaccination and control are major indirect impacts. The global burden of rabies disproportionately affects Asia, which experiences more than half of human rabies deaths and approximately 65% of livestock losses, and performs more than 90% of PEP. Africa is second to Asia in terms of human deaths and livestock losses, but administers the least number of PEPs of the three regions. Recent experience in Latin America shows that efforts to reduce human deaths from rabies through expanded dog vaccination and improved access to PEP result in significant monetary savings. The elimination of canine rabies would lead to major economic benefits in developing countries that are often the least capable of dealing with the disease.
Campylobacter jejuni Infections Associated with Raccoon Contact at a Wildlife Rehabilitation Center

Samantha Saunders, CDC/CSTE Applied Epidemiology Fellow, Minnesota Department of Health, Acute Disease Investigation and Control Section
Kirk Smith, Joni Scheftel, Minnesota Department of Health, Acute Disease Investigation and Control Section
Renee Schott, The Wildlife Rehabilitation Center, Minnesota

Background: In September 2013, the Minnesota Department of Health identified two Campylobacter jejuni cases who reported volunteering at the same wildlife rehabilitation center (WRC). The cases’ isolates were indistinguishable by pulsed-field gel electrophoresis (PFGE). An investigation was initiated to determine whether there was an association between volunteering at the WRC and illness.

Methods: A case-control study design was used. Cases were defined as people who volunteered at the WRC during July-September 2013 and experienced fever and diarrhea, or diarrhea lasting ≥3 days, within one week of working at the WRC. Controls were defined as individuals who had volunteered at the WRC during July-September 2013. Cases and controls were interviewed about animal species handled, tasks performed, use of personal protective equipment (PPE), disease training, eating and drinking habits at the WRC, and hand washing. Pooled animal fecal samples were collected from six different animal locations: avian nursery, waterfowl nursery, laundry room, raccoon nursery, squirrel nursery, and rabbit room.

Results: Of the 184 individuals enrolled, 18 (10%) met the case definition. In univariate analyses, contact with multiple animal species was significantly associated with illness. In a multivariate model, only direct contact with raccoons was independently associated with illness (adjusted odds ratio [aOR], 12.2; 95% confidence interval [CI], 1.84-80.1; p=0.001). Both pooled juvenile raccoon samples tested positive for Campylobacter jejuni; all other pooled animal fecal samples were negative for Campylobacter. The PFGE pattern of isolates from raccoons was indistinguishable from that of the two index case isolates.

Conclusions: This was an outbreak of Campylobacter jejuni infections associated with raccoon contact among volunteers/staff at a wildlife rehabilitation center. Raccoons were identified as the source of infection through a case-control study and through isolation of the outbreak strain of Campylobacter jejuni from raccoon feces. Increased infection control measures were recommended, and the importance of PPE usage and hand washing were stressed.

USDA-Animal and Plant Health Inspection Service (APHIS)-Wildlife Services (WS) Rabies Update

Richard Chipman, National Rabies Management Coordinator, USDA, APHIS, Wildlife Services

In FY2014, APHIS distributed >8.1 million oral rabies vaccination (ORV) baits over 163,000 km² (an area almost the size of Wisconsin) in 15 states: Alabama, Florida, Georgia, Maine, Massachusetts, New Hampshire, New York, North Carolina, Ohio, Pennsylvania, Tennessee, Texas, Vermont,
Virginia, and West Virginia. Bait distribution included Raboral V-RG® and ONRAB vaccines that prevented raccoon rabies from spreading beyond the eastern U.S. and canine rabies from reemerging in Texas. These efforts included the distribution of 233,100 ORV baits in Concho County, Texas during a continued contingency action surrounding the first case of Texas gray fox (TXGF) variant in the U.S. since May 2009 (which occurred in May 2013). This effort helped prevent the spread of rabies beyond this one case. In addition, the NRMP is supporting (GIS, logistics) a skunk ORV trial west of Houston being conducted by the Texas Department of State Health Services (TDSHS). In January, >1.2 million Raboral V-RG® coated sachet baits were distributed by WS helicopter at varying bait densities (25, 58 and 116 baits/km²) targeting skunks in Texas. In cooperation with the Centers for Disease Control and Prevention (CDC) and state agricultural, health, and fish and wildlife agencies, the NRMP continued to expand use of the direct rapid immunohistochemical test (dRIT), a rapid diagnostic test that can confirm rabies in 50 minutes in the field, allowing for sound decisions in real-time based on the best available rabies surveillance data. To date, WS has sent 66 personnel from 20 states for dRIT training and certification at the CDC. From 2005 through October 15, 2014, WS collected 80,821 animals (from 27 states) to enhance rabies surveillance. Of those, WS tested 66,993 samples (from 23 states) using the dRIT, while the remaining animals were submitted to local public health laboratories or the CDC; 1,248 of the dRIT tested animals were confirmed rabid. Following a field trial conducted by APHIS in West Virginia in 2011 using ONRAB (a recombinant oral rabies vaccine that uses a human adenovirus5 as the virus vector to express the rabies glycoprotein), the trial was replicated in West Virginia and expanded to New York, Vermont, New Hampshire and Ohio in FY2012. Due to unusual laboratory results, blood samples from Ohio and West Virginia collected in 2012 are being retested. Preliminary results showed rabies antibody levels in the New York-Vermont-New Hampshire field trial were substantially higher post-ORV (66.1%) than prior to ONRAB baiting (29.5%) in 2012. In FY2013, ONRAB trials were repeated again in New York, Vermont, New Hampshire, Ohio and West Virginia with expansion in northeastern New York by APHIS as well as a Cornell-led field trial in the vicinity of Buffalo, New York. Serology results are pending for all of the APHIS trial states except for Vermont. Preliminary results continue to be promising with 58.4% of the pre-bait samples showing antibodies and 68.1% showing antibodies after baiting. The high antibody level prior to baiting is likely because 20% of the animals captured during the pre-bait interval in 2013 were recaptures from 2012, so had potentially been exposed to bait before. In FY2014, the New York, Vermont, New Hampshire and Ohio trials were again repeated, while in West Virginia ONRAB baiting was done at 300 baits/km² targeting skunks (rather than 75 baits/km² for raccoons as in FY2011-FY2013). Nearly 1.7 million ONRAB baits were distributed in the five states. Pre-ONRAB trapping in all states took place from June 23-August 15 and >2,600 raccoons were captured and sampled prior to FY2014 ONRAB ORV distribution. Post-
ONRAB trapping took place in all states from September 23-October 17 and more than 1,800 raccoons were sampled. All FY2014 results are pending from laboratories.

**Knowledge Gaps Limit Application of ORV to Emerging Skunk Rabies Concerns in the United States**

Emily Lankau, Joanne Maki, Merial

Oral rabies vaccine (ORV) filled baits have been successfully applied to reducing rabies virus transmission in U.S. wildlife populations, including coyotes, gray foxes, and raccoons. However, control of rabies in striped skunks (*Mephitis mephitis*) with ORV has proved a more challenging prospect, despite laboratory evidence that available oral vaccines are immunogenic in skunks. Effective delivery of ORV to skunks in the field setting has proved more difficult than other reservoir species, presumptively due to differences in the biology, behavior, and ecology of this species. In this presentation, we review skunk rabies epidemiology in the United States and highlight regions with established and emerging skunk rabies concerns. Next we will review laboratory and field evidence of RABORAL V-RG efficacy in skunks, including a recent bait density trial performed in Texas. Finally, we will discuss why skunks remain a difficult species to reach with ORV baits and will outline future research needs to address gaps in understanding of skunk ecology and bait consumption that may improve capacity to use ORV for controlling rabies virus circulation in this species.

**USDA-APHIS One Health Coordination Center Update**

Tracey Lynn, USDA, APHIS, Veterinary Services, One Health Coordination Center

Dr. Tracey Lynn provided a brief overview of the five VS One Health Priority Areas: Zoonotic Disease Engagement, Antimicrobial Resistance, Pre-Harvest Food Safety, Pandemic Preparedness and Response, and Global Health Security. She provided an in-depth look at one key project designed to foster greater cross-agency collaborations – the One Health Systems Mapping and Analysis Resource Toolkit. OH-SMART consists of a series of six steps that stakeholder organizations work through together. The method guides participants through activities to gain a better understanding of what drives One Health collaborations, and allows cross-agency networks to create a shared understanding of the One Health system. Using an interactive mapping process, participants build consensus on best practices and standardized operating procedures for current and future cross-sectoral work and collaboration in their state or country. The One Health Coordination Center (OHCC) is seeing a number of positive outcomes from the OH-SMART training workshops, including development of cross-sectoral action plans, workforce development and training, and identification and implementation of best practices. Several states have used the method to strengthen outbreak and all-hazards incident response plans. OH-SMART is a valuable tool to analyze the interactions and connections between sectors,
and is useful to augment - not replace - other systems analysis tools or workforce assessments, including the World Animal Health Organization (OIE), Performance of Veterinary Services (PVS) tool. OHCC believes the OH-SMART workshops are a valuable way to advance the Global Health Security agenda. The OHCC is actively working to get the method included in the Global Health Security implementation plans. The next OH-SMART training workshop will be May 19-21 in Minneapolis Minnesota.

25 Year Anniversary Review: Raboral V-RG
Joanne Maki and Emily Lankau, Merial

Sanofi-Pasteur and Merial are One Health leaders in the global fight against rabies. As a veterinary vaccine manufacturer, Merial has a 25 year history of working with private and public partners to control wildlife rabies using an orally-delivered vaccinia-vectored rabies vaccine. After a successful application of this vaccine in Europe to control rabies in red foxes, RABORAL V-RG® was chosen to be developed as the first licensed wildlife oral rabies vaccine in North America. After pivotal studies conducted on Paramore Island, Virginia, the first oral rabies vaccination (ORV) program in the United States was initiated on Cape May, New Jersey during 1992. Additional raccoon rabies control programs followed at the federal, state, and county levels. Coordinated ORV programs proved successful in establishing a barrier against the western spread of raccoon rabies beyond the Appalachian Mountains. Smaller programs reduced prevalence of raccoon rabies in vaccinated zones and local elimination of virus circulation was achieved. Programs using RABORAL V-RG® have led to regional elimination of rabies from Texas coyote populations and near elimination of the Texas gray foxes variant in the United States. Internationally, the vaccine has aided rabies control efforts in multiple species, including foxes in Canada and Israel, raccoons in Canada, and raccoon dogs in South Korea. After 25 years in the global market, RABORAL V-RG has repeatedly been shown to be a cost-effective component of rabies prevention. Even so, many challenges to effective wildlife rabies control in the U.S. and internationally remain, including: an improved understanding of key program parameters which will lead to regional rabies elimination in North American raccoon and skunk populations, emerging rabies cases in hard-to-reach species such as skunks and ferret badgers, and the long-term battle to garner stable financial and political support for ORV programs after cases decline due to successful ORV programs. Both strong partnership and rigorous science will be required from the rabies community to address these challenges.
Coxiella burnetti and Zoonotic Infectious Diseases in Arctic Wildlife

Robert Gerlach, State Veterinarian, Alaska Department of Environmental Conservation

Diagnosis of Coxiella burnetti and Brucella spp. in the Northern Fur Seals on the remote Native village of St. Paul resulted in a public health concern for the residents who rely on these animals as part of their subsistence diet. The Northern Fur Seal population has been declining over the last 40 years as a result of reduced birthing rate. The identification of a number of zoonotic pathogens in the seals by wildlife biologist resulted in a collaborative effort among state and federal public health and animal health agencies to address the risk of infection to the village residents. This one health investigation involved active surveillance in the community health clinic, evaluating archive and contemporary serum samples of the resident s and further testing of animal and environmental samples. Results illustrated that the public health risk for contracting brucellosis or Q Fever from the consumption of northern fur seals is low.

Committee Business

The Committee passed a resolution requesting an increase in funding for the USDA-APHIS-WS oral rabies vaccination program. That resolution was forwarded to the Committee on Nominations and Resolutions for review. Don Hoenig presented the resolution in the absence of Don Lein who was unable to make it due to illness. Dr Norman asked committee members to think of him and send best wishes to him. The resolution was passed.

Dr. Norman and Dr. Frank thanked Committee members for their participation and told them how much they enjoyed their tenure with the Committee. Names of committee members who expressed interest in the chairmanship had their names forwarded to the President for consideration. He will appoint the next committee chair.

With no further business before the Committee, it was voted to adjourn.
REPORT OF THE COMMITTEE ON SALMONELLA  
Chair: Doug Waltman, GA  
Vice Chair: Richard Sellers, VA

David Ailor, DC; Chris Ashworth, AR; Deanna Baldwin, MD; Stacey Bosch, GA; Richard Breitmeyer, CA; Paul Brennan, IN; Dwight Bruno, NY; Jones Bryan, SC; Yung Fu Chang, NY; Kevin Custer, IA; Sherrill Davison, PA; Brandon Doss, AR; Tracy DuVernoy, MD; Tony Frazier, AL; Mallory Gaines, DC; Richard Gast, GA; Eric Gingerich, IN; Eric Gonder, NC; Jean Guard, GA; Scott Gustin, AR; 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, BC; Michael Kopp, IN; Elizabeth Krushinskie, DE; Dale Lauer, MN; Elizabeth Lautner, IA; Tsang Long Lin, IN; Rick Linscott, ME; Edward Mallinson, MD; Beth Mamer, ID; Sarah Mason, NC; Patrick McDonough, NY; 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 Roney, GA; A. Gregorio Rosales, AL; John Sanders, WV; Travis Schaal, IA; Joni Scheftel, MN; Richard Sellers, VA; Tom Sidwa, TX; Terry Slaten, AL; John Smith, GA; Bruce Stewart-Brown, MD; Patricia Stonger, WI; Belinda Thompson, NY; Alberto Torres, AR; Bob Tully, KS; Liz Wagstrom, DC; Don Waldrip, TN; Doug Waltman, GA; Scott Wells, MN; Nora Wineland, MO; Ching Ching Wu, IN.

The Committee met on October 21, 2014 at the Sheraton Hotel in Kansas City, Missouri, from 8:00 a.m. to 12:00 p.m. There were 22 members and 29 guests present. After the Chair opened the meeting and welcomed the attendees, he reminded those present to sign the attendance sheets. Members of the committee should check to see that their contact information was correct and if they were not members they were to sign the blank sheets and they could 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.

The Chair reviewed the previous year's Resolution and the response by USDA. July 2014, USDA--FSIS denied the Center for Science in the Public Interest (CSPI) petition (http://www.fsis.usda.gov/wps/wcm/connect/73037007-59d6-4b47-87b7-2748edaa1d3e/FSIS-response-CSPI-073114.pdf?MOD=AJPERES), which was the desire of the Resolution. However, on October 1, 2014 CSPI submitted a revised petition to FSIS (http://cspinet.org/new/pdf/oct-14-abr-petition.pdf).
Multistrain Salmonella Outbreaks
Stacey Bosch, Division of Foodborne, Waterborne and Environmental Diseases, Centers for Disease Control and Prevention

Fewer producers of food having a wider distribution have resulted in changes in the characteristics of foodborne outbreaks. These outbreaks are often caused by industrial contamination events. A few illnesses in each of many jurisdictions have necessitated detection by national laboratory-based surveillance. When bacteria are isolated from ill individuals, these laboratories create deoxyribonucleic acid (DNA) fingerprints using pulsed-field gel electrophoresis (PFGE) and the pattern is uploaded into a national data base called PulseNet. The idea is that bacteria with the same fingerprint are more likely to come from a common source. PulseNet monitors the database for collections, or clusters, of similar patterns uploaded in the past 2-4 months. These patterns are visually compared in order to identify indistinguishable patterns. When a cluster of indistinguishable patterns is identified, PulseNet notifies foodborne epidemiologists and an outbreak investigation begins.

How does Centers for Disease Control and Prevention (CDC) know when different “fingerprints” come from the same source? They look at three primary types of evidence:

1. Epidemiologic: Do ill persons eat food items more frequently than we would expect?
2. Traceback: Do food reported by ill persons come from a common source?
3. Microbiologic: Is the outbreak strain found in the food or production environment?

Evidence in two of the three criteria is generally sufficient for action.

There are three characteristics of multistrain salmonella outbreaks:

1. Multiple serotypes or Polarized Fractal Efficiency (PFE) patterns are identified, but have commonalities between human isolates, meat, product, or animal isolates, and environmental samples.
2. Patients have similar epidemiology
3. Patients report the same exposure
The table below lists the multi-strain outbreaks since 2011.

<table>
<thead>
<tr>
<th>Year</th>
<th>Serotype(s)</th>
<th># PFGE patterns</th>
<th>Vehicle</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>Heidelberg</td>
<td>2</td>
<td>Ground turkey</td>
</tr>
<tr>
<td>2011</td>
<td>Altona, Johannesburg</td>
<td>12</td>
<td>Live poultry</td>
</tr>
<tr>
<td>2012</td>
<td>Infantis, Newport, Lille</td>
<td>7</td>
<td>Live poultry</td>
</tr>
<tr>
<td>2012</td>
<td>Bareilly, Nchanga</td>
<td>2</td>
<td>Ground tuna</td>
</tr>
<tr>
<td>2013</td>
<td>Montivideo, Mbandaka</td>
<td>2</td>
<td>Tahini paste</td>
</tr>
<tr>
<td>2013</td>
<td>Infantis, Lille, Newport, Mbandaka</td>
<td>6</td>
<td>Live poultry</td>
</tr>
<tr>
<td>2013</td>
<td>Heidelberg</td>
<td>7</td>
<td>Chicken</td>
</tr>
<tr>
<td>2014</td>
<td>Newport, Hartford, Oranienburg</td>
<td>4</td>
<td>Sprouted chia powder</td>
</tr>
<tr>
<td>2014</td>
<td>Infantis, Newport, Hadar</td>
<td>5</td>
<td>Live poultry</td>
</tr>
</tbody>
</table>

**Outbreak of Salmonella Heidelberg (July 2013 – July 2014)**

On June 17, 2013 PulseNet detected a cluster of *Salmonella* Heidelberg illnesses with a rare PFGE pattern. After hypothesis-generating interviews of ill persons, 88% of ill persons reported eating chicken and 67% reported eating Company A brand chicken. The same rare PFGE pattern in a chicken breast sample from Company A was identified through routine pathogen testing of retail meat in California.

During July and August, PulseNet detected six additional clusters of Heidelberg illnesses with a similar geographic distribution. A high proportion of ill persons reported having eaten chicken, specifically Company A brand. Testing identified outbreak strains in leftover Company A chicken collected from two ill person’s homes. Therefore the seven PFGE patterns were combined into a single investigation.

USDA-FSIS in September 2013 conducted testing at three Company A facilities. Five of seven outbreak patterns were identified in two of the facilities and four of seven patterns were identified in the other facility. During the first week of October over 25 ill persons with a single outbreak strain reported eating rotisserie chickens purchased from the same location of a national warehouse store chain. The chickens were sourced from Company
REPORT OF THE COMMITTEE

A. California public health officials collected leftovers from the homes of two ill persons and identified one of the outbreak strains in both samples. Therefore as of October 2013 a summary of the findings included:

**Epidemiologic**
- 80% chicken (105/132)
- 79% Company A brand (48/61)
- Illness clusters in CA
- Whole chickens and parts reported

**Traceback**
- Products traced back to three Company A facilities
- Illnesses could not be linked to one specific product or production period

**Microbiologic**
- Outbreak strains identified in
  - Patients
  - Leftover food
  - Retail chicken samples from Company A
- Outbreak strains identified by FSIS at the three Company A facilities

On October 7, 2013 USDA-FSIS issued a Public Health Alert and delivered a Notice of Intended Enforcement to Company A. On October 12 and 17 the national warehouse store chain recalled approximately 100,000 pounds of ready-to-eat chicken products.

**Outbreak due to Salmonella Infantis, Newport, and Hadar (February – October 2014)**

In April, PulseNet detected two clusters of *Salmonella* Infantis and one cluster of *Salmonella* Newport. Interviews were conducted with ill persons in all clusters with similar temporal and geographic distribution of illnesses. Exposure to live poultry was frequently reported and the poultry was sourced from a single mail-order hatchery (Hatchery A).

In May, PulseNet detected additional *Salmonella* Infantis cluster and a cluster of *Salmonella* Hadar illnesses. The temporal and geographic distribution of illnesses was similar to the prior cases. Exposure to live poultry was frequently reported and the poultry was sourced from Hatchery A. Therefore all five PFGE patterns were combined into a single investigation.

**NVSL Salmonella Update**

Brenda Morningstar-Shaw, National Veterinary Services Laboratory, USDA-APHIS-VS

*Salmonella* serotypes isolated from animals in the United States: January 1-December 31, 2013


The Diagnostic Bacteriology Laboratory within the National Veterinary Services Laboratories (NVSL) routinely serotype *Salmonella* isolates submitted by private, state, and federal laboratories as well as veterinarians,
Salmonella researchers and other animal health officials. Most submissions were from diagnostic laboratories across the U.S. This report summarizes *Salmonella* serotyping submissions to NVSL from January 1 through December 31, 2013. *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 source specific summaries. Based on information provided by the submitter the isolates were divided into animal source categories for analysis. The animal sources include Avian (avian of unknown origin, condor, crow, finch, hawk, goose, sparrow, partridge, parrot, parakeet, pheasant, pigeon quail, duck, and owl), Cattle, Chicken, Dog/Cat, Horse (horse, donkey, mule), Other Domestic (alpaca, ferret, goat, sheep, guinea pig, llama, mink), Pigs, Reptiles/Amphibians (iguana, lizard, reptile, snake, turtle, tortoise, amphibian, frog, alligator, crocodile), Turkey, Wild/Zoo (antelope, deer, fish, marine mammals, opossum, rabbit, raccoon, rodent, camel, monkey, lemur, tiger, zebra, rhinoceros, wallaby, cervid, cheetah, coyote, gazelle, jaguar, leopard, lion, warthog), and Other (environment, unknown).

*Salmonella* serotyping at the NVSL is an ISO 17025 accredited test. *Salmonellae* are typed using polyvalent and single factor antisera to determine the O and H antigens. Approximately 60% of the sera used at the NVSL is produced in house as previously described. (Ewing) The remaining antisera are purchased from commercial vendors. All sera are subject to extensive quality control testing prior to use. *Salmonella* antigenic formulae are determined as previously described (Ewing) and interpreted via the White-Kauffmann-Le Minor scheme (Grimont). The subspecies designation precedes the antigenic formula for those serotypes other than subspecies I.

In 2013, 15,209 submissions were received for *Salmonella* serotyping. *Salmonella* isolates were divided into clinical isolates (5,516), non-clinical isolates (6,753), research isolates (2,725) and "other" (215). Isolates that were submitted for *S. Enteritidis* or *S. Heidelberg* rule-out testing are included in the clinical and non-clinical counts. The sources of clinical and non-clinical *Salmonella* isolates are shown in Table 1. There were 304 different serotypes identified in 2013. Table 2 lists the ten most common serotypes when all animal sources were combined. The most common isolates from chickens, turkeys, pigs, cattle, and horses are listed in Tables 3-7.

The NVSL provided a *Salmonella* Group D proficiency test to assess the ability of laboratories to isolate *Salmonella* from environmental samples and determine the serogroup (specifically group D) of any *Salmonella* isolated. The samples consisted of drag swabs spiked with *Salmonella* serotypes Enteritidis, Javiana, Saintpaul, Anatum, Oranienburg, Heidelberg, Ouakam, Virchow, 9,12:non-motile, and an *sdf* negative Enteritidis. Contaminant bacteria included *Enterobacter cloacae*, *Escherichia coli*, *Citrobacter freundii*, *Pseudomonas aeruginosa*, and *Providencia* sp. The test consisted of ten...
samples which were shipped to laboratories overnight on ice packs. Laboratories were instructed to use their current protocols to test and were asked to report the results within three weeks. The NVSL randomly retained 8% of the test kits and tested them blindly for quality assurance (QA) purposes. The results of the proficiency test are shown in Table 8. Additionally, the NVSL offered a Salmonella serotyping proficiency test to allow laboratories to assess their ability to serogroup or serotype Salmonella. The panel consisted of ten pure Salmonella isolates, including Salmonella serotypes Heidelberg, Senftenberg, Enteritidis, Kentucky, Mbandaka, Anatum, Give, Typhimurium, Berta and Agona. Participants were given the option to perform serogrouping, partial serotyping, or full serotyping of the isolates and were graded based on appropriate identification to the level of typing they performed. The NVSL randomly retained 19% of the test kits and tested them blindly for QA purposes. The results of the proficiency test are shown in Table 9.

Table 1: Sources of submissions to the NVSL for Salmonella serotyping in 2013

<table>
<thead>
<tr>
<th>Source</th>
<th>No. Clinical Submissions</th>
<th>No. Non-Clinical Submissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cattle</td>
<td>1,504</td>
<td>248</td>
</tr>
<tr>
<td>Chicken</td>
<td>182</td>
<td>3,730</td>
</tr>
<tr>
<td>Horse</td>
<td>376</td>
<td>121</td>
</tr>
<tr>
<td>Swine</td>
<td>2,356</td>
<td>30</td>
</tr>
<tr>
<td>Turkey</td>
<td>420</td>
<td>958</td>
</tr>
<tr>
<td>All others</td>
<td>1,751</td>
<td>1,723</td>
</tr>
<tr>
<td>Total</td>
<td>6,589</td>
<td>6,810</td>
</tr>
</tbody>
</table>

Table 2: Most common serotypes in 2013: All sources

<table>
<thead>
<tr>
<th>Serotype</th>
<th>No. Isolates</th>
<th>Serotype</th>
<th>No. Isolates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typhimurium</td>
<td>921</td>
<td>Senftenberg</td>
<td>895</td>
</tr>
<tr>
<td>4,(5),12:i:-</td>
<td>464</td>
<td>Kentucky</td>
<td>716</td>
</tr>
<tr>
<td>Dublin</td>
<td>324</td>
<td>Heidelberg</td>
<td>662</td>
</tr>
<tr>
<td>Derby</td>
<td>321</td>
<td>Enteritidis</td>
<td>591</td>
</tr>
<tr>
<td>Agona</td>
<td>301</td>
<td>Mbandaka</td>
<td>568</td>
</tr>
<tr>
<td>Cerro</td>
<td>266</td>
<td>Typhimurium</td>
<td>331</td>
</tr>
<tr>
<td>Senftenberg</td>
<td>209</td>
<td>Braenderup</td>
<td>185</td>
</tr>
<tr>
<td>Montevideo</td>
<td>196</td>
<td>Anatum</td>
<td>166</td>
</tr>
<tr>
<td>Heidelberg</td>
<td>188</td>
<td>Agona</td>
<td>136</td>
</tr>
<tr>
<td>Newport</td>
<td>174</td>
<td>Hadar</td>
<td>136</td>
</tr>
<tr>
<td>All others</td>
<td>3,225</td>
<td>All others</td>
<td>2,424</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>6,589</strong></td>
<td><strong>Total</strong></td>
<td><strong>6,810</strong></td>
</tr>
</tbody>
</table>
### Table 3: Most common serotypes in 2013: Chickens

<table>
<thead>
<tr>
<th>Serotype</th>
<th>No. Isolates</th>
<th>Serotype</th>
<th>No. Isolates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enteritidis</td>
<td>71</td>
<td>Senftenberg</td>
<td>570</td>
</tr>
<tr>
<td>Kentucky</td>
<td>21</td>
<td>Kentucky</td>
<td>505</td>
</tr>
<tr>
<td>Typhimurium</td>
<td>15</td>
<td>Mbandaka</td>
<td>429</td>
</tr>
<tr>
<td>Heidelberg</td>
<td>9</td>
<td>Heidelberg</td>
<td>371</td>
</tr>
<tr>
<td>Mbandaka</td>
<td>8</td>
<td>Enteritidis</td>
<td>329</td>
</tr>
<tr>
<td>All others</td>
<td>58</td>
<td>Typhimurium</td>
<td>201</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Infantis</td>
<td>74</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cerro</td>
<td>67</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Newport</td>
<td>65</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Montevideo</td>
<td>62</td>
</tr>
<tr>
<td></td>
<td></td>
<td>All others</td>
<td>1,057</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>182</strong></td>
<td><strong>Total</strong></td>
<td><strong>3,730</strong></td>
</tr>
</tbody>
</table>

### Table 4: Most common serotypes in 2013: Turkeys

<table>
<thead>
<tr>
<th>Serotype</th>
<th>No. Isolates</th>
<th>Serotype</th>
<th>No. Isolates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senftenberg</td>
<td>135</td>
<td>Senftenberg</td>
<td>228</td>
</tr>
<tr>
<td>Albany</td>
<td>58</td>
<td>Hadar</td>
<td>115</td>
</tr>
<tr>
<td>Bredeney</td>
<td>32</td>
<td>Anatum</td>
<td>109</td>
</tr>
<tr>
<td>Montevideo</td>
<td>32</td>
<td>Albany</td>
<td>78</td>
</tr>
<tr>
<td>Ouakam</td>
<td>29</td>
<td>Muenster</td>
<td>73</td>
</tr>
<tr>
<td>Heidelberg</td>
<td>28</td>
<td>Agona</td>
<td>70</td>
</tr>
<tr>
<td>All others</td>
<td>106</td>
<td>Cerro</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Saintpaul</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Kentucky</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4,(5),12:-</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td></td>
<td>All others</td>
<td>193</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>420</strong></td>
<td><strong>Total</strong></td>
<td><strong>958</strong></td>
</tr>
</tbody>
</table>

### Table 5: Most common serotypes in 2013: Pigs

<table>
<thead>
<tr>
<th>Serotype</th>
<th>No. Isolates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typhimurium</td>
<td>568</td>
</tr>
<tr>
<td>4,(5),12:i:-</td>
<td>359</td>
</tr>
<tr>
<td>Derby</td>
<td>315</td>
</tr>
<tr>
<td>Agona</td>
<td>210</td>
</tr>
<tr>
<td>Infantis</td>
<td>123</td>
</tr>
<tr>
<td>Heidelberg</td>
<td>79</td>
</tr>
<tr>
<td>Senftenberg</td>
<td>61</td>
</tr>
<tr>
<td>Worthington</td>
<td>56</td>
</tr>
<tr>
<td>Johannesburg</td>
<td>54</td>
</tr>
</tbody>
</table>
### Table 6: Most common serotypes in 2013: Cattle

<table>
<thead>
<tr>
<th>Serotype</th>
<th>No. Isolates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dublin</td>
<td>324</td>
</tr>
<tr>
<td>Cerro</td>
<td>287</td>
</tr>
<tr>
<td>Typhimurium</td>
<td>237</td>
</tr>
<tr>
<td>Montevideo</td>
<td>147</td>
</tr>
<tr>
<td>4,5,12:i:-</td>
<td>78</td>
</tr>
<tr>
<td>Newport</td>
<td>74</td>
</tr>
<tr>
<td>Heidelberg</td>
<td>65</td>
</tr>
<tr>
<td>Anatum</td>
<td>59</td>
</tr>
<tr>
<td>Muenster</td>
<td>46</td>
</tr>
<tr>
<td>Meleagridis</td>
<td>41</td>
</tr>
<tr>
<td>All others</td>
<td>394</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,752</strong></td>
</tr>
</tbody>
</table>

### Table 7: Most common serotypes in 2013: Horses

<table>
<thead>
<tr>
<th>Serotype</th>
<th>No. Isolates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typhimurium</td>
<td>81</td>
</tr>
<tr>
<td>Anatum</td>
<td>67</td>
</tr>
<tr>
<td>Newport</td>
<td>59</td>
</tr>
<tr>
<td>Agona</td>
<td>52</td>
</tr>
<tr>
<td>Javiana</td>
<td>21</td>
</tr>
<tr>
<td>Braenderup</td>
<td>21</td>
</tr>
<tr>
<td>4,5,12:i:-</td>
<td>18</td>
</tr>
<tr>
<td>Muenster</td>
<td>13</td>
</tr>
<tr>
<td>Meleagridis</td>
<td>12</td>
</tr>
<tr>
<td>Ohio</td>
<td>10</td>
</tr>
<tr>
<td>All others</td>
<td>143</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>497</strong></td>
</tr>
</tbody>
</table>

### Table 8: Summary of NVSL *Salmonella* Group D proficiency test

<table>
<thead>
<tr>
<th></th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participants</td>
<td>40</td>
<td>55</td>
<td>70</td>
<td>73</td>
<td>61</td>
</tr>
<tr>
<td>Mean Score</td>
<td>93%</td>
<td>92%</td>
<td>97%</td>
<td>92%</td>
<td>94%</td>
</tr>
<tr>
<td>Score Range</td>
<td>100-44%</td>
<td>100-44%</td>
<td>100-85%</td>
<td>100%-29%</td>
<td>100-68%</td>
</tr>
<tr>
<td>Below Passing</td>
<td>4</td>
<td>3</td>
<td>0</td>
<td>N/A*</td>
<td>N/A**</td>
</tr>
</tbody>
</table>
Because of the change in grading method, a pass/fail designation was not assigned.
*2012 Seven individuals scored less than 80%
**2013 Four laboratories scored less that 80%

<table>
<thead>
<tr>
<th>Table 9: Summary of NVSL Salmonella Serotyping proficiency test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serogrouping 2012</td>
</tr>
<tr>
<td>Participants</td>
</tr>
<tr>
<td>Mean Score</td>
</tr>
<tr>
<td>Score Range</td>
</tr>
</tbody>
</table>


Salmonella enteric serotypes: Antimicrobial resistance trends from the NARMS Program
Heather Harbottle, FDA, NARMS

The National Antimicrobial Resistance Monitoring System (NARMS) is a national public health surveillance program that monitors the susceptibility of enteric bacteria to antimicrobial agents of medical importance in order to help assess the impact of veterinary antimicrobial use on human health. The program is comprised of three Arms - the Human Arm at CDC, the Animal Arm at USDA, and the Retail Arm at the FDA-CVM. All three Arms report resistance trends in non-Typhoidal Salmonella, Campylobacter, E. coli, and Enterococcus species. CDC collects clinical isolates from all 50 states. FDA works with FoodNet and State Public Health Labs to collect retail meat samples from grocery stores in 14 states. Each state laboratory purchases ten packages each of chicken breasts, pork chops, ground turkey, and ground beef per month.

All 14 states culture for Salmonella and Campylobacter and four states (GA, OR, TN, MD) culture for E. coli and Enterococcus. The Animal Arm has historically been comprised of HACCP samples collected by USDA-Food Safety Inspection Service (FSIS) from animals at slaughter. Beginning in 2013, the Animal Arm of NARMS is adding an "in-plant" sampling program whereby cecal sampling will be conducted. Cecal samples better reflect animal status and are less confounded by plant events. A randomized, nationally representative testing of slaughterhouses was designed.

An "on-farm" pilot sampling program has been initiated by NARMS and is led by USDA-Agricultural Research Service (ARS) in partnership with universities and industry. The goals of this program include evaluating the logistical challenges and the potential value in adding a pre-harvest component to NARMS, examining the differences in resistance on farm and
The data presented in this presentation is from the 2011 Executive Report. A major revamp of the report is underway, in response to criticisms and requests from stakeholders. The online 2011 Executive Report features an interactive data display where users can customize the graphical representation of the data for particular years, drugs, or sources. It is located at the following website:

http://www.fda.gov/AnimalVeterinary/SafetyHealth/AntimicrobialResistance/NationalAntimicrobialResistanceMonitoringSystem/ucm416741.htm

In 2011, 3,725 non-Typhoidal *Salmonella* isolates were tested consisting of 2,344 from humans, 357 from retail meats and 1,024 from healthy food animals at slaughter. Animal isolates consisted of 491 from chicken, 103 from turkeys, 340 from cattle, and 90 from swine. In retail meats, *Salmonella* was isolated from 12% of ground turkey, 12% of retail chicken, 2% of pork chops and 1% of ground beef samples.

The Highest levels of resistance in Human isolates were resistant to tetracycline, streptomycin and ampicillin. The highest levels of resistance in animal and retail chicken, turkey, cattle, and swine were to tetracycline, sulfa drugs, ampicillin and streptomycin.

Ceftriaxone is considered a critically important drug for treating severe *Salmonella* infections. A closely related cephalosporin antibiotic, ceftiofur, is licensed for use in food animal production. Historically, the same molecular mechanism has been responsible for resistance to both ceftriaxone and ceftiofur in NARMS isolates. Retail ground turkey isolates resistant to ceftriaxone increased from 5% in 2008 to 22% in 2011. Resistance in isolates from cattle increased from 59% in 2009 to 77% in 2011 among isolates of serotype Newport. The continued rise in ceftriaxone resistance led to the April 2012 cephalosporin order of prohibition which prohibits certain unapproved uses of cephalosporin drugs in cattle, swine, chickens and turkeys.

Multi drug resistance (MDR) increased from 30% to 50% in 2011 in ground turkey and increased from 28% to 45% in 2011, after peaking at 49% in 2009 in retail chicken. MDR declined in human isolates from 12.1% in 2003-2007 to 9.1% in 2011. Slaughtered Chicken (8%) and slaughtered swine (16%) isolates have declined in 2011 to the lowest levels since testing began. MDR resistance among retail beef and slaughtered turkeys also has declined when compared with the five year average. When the 2011 resistance levels from retail turkey and retail chicken are compared to the five year baseline, this increase appears to be the largest among the 9 sources tested in NARMS.

MDR in serotype I4,[5],12:i:-increased from 6% in 2007 to 27% in 2011 in human isolates and increased from 7% in 2008 to 33% in 2011 in chickens at slaughter. MDR in serotype Heidelberg increased from 13% in 2006 to 34% in 2010, declining slightly to 30% in 2011 in human isolates. MDR increased
from 40% in 2006 to 93% in 2011 in ground turkey and increased from 44% in 2006 to 60% in 2011 in turkeys at slaughter.

Summary:
- No resistance was detected in 85% of non-Typhoidal *Salmonella* isolates from humans in 2011.
- Highest prevalence of resistant *Salmonella* was identified in retail chicken, retail turkey, and retail pork, followed by poultry at slaughter.
- Ceftriaxone resistance increased in retail turkey and slaughtered cattle isolates.
- Tetracycline resistance in *Salmonella* serotypes remained at the highest level from all animal sources, followed by streptomycin, ampicillin, and sulfadiazine.
- Ciprofloxacin and nalidixic acid resistance remained less than 3% from all sources.
- MDR to three and four classes of antimicrobials in *Salmonella* isolates from retail poultry meats increased.
- MDR in serotype I 4,[5],12:i:- isolates from humans continued to increase; a similar trend was observed among isolates from chickens at slaughter.
- MDR in serotype Heidelberg isolates increased from turkeys (60%) to retail turkeys (93%), and remained around 30% in human isolates.
- New testing methods for the Animal Arm component of NARMS will provide more informative data regarding antimicrobial resistance in foodborne pathogens on farm.
- New interactive graphs and a revamped Executive Report will provide more customizable data analyses and more timely reports.
- New whole-genome sequencing data from NARMS isolates will provide improved identification of resistance genes and mobile elements.

**FSIS Initiatives to Reduce Human Exposure to Salmonella**

John W. Linville, *Salmonella/Campylobacter* Policy Lead, USDA-FSIS-OPPD-PDS

The following preliminary data from Comminuted Chicken and Turkey samples served as a basis for developing performance standards.

<table>
<thead>
<tr>
<th>Samples</th>
<th>% Salmonella</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NRTE Comminuted Chicken</td>
</tr>
<tr>
<td>Ground</td>
<td>41%</td>
</tr>
<tr>
<td>Other</td>
<td>42%</td>
</tr>
<tr>
<td>Mechanically separated</td>
<td>82%</td>
</tr>
</tbody>
</table>
Similarly, the Chicken Parts National Prevalence study found the following:

<table>
<thead>
<tr>
<th>Chicken Part by Type</th>
<th>Number of Samples</th>
<th>Number of Salmonella Positives</th>
<th>Percent Salmonella Positives</th>
</tr>
</thead>
<tbody>
<tr>
<td>A – Breast</td>
<td>776</td>
<td>210</td>
<td>27.06%</td>
</tr>
<tr>
<td>B - Neck</td>
<td>22</td>
<td>12</td>
<td>54.55%</td>
</tr>
<tr>
<td>C - Leg</td>
<td>584</td>
<td>141</td>
<td>24.14%</td>
</tr>
<tr>
<td>D - Wing</td>
<td>321</td>
<td>107</td>
<td>33.33%</td>
</tr>
<tr>
<td>E - Half Carcass</td>
<td>149</td>
<td>33</td>
<td>22.15%</td>
</tr>
<tr>
<td>F - Quarter Carcass</td>
<td>330</td>
<td>68</td>
<td>20.61%</td>
</tr>
<tr>
<td>G - Giblets</td>
<td>57</td>
<td>23</td>
<td>40.35%</td>
</tr>
<tr>
<td>H - Other</td>
<td>248</td>
<td>59</td>
<td>23.79%</td>
</tr>
<tr>
<td>Type not provided</td>
<td>9</td>
<td>4</td>
<td>44.44%</td>
</tr>
<tr>
<td>Totals</td>
<td>2,496</td>
<td>657</td>
<td></td>
</tr>
</tbody>
</table>

The Performance Standards for the comminuted chicken and turkey and for chicken parts are currently in rule making and should be published in the next few months.

**CVM Salmonella Surveillance Update**
Dan McChesney, FDA-CVM

The objective of the Feed Contaminants Program include:
- Survey industry to identify potential problem areas and to ensure compliance
- Provide direction for FDA’s sampling program to help detect and control the presence of deleterious chemicals and microorganisms in food for animals.


Salmonella Surveillance objectives:
- Determine the prevalence of *Salmonella*
  - Determine the serovar, genetic fingerprint, and antimicrobial susceptibilities of each isolate
- Take action to ensure violative products removed from commerce (i.e., recall)
- Sample type
  - Pet food
  - Pet treat
  - Nutritional supplement for pet
  - Complete animal feed
SALMONELLA

- Ingredient
- Sample size
  Aseptically collect ten representative sub-samples from each lot, ~200 g per sub sample

Findings of Salmonella Surveillance: Food for Animals

<table>
<thead>
<tr>
<th>Year</th>
<th>Tested (n)</th>
<th>Positive (n)</th>
<th>Prevalence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002-2006</td>
<td>869</td>
<td>157</td>
<td>18.1</td>
</tr>
<tr>
<td>2007-2009</td>
<td>1189</td>
<td>100</td>
<td>8.4</td>
</tr>
<tr>
<td>2010</td>
<td>584</td>
<td>30</td>
<td>5.1</td>
</tr>
<tr>
<td>2011</td>
<td>684</td>
<td>51</td>
<td>7.4</td>
</tr>
<tr>
<td>2012</td>
<td>685</td>
<td>30</td>
<td>4.4</td>
</tr>
<tr>
<td>2010-2012</td>
<td>1953</td>
<td>111</td>
<td>5.7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sample Type</th>
<th>Prevalence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pet Food</td>
<td>13.0</td>
</tr>
<tr>
<td>Pet Treat</td>
<td>12.3</td>
</tr>
<tr>
<td>Supplement for Pet</td>
<td>18.8</td>
</tr>
<tr>
<td>Animal Feed</td>
<td>9.4</td>
</tr>
<tr>
<td>Plant Based Ingredients</td>
<td>11.0</td>
</tr>
<tr>
<td>Animal Based Ingredients</td>
<td>66.1</td>
</tr>
</tbody>
</table>

Committee Business
A proposed Resolution was submitted by Ed Mallinson (not present) on the Development of practical measures to increase air flow in a broiler house to reduce the presence/level of Salmonella. After discussion the Resolution was not approved.
NOTE: Denise Brinson, although was not on the agenda, submitted the National Poultry Improvement Plan (NPIP) update as a part of this report.
There were no isolations of *Salmonella* pullorum in commercial poultry in FY2011, FY2012, FY2013, or FY2014. There were no isolations of *Salmonella* pullorum in backyard birds in FY2013 or FY2014. 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

<table>
<thead>
<tr>
<th>Testing Year FY2014</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Egg and Meat-Type Chickens: Participating</td>
<td>225</td>
</tr>
<tr>
<td>Turkeys: Participating</td>
<td>37</td>
</tr>
<tr>
<td>Waterfowl, Exhibition Poultry and Game Birds: Participating</td>
<td>734</td>
</tr>
</tbody>
</table>

### Egg-Type Chicken Breeding Flocks in the National Poultry Improvement Plan Participation and Testing Summary

<table>
<thead>
<tr>
<th>Testing Year FY2014</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. Pullorum-Typhoid Clean Flocks</td>
<td>237</td>
</tr>
<tr>
<td>Birds in Flocks</td>
<td>6,233,761</td>
</tr>
<tr>
<td>Birds Tested</td>
<td>51,103</td>
</tr>
</tbody>
</table>

### Meat-Type Chicken Breeding Flocks in the National Poultry Improvement Plan Participation and Testing Summary

<table>
<thead>
<tr>
<th>Testing Year FY2014</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. Pullorum-Typhoid Clean Flocks</td>
<td>3,192</td>
</tr>
<tr>
<td>Birds in Flocks</td>
<td>72,671,121</td>
</tr>
<tr>
<td>Birds Tested</td>
<td>224,154</td>
</tr>
</tbody>
</table>

### Turkey Breeding Flocks in the National Poultry Improvement Plan

<table>
<thead>
<tr>
<th>Testing Year FY2014</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. Pullorum-Typhoid Clean Flocks:</td>
<td>492</td>
</tr>
<tr>
<td>Birds in Flocks</td>
<td>4,886,147</td>
</tr>
<tr>
<td>Birds Tested</td>
<td>20,048</td>
</tr>
</tbody>
</table>

### Waterfowl, Exhibition Poultry, and Game Birds Breeding Flocks in the National Poultry Improvement Plan Participation and Testing Summary

<table>
<thead>
<tr>
<th>Testing Year FY2014</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>U. S. Pullorum-Typhoid Clean Flocks</td>
<td>5,601</td>
</tr>
<tr>
<td>Birds in Flocks</td>
<td>1,574,450</td>
</tr>
<tr>
<td>Birds Tested</td>
<td>326,128</td>
</tr>
<tr>
<td>State</td>
<td>Flocks</td>
</tr>
<tr>
<td>--------------</td>
<td>--------</td>
</tr>
<tr>
<td>Arkansas</td>
<td>1</td>
</tr>
<tr>
<td>Georgia</td>
<td>4</td>
</tr>
<tr>
<td>Illinois</td>
<td>3</td>
</tr>
<tr>
<td>Indiana</td>
<td>15</td>
</tr>
<tr>
<td>Kentucky</td>
<td>1</td>
</tr>
<tr>
<td>Ohio</td>
<td>17</td>
</tr>
<tr>
<td>Oregon</td>
<td>2</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>16</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, 1990-2014

<table>
<thead>
<tr>
<th>State</th>
<th>Birds in Flocks</th>
<th>Flocks</th>
<th>Birds in Flocks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Texas</td>
<td>166,385</td>
<td>1</td>
<td>10,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Phage Type</th>
<th>Environmental</th>
<th>Dead Germ</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Phage Type 13</strong></td>
<td></td>
<td></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><strong>Phage type 13A</strong></td>
<td></td>
<td></td>
</tr>
<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><strong>Phage type 2</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flocks</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Birds in Flocks</td>
<td>28,900</td>
<td></td>
</tr>
<tr>
<td><strong>Phage type 23</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flocks</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>Birds in Flocks</td>
<td>16,000</td>
<td></td>
</tr>
<tr>
<td><strong>Phage type 28</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flocks</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Birds in Flocks</td>
<td>15,000</td>
<td>46,000</td>
</tr>
<tr>
<td><strong>Phage type 34</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flocks</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Birds in Flocks</td>
<td>12,500</td>
<td></td>
</tr>
</tbody>
</table>
## Egg-type Chicken breeding flocks with isolates of *Salmonella enteritidis*

*by phage type and by year 1989-2014*

<table>
<thead>
<tr>
<th>Year</th>
<th>No. Flocks</th>
<th>Phage Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1989</td>
<td>1</td>
<td>13A</td>
</tr>
<tr>
<td>1990</td>
<td>11</td>
<td>13A, 13, 8, 28</td>
</tr>
<tr>
<td>1991</td>
<td>12</td>
<td>13A, 13, 8</td>
</tr>
<tr>
<td>1992</td>
<td>10</td>
<td>Untypable, 13A, 8, 28, 34</td>
</tr>
<tr>
<td>1993</td>
<td>5</td>
<td>Untypable, 8, 2</td>
</tr>
<tr>
<td>1994</td>
<td>3</td>
<td>13A, 8</td>
</tr>
<tr>
<td>1995</td>
<td>2</td>
<td>13A, 28</td>
</tr>
<tr>
<td>1996</td>
<td>5</td>
<td>Untypable, RNDC, 13A, 8, 2</td>
</tr>
<tr>
<td>1997</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>1998</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>1999</td>
<td>1</td>
<td>13</td>
</tr>
<tr>
<td>2000</td>
<td>4</td>
<td>13, 8</td>
</tr>
<tr>
<td>2001</td>
<td>1</td>
<td>13</td>
</tr>
<tr>
<td>2002</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>2003</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>2004</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td>1</td>
<td>13</td>
</tr>
<tr>
<td>2006</td>
<td>1</td>
<td>34</td>
</tr>
<tr>
<td>2007</td>
<td>4</td>
<td>13, 8</td>
</tr>
<tr>
<td>2008</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>2009</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td>3</td>
<td>8(2), 13</td>
</tr>
</tbody>
</table>
### U.S. *Salmonella* enteritidis Clean Egg-Type Breeding Chickens
No. of flocks and birds in the flocks with *Salmonella* enteritidis isolates, 1990-2014

<table>
<thead>
<tr>
<th></th>
<th>Environmental</th>
<th>Dead Germ</th>
<th>Bird</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flocks</td>
<td>72</td>
<td>6</td>
<td>19</td>
</tr>
<tr>
<td>Birds in Flocks</td>
<td>726,871</td>
<td>77,179</td>
<td>201,342</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>No. of Flocks</th>
<th>Birds in Flocks</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>0</td>
<td>72</td>
</tr>
<tr>
<td>2012</td>
<td>0</td>
<td>72</td>
</tr>
<tr>
<td>2013</td>
<td>0</td>
<td>72</td>
</tr>
</tbody>
</table>
| 2014 | 1             | 72              | NA
The Committee met on October 21, 2014 at the Sheraton Hotel in Kansas City, Missouri, from 9:00 a.m. to 12:05 p.m. There were 13 members and 18 guests present.

Presentations and Reports

USDA-APHIS Scrapie Program Update and Scrapie Surveillance Projects
Diane Sutton, USDA-APHIS-VS

Scrapie Eradication Program Results
- The percent positive black-face sheep sampled at slaughter as of September 30, 2014, was 0.020 percent. This is a decrease of 51 percent compared to FY 2013.
- At the end of FY 2014, the percent of cull sheep found positive at slaughter and adjusted for face color was 0.019 percent. This measure increased by 31 percent compared to FY 2013, the increase was not statistically significant due to sample size.
- As of September 30, 2014, there were only six new infected or source flocks identified in FY 2014, compared to 11 in FY 2013 a decrease of 45 percent.
- In FY 2014 there was a 9 percent increase in the number of States meeting their sampling minimums for sheep and goats and notable improvement occurred in most States.

Slaughter Surveillance
- 48,102 sheep and goats (37,028 sheep and 8,285 goats) were sampled in FY 2014, exceeding the number of animals sampled in FY 2013 by 6 percent.
Scrapie Surveillance Plan

Implementation
- States with RSSS collection sites will continue to sample all targeted sheep and goats.
- 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 one 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 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.

Note: These are minimums. Plan is to continue to collect samples from the maximum number of targeted animals given the available budget.

ID Compliance:
- There were two untraceable scrapie positive sheep in FY 2014, reminding us of the importance of monitoring for and enforcing ID compliance.

Proposed Rules Planned for Publication:
- Veterinary Services (VS) plans to publish revisions to 9 CFR parts 54 and 79. The changes are intended to improve the effectiveness and cost efficiency of surveillance and to increase animal identification compliance by addressing gaps in identification and by requiring 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:
  - 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;
o 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);

o Tighten the definition of slaughter channels;

o 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);

o Limit the use of tattoos and implants to animals not moving through markets and not in slaughter channels; and

o 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 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)

• Implementation of the revised Scrapie Flock Certification Program (SFCP) in FY 2014 has increased the efficacy of the program while reducing program costs.

• At the end of FY 2014 there were 455 producers enrolled in the program.

Scrapie research at the National Animal Disease Center

Justin Greenlee, Virus and Prion Research Unit, National Animal Disease Center, Agricultural Research Service, USDA

The Virus and Prion Research Unit at the National Animal Disease Center has ongoing research projects with scrapie in sheep and goats, bovine spongiform encephalopathy, and chronic wasting disease. Several long-term sheep scrapie studies were completed this year and reported on in scientific journals. Two related manuscripts describe the findings of sheep with enhanced resistance (ARQ/ARR genotype) to scrapie after intracranial inoculation or oral inoculation within the first 24 hours of birth. The first manuscript demonstrates that ARQ/ARR sheep are susceptible to scrapie after intracranial inoculation, but with prolonged incubation times (56 month average) and without distribution of abnormal prion protein to the lymphoid system. The most important finding of the second manuscript is that when ARQ/ARR sheep are orally inoculated within the first 24 hours of life they do not develop scrapie after being monitored for 86 months post inoculation. In addition to these completed studies, there is ongoing work with a herd of goats naturally infected with scrapie. These animals were depopulated from an infected farm in 2014 and brought to the National Animal Disease Center for continued monitoring, serial testing by rectal biopsy and optical coherence tomography, and submission of postmortem samples to APHIS, National Veterinary Services Laboratory (NVSL) for final scrapie diagnosis. Out of 11 does and 17 kids obtained, there have been three positive rectal biopsies.
One case developed clinical signs and was necropsied. The two additional known cases continue to incubate in containment. One of the positive biopsies is from a kid born in September 2013 with the first positive biopsy obtained at approximately nine months of age. Finally, an update was given on an ongoing interspecies transmission study where white-tailed deer were inoculated with scrapie from sheep. White-tailed deer are susceptible to scrapie by a combined oral/intranasal inoculation and develop disease in 28-33 months. Interestingly, two molecular profiles are obtained from the abnormal prion protein in these deer when western blots are performed. One pattern is similar to the original scrapie inoculum, but the abnormal prion protein from the lymph nodes and certain brain regions has a different western blot profile. Material from brain regions with each of these patterns was passaged by the intranasal route to white-tailed deer and sheep. These animals will continue to be monitored for up to 3 additional years, but at this point, only two sheep have developed scrapie. Both of these sheep were VRQ/VRQ sheep inoculated with material with a western blot pattern similar to the original scrapie inoculum. Additional VRQ/ARQ and ARQ/ARQ are free from clinical signs and are scrapie negative by rectal biopsy.

2014 USAHA Scrapie Committee Update from ARS-Pullman
David Schneider, Animal Disease Research Unit, USDA-ARS

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. In this update, we report on the effects of the relatively highly polymorphic prion protein of goats on immunoassay detection of scrapie, the effects of age and processing of rectal biopsy tissue on the observance of RAMALT follicles, and our progress on adapting a highly sensitive in vitro assay in the detection of scrapie prions on farm surfaces. Regarding scrapie diagnosis, immunoassays (immunohistochemistry, ELISA, and western blot) are widely used to detect accumulation of disease-associated prion protein (PrP-Sc), the sensitivity of which critically depends on the binding of an antibody to its unique epitope on that protein. In the United States, diagnosis of scrapie infection relies on immunohistochemistry using a single antibody (F99/97.6.1). However, detection of PrP by F99/97.6.1 is reduced by a genetic variation in PrP known to occur in some goats. Detection by other anti-PrP antibodies that bind to other epitopes on the protein was not adversely affected. Additional genetic variants that occur in goats were also assessed, two of which interfered with detection by F89/160.1.5 (epitope amino acids 142-145, IHFG). Thus, in the absence of genetic testing, use of a multi-antibody approach may provide more robust detection of PrP-Sc in infected tissues from goats. Regarding rectal biopsy in the antemortem diagnosis of scrapie, we investigated the effects of age and tissue processing on the observance of RAMALT follicles, the anatomic structure in which PrPSc accumulates during disease. The number and density of RAMALT follicles were similarly and sharply reduced with aging, especially starting at about two years of age.
in both sheep and goats. Optimal follicle counts were achieved by sectioning flattened tissue to a mucosa-to-submucosa depth of ~300 um. Finally, we’ll report on our progress made in adapting serial protein misfolding cyclic amplification (sPMCA) to the detection of prions on metallic farm surfaces. With further development, sPMCA may provide a much needed tool for environmental risk and mitigation assessments.

Committee Business

The Committee discussed various ways to increase the collection of slaughter samples for scrapie testing. Suggestions included:

- Focus on establishments that slaughter club lambs and goats
- Contact producers or processors that conduct ethnic slaughter and encourage participation
- Visit all custom and state inspected establishments to identify those that are slaughtering targeted animals and offer to collect samples.

One state indicated that some establishments are reluctant to enter into an agreement with the federal government to provide samples even when a reimbursement fee is offered. Dr. Diane Sutton mentioned an alternative in which the USDA could enter into an agreement with the state which would, in turn, provide payment to the establishment for samples. States that are interested in this arrangement should contact their Assistant District Director.

Sutton also indicated that a previous pilot project in which the USDA paid accredited veterinarians to sample targeted animals on the farm had not been successful.

The Committee reviewed the USDA Sheep and Goat Health Business Plan which had been e-mailed to all committee members prior to the meeting. The Committee had no comments on the Plan during the business meeting. Sutton noted that written comments on the Plan could be submitted to APHIS via the sheep and goat website by November 1, 2014.

The final response to the Committee on Sheep and Goats’ 2013 resolution that urged the USDA-AHIS-VS to establish a separate funding line item for Sheep and Goat Health was reviewed. Although included in the Presidents proposed budget, Congress chose not to create this separate funding line when it finalized the FY 2013 and 2014 APHIS appropriations.

A resolution was introduced that urges the Secretary of Agriculture to quickly publish and finalize the proposed rule amending 9 CFR Parts 54 and 79. This rule has been in clearance for six years and is important to complete the eradication of scrapie. After a brief discussion and minor revisions the resolution was unanimously passed by the Committee.

The Committee reviewed its mission statement and no alterations were suggested. There was a discussion about whether the Committee on Scrapie and the Committee on Sheep and Goats should be combined. The
Committee members indicated that at this time the two committees should remain separate. Several members felt that while program changes are still being made, it is important to remain a separate committee. It was agreed that this decision should be reviewed annually.
REPORT OF THE COMMITTEE ON SHEEP AND GOATS
Chair: William Edmiston Jr., TX
Vice Chair: Don Knowles, WA

Scott Bender, AZ; Deborah Brennan, GA; John Clifford, DC; Thomas Conner, OH; Walter Cook, TX; Stephen Crawford, NH; Nancy East, CA; William Edmiston, TX; 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; Linda Logan, TX; Jim Logan, WY; Francine Lord, CAN; David Marshall, NC; 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, CA; Mo Salman, CO; A. David Scarfe, IL; Diane Sutton, MD; Peter Timm, CA; Stephen White, WA; Margaret Wild, CO; Ellen Mary Wilson, NM; William Wilson, KS; Nora Wineland, MO; David Winters, TX; Cindy Wolf, MN.

The Committee met on October 21, 2014 at the Sheraton Hotel in Kansas City, Missouri. The meeting was called to order by chair William Edmiston, at 1:10 p.m.

Domestic – Bighorn Sheep Interface Problem Overview and Research
Margaret Highland, USDA-ARS Animal Disease Research Unit

Dr. Highland discussed the research being carried out with domestic and bighorn sheep, detailing the multi-organism etiology of many respiratory infections, and discussed differences in response to physiological challenges between the two groups. The entire presentation is available at usaha.org under this Committee page.

Dr. Diane Sutton, USDA-APHIS, discussed and solicited input for the Sheep and Goat Comprehensive Surveillance. Opportunities to improve disease surveillance through more complete identification utilization and inclusion of less traditional marketing channels were debated.

The third presentation was an informational slide show concerning production of (CEVA) vaccine for *Coxiella burnetti*. This led to discussion of a human vaccine produced by bioCSL in Australia, with the possibility of pursuit of licensure and availability in the USA. Response to the USAHA resolution concerning *Coxiella* was discussed, and the following addition was drafted to that resolution.

2014 action- USAHA Sheep and Goat Committee urges USDA One Health Office to collaborate with CDC to gather the data on the impact of *Coxiella Burnetti* on human health and the relationship of that to the incidence of disease in animals. This information would be invaluable to support the advancement of the licensure of human and animal vaccines in the USA.
Committee Business

Cindy Wolf made the motion, and Paul Rodgers seconded, to include this addition to the *Coxiella* resolution. Motion passed.

A resolution from the Committee on Brucellosis was reviewed and adopted concerning standardizing *Brucella ovis* testing between all laboratories. Motion to adopt was made by Jim Logan, and seconded by Ron Miller, motion passed.

The 2013 resolution concerning brucellosis and tuberculosis (TB) in sheep and goats was reviewed, along with the response from USDA. The resolution was updated, including a request to USDA to declare the U.S. historically free of TB and brucellosis in sheep and goats, and urged the ending of testing for same in these animals. Motion by Paul Rodgers, second by Eileen Kuhlmann, motion passed.
The Committee met on October 20, 2014 from 1:00 to 5:50 p.m. and October 21, 2014 from 1:00 to 5:15 p.m. at the Sheraton Hotel in Kansas City, Missouri. There were 46 Committee members and 50 guests in attendance, for a total of 96 participants. Chair Dale Lauer presided assisted by Sarah Mason, Vice Chair. The Chair welcomed the Committee, summarized the 2013 meeting, and reported on the responses to the 2013 Resolution:
Resolution 17 and 18 (Combined with the Committee on Salmonella)

Subject Matter: OBJECTION TO SALMONELLA LINKED TO HUMAN ILLNESSES BEING DECLARED ADULTERANTS: The United States Animal Health Association (USAHA) urges the United States Department of Agriculture (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.

Response – USDA’s Food Safety and Inspection Service (FSIS) evaluated the petition from the Center for Science in the Public Interest (CSPI) requesting that antibiotic-resistant Salmonella be declared as adulterants. FSIS posted the CSPI letter as a related document to the CSPI petition on the FSIS website and in the administrative record. The USDA denied the CSPI petition (August 2014).

Presentations and Reports—Session 1

Annual Broiler Industry Report was presented by Dr. David Shapiro, Perdue Foods, LLC, Salisbury, MD. A summary of the report is included in these proceedings.

Annual Table Egg Industry Report was presented by Dr. Eric Gingerich, Diamond V, Zionsville, IN. A summary of the report is included in these proceedings.

Annual Turkey Industry Report was presented by Dr. Steven Clark, Pfizer Animal Health Global Poultry, West Jefferson, NC. A summary of the report is included in these proceedings.

Upland Gamebird Industry Report was presented by Mr. Bill MacFarlane, MacFarlane Pheasants, Janesville, WI. A summary of the report is included in these proceedings.

Annual Report for Backyard and Small Commercial Flocks Dr. Julie Helm, Livestock Poultry Health, Clemson University, Columbia, SC. A summary of the report is included in these proceedings.

Avian Influenza and Newcastle Disease Subcommittee Report was presented by Dr. David Suarez, USDA-ARS, Athens, GA. The report was approved by the Committee and a summary is included in these proceedings.

Southeast Poultry Research Lab Research (SEPRL) Update was presented by Dr. David Suarez and Dr. Darrel Kapczynski, USDA-ARS, Athens, GA. A summary of the report is included in these proceedings.

The U.S. Poultry & Egg Association Research Report was presented by Dr. Gregorio Rosales, Aviagen, Inc., Huntsville, AL in lieu of Dr. John Glisson. A summary of the report is included in these proceedings.

Update on the Proposal for a U.S. National List of Reportable Animal Diseases (NLRAD) and on the National Animal Health Reporting System (NAHRS) was presented by Dr. Stan Bruntz, USDA APHIS VS Science, Technology and Analysis Services (STAS), Fort Collins, CO. A summary of the presentation is included in these proceedings.
National Animal Health Monitoring System/Layers 2013 Report was presented by Dr. Lindsey Garber, USDA-APHIS-VS-CEAH-NAHMS, Fort Collins, CO. A summary of the report is included in these proceedings.

Avian Disease and Oncology Lab (ADOL) Research Update was presented by Dr. John Dunn, USDA Agricultural Research Service, East Lansing, MI. A summary of the report is included in these proceedings.

Industry Concerns with AI Response Plans was presented by Dr. David Shapiro, Perdue Foods, LLC, Salisbury, MD. A summary of the report is included in these proceedings.

California H5N8 LPAI Incident Report was presented by Dr. Sarah Mize, California Department of Food and Agriculture, Ontario, CA. A summary of the report is included in these proceedings.

The Monday session adjourned at 5:50 p.m. The Committee reconvened at 1:00 p.m. on Tuesday, October 21, 2014.

Presentations and Reports—Session 2

Off Site Carcass Disposal Challenges in FAD Outbreaks was presented by Dr. Jimmy Tickel, North Carolina Department of Agriculture & Consumer Services Emergency Programs Division, Raleigh, NC. A summary of the report is included in these proceedings.

Minnesota NAI Tabletop Exercise report was presented by Dr. Shauna Voss, Minnesota Board of Animal Health, Willmar, MN. A summary of the report is included in these proceedings.

Secure Poultry Supply Plan report was presented by Dr. Tim Goldsmith, University of Minnesota, Center for Animal Health and Food Safety, St. Paul, MN. A summary of the report is included in these proceedings.

A World Organization for Animal Health (OIE) update on poultry activities was presented by Dr. Michael David, Director of Sanitary International Standards, National Center for Import and Export, USDA-APHIS-VS, Riverdale, MD. A summary of the report is included in these proceedings.

Annual Status report for the National Poultry Improvement Plan (NPIP) was presented by Dr. Denise Brinson, USDA-APHIS-VS, National Poultry Improvement Plan (NPIP), Conyers, GA. A summary of the report is included in these proceedings.

Annual Status Report for Avian Influenza and Newcastle Disease (NDV) Diagnostics was presented by Dr. Mia Kim Torchetti, National Veterinary Services Laboratory (NVSL), Ames, IA. A summary of the report is included in these proceedings.

Annual NVSL Bacteriology Diagnostic Report was presented by Ms. Brenda Morningstar-Shaw, NVSL, Ames, Iowa. A summary of the report is included in these proceedings.

Live Bird Market System Update Report was presented by Dr. Elena Behnke, USDA-APHIS-VS, National Poultry Improvement Plan (NPIP),
REPORT OF THE COMMITTEE

Conyers, GA, in lieu of Dr. Fidel Hegngi. A summary of the report is included in these proceedings.

**Reovirus Infection, Diagnostics and Prevention in Turkeys** update was presented by Dr. Ben Wileman, Ag Forte, Willmar, MN. A summary of the report is included in these proceedings.

**Evaluation of Pre-movement Active Surveillance Options for Broilers** was presented by Dr. Sasidhar Malladi, University of Minnesota and the USDA-APHIS-VS-Center for Epidemiology and Animal Health (CEAH). A summary of the report is included in these proceedings.

**The Chicken Gut Microbiome** was presented by Dr. Hosni Hassan, Prestage Department of Poultry Science, NCSU, Raleigh NC. A summary of the report is included in these proceedings.

**Committee on Salmonella Report** was presented by Dr. Doug Waltman, Georgia Poultry Laboratory Network, Oakwood GA. A summary of the report is included in these proceedings.

**Committee Business**

No Resolutions were proposed, and no Recommendations were proposed this year.

In old business, the Chair reported that a previous 2012 Resolution sent to the Department of Homeland Security concerning funding of avian influenza vaccine production received no response. The Chair will follow up on the Resolution to determine the outcome.

**New Business**

The Chair reported that the previous Chair (Dr. David Swayne) of the Subcommittee on Avian Influenza and Newcastle Disease (AIV/NDV) will be stepping down. Dr. David Suarez has offered and is willing to take over the AIV / NDV Subcommittee Chair position. The Chair will follow-up with Dr. Suarez and confirm this change.

Dr. Bruce Stewart-Brown will be stepping down as the poultry commodity representative to the Committee on the National List of Reportable Animal Diseases (NLRAD). The Chair asked TDP members to consider assuming this open position on the committee. After discussion it was suggested the Chair consult the current leadership of the Veterinarians in Broiler Production for possible candidates for this position. The Chair asked TDP committee members to consider other possible candidate. December 1, 2014 was set as the deadline for filling the position.

OIE request for comments on proposed changes to the Terrestrial Code will be published soon (November-December, 2014). The Chair will forward the request for comments to TDP committee members when received.

The Chair urged TDP members to review 2015-2020 USAHA Strategic Plan.

The Chair announced that a meeting survey will be sent to TDP members for comments on the 2014 meeting.
There being no additional business, a motion was made and seconded to adjourn, and the motion was approved.

Presentation and Report Summaries

Broiler Industry Report
David Shapiro, Perdue Foods LLC

Broiler Production: Production thus far in 2014 is about 2.5% lower by broiler head but about 1.5% higher in dressed pounds (due to higher average slaughter weight) than the same period in 2013 and is projected to be close to the same as last year. Average broiler weight has increased slightly. Average feed cost is lower than last year.

Mortality: First week mortality over the first half of 2014 is slightly higher than the same period in 2013. 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. This same trend was reported last year. Total mortality during the first half of 2014 was 0.48% higher than the same period in 2013. This was reflected in most weight classes but was more pronounced in the heavier broiler classes. This same trend was also reported last year.

Condemnations: Whole Body Farm Condemnations + Parts Condemnations increase from 0.538% in the first half of 2013 to 0.568% in the first half of 2014. Septic toxemia accounted for the increase with IP, airsacculitis and leukosis all decreasing.

Key Broiler Health Issues: Coccidiosis was again listed as the highest ranking disease by broiler veterinarians. This reflects not only the actual frequency of diagnosis or treatment of coccidiosis but also to the cost and challenge of maintaining effective anticoccidial programs. Eimeria Maxima was the coccidial 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. Both this year and last, it was ranked second.

Infectious Bronchitis continues to be a challenge, whether due to new strains or failure to of vaccination programs to protect completely against existing strains.

Other diseases ranked in the top rankings of the most recent survey of the Association of Veterinarians in Broiler Production (AVBP) members were ILT (an increasing problem regionally), chick quality/early mortality, IP, Gangrenous Dermatitis, Necrotic Enteritis, E. Coli airsacculitis, Femoral Head Necrosis, Kinky-Back, Foot Pad Dermatitis, and Gumboro disease.

Generally, the diseases of concern have not changed from last year.

Key Non-Disease Broiler Issues: Salmonella (as a food safety concern) was ranked highest in the non-disease issue category. Salmonellosis also ranked highly (65th percentile) in the disease ranking,
leaving no doubt as to the importance of this genus to modern broiler production.

As significant change from last year was the high ranking of Antibiotic-Free (ABF) issues compared to last year. This is undoubtedly related to recent public announcements regarding increased production and demand for ABF poultry by both customers and broiler production companies.

Like last year, the loss or lack of effective drugs was ranked highly a key issue. Also, similar to last year, increased regulation by the USDA and FDA were ranked highly as serious concerns. Increased monitoring of Salmonella spp. and Campylobacter spp. in the processing plant and the future implementation of FDA guidelines for drug use are the most likely causes.

Other non-disease issues ranked in the top ten percentile of the most recent AVBP members included Poultry Welfare, Biosecurity, Campylobacter, Paw Quality, and accuracy of FSIS condemnation dispositions.

Increasing and more stringent poultry welfare audits occupy more of a broiler veterinarian’s time than previously.

Paw Quality was not listed as a major concern in previous years, but was ranked highly this year. Many companies report increasing challenges maintained paw quality (minimizing foot pad dermatitis).

U.S. Table Egg Industry Update, October 2013 to October 2014

Eric Gingerich, Diamond V

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 34 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. 16 members of the total membership of 100 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><strong>Prevalence</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yolk Infections</td>
<td>1.19 (1.32)*</td>
<td>1.14 (1.47)</td>
</tr>
<tr>
<td>Starveouts</td>
<td>1.25 (1.14)</td>
<td>1.14 (1.21)</td>
</tr>
<tr>
<td></td>
<td>0.93 (1.05)</td>
<td>1.08 (1.19)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
* 2013 survey results are in parenthesis

Yolk infections and starveouts are associated with hatch egg quality, hatchery sanitation, and hatchery management of incubation, sanitation, chick processing, holding, and delivery. Compared to last year’s survey, these problems appear to be subsiding.

The survey revealed the following top 5 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>Prevalence</td>
<td>Importance</td>
</tr>
<tr>
<td>1 – Coccidiosis (1.50)</td>
<td>1 – Coccidiosis (2.00)</td>
</tr>
<tr>
<td>2 – Necrotic enteritis (1.00), E. coli (1.00)</td>
<td>2 – Infectious bursal disease (1.47)</td>
</tr>
<tr>
<td>3 – Infectious laryngotracheitis (1.40)</td>
<td>3 – Ascarids (1.21)</td>
</tr>
<tr>
<td>4 – Infectious Laryngotracheitis (0.88)</td>
<td>4 – Marek’s (1.27)</td>
</tr>
<tr>
<td>5 – Post SE bacterin hepatitis (0.81)</td>
<td>5 - Post SE bacterin hepatitis (1.20)</td>
</tr>
</tbody>
</table>

**Coccidiosis and secondary necrotic enteritis** remains the major disease concern in pullets. It is an increasing problem in caged pullets as well with vaccine usage as an intervention on the rise.

**Marek’s Disease in cagefree pullets** is due to early exposure to Marek’s virus laden dust from the prior flock in the house that is not removed.
by the cleaning and disinfection program between flocks. Marek’s vaccine requires 5 to 7 days to provide full immunity.

**SE bacterin induced hepatitis syndrome** can result in up to 7 percent mortality starting 2 weeks after the administration of SE bacterin. It is has a genetic susceptibility base as it has not been seen in one strain of birds. 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.

**Infectious laryngotracheitis** is causing losses of pullet flocks in enzootic areas.

To follow are the top 5 diseases for caged and cage-free layers from the survey:

<table>
<thead>
<tr>
<th>Top 5 Caged Layer Diseases</th>
<th>Top 5 Cage-Free Layer Diseases</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Prevalence</strong></td>
<td><strong>Importance</strong></td>
</tr>
<tr>
<td>1 – E. coli (1.69)</td>
<td>1 – E. coli (2.07)</td>
</tr>
<tr>
<td>2 – Focal Duodenal Necrosis (FDN) (1.63)</td>
<td>2 – Calcium depletion (1.93)</td>
</tr>
<tr>
<td>2 – <em>Mycoplasma Gallisepticum</em> (1.63)</td>
<td>2 – FDN</td>
</tr>
<tr>
<td>4 – Calcium depletion (1.56)</td>
<td>4 – MG (1.80)</td>
</tr>
<tr>
<td>4 – Cannibalism</td>
<td>4 – ILT</td>
</tr>
<tr>
<td>4 – Mites</td>
<td>5 – Infectious bronchitis (1.47)</td>
</tr>
</tbody>
</table>

**Cannibalism** continues to be seen in cagefree flocks especially in high light intensity situations. In these cases, the 10-day or younger rule for beak trimming results in longer beaks than desired compared to a beak trim at 4 to 8 weeks and may result in an increase in incidence and severity of cannibalism. As this is a major problem for cage-free flocks that are gaining market share, 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** continues as the #1 disease problem in caged flocks and 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. in early lay. It also
may be a primary problem if water lines are contaminated with *E. coli*. The overall prevalence of early colibacillosis was about the same as last year, 1.62. 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** continues to maintain high importance in caged flocks and 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 accompanied with lower feed consumption through improvements in management and genetics.

**Focal duodenal necrosis (FDN),** felt to be due to *Clostridium Colinum*, is an under-diagnosed problem and has come up to #2 in importance from #5 last year. 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 antibiotics chlorotetacycline or bacitracin are used successfully for treatment and/or prevention. Fermentation metabolite, probiotic, prebiotic, and botanical products are being evaluated for their usefulness in prevention of FDN.

**Coccidiosis** was tied for #2 in importance for cagefree layers indicating problems with developing immunity during growing.

**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 before alterations in the immunity program are made. Most all operators are now applying the F-strain vaccine by eyedrop rather than spray in an effort to increase its efficacy.

**Infectious bronchitis (IB)** has a low prevalence in flocks but crept into the picture due to its importance where found in cagefree flocks. 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, preventing the entry of variant strains using good biosecurity especially concerning egg pickup and egg handling materials, and/or utilizing a live booster program in lay are utilized in response to these problems.

**Infectious laryngotracheitis** made the top 5 for caged layers this year indicating the ongoing struggle to contain the vaccine viruses from causing disease in our flocks. Some of the reason for ILT problems is the switch to
recombinant vaccines with low efficacy compared to the chick embryo origin (CEO) vaccines.

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.

Diseases under control and of low incidence are as follows: fowl cholera (cagefree), fowl coryza, and urolithiasis/gout. These diseases tend to be localized to a region or a farm. Fowl cholera in cagefree flocks due to introduction from wild or domesticated animals is occurring on some farms with outdoor access. 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 (vvIBD) 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 in central CA. An outbreak on a commercial pullet farm in Washington State in Feb14 showed high mortality in the pullets and has luckily not spread.

An emerging disease that has several veterinary investigators concerned is the role of Spirochetes in causing egg production losses. A couple sites have seen production issues similar to that seen in Europe and elsewhere in regard to slow onset of production and very poor peaks in production with a prolonged recovery associated with the isolation of Brachyspira Pilosicoli and B. Intermedia from cecae of flock members. Unfortunately, the U.S. egg producer does not have the antibiotic tools to fight this disease, lincomycin or tiamulin, as do the Europeans.

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</th>
<th>Average 2012</th>
<th>2013</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avian Influenza (AI)</td>
<td>1.55</td>
<td>2.00</td>
<td>2.19</td>
</tr>
<tr>
<td>Lack of Effective Treatments</td>
<td>2.15</td>
<td>2.43</td>
<td>2.56</td>
</tr>
<tr>
<td>SE and FDA Egg Safety Rule</td>
<td>2.55</td>
<td>2.29</td>
<td>2.31</td>
</tr>
<tr>
<td>S. Heidelberg and Egg Safety Rule</td>
<td>2.45</td>
<td>1.90</td>
<td>2.13</td>
</tr>
<tr>
<td>Welfare in General</td>
<td>2.33</td>
<td>2.15</td>
<td>2.31</td>
</tr>
</tbody>
</table>
Concern for avian influenza appears to be increasing likely due to ongoing 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 U.S. 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 U.S. in the last year. A majority of egg operations are complying with the National Poultry Improvement Plan (NPIP) low pathogenic AI (LPAI) program for commercial layers.

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 chlortetracycline. 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.

Concern for *Salmonella Enteritidis* (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. Inspections by FDA are ongoing. The prevalence of SE is at an all time low based on certain states monitoring results. A moderate degree of concern for adding other serotypes to the plan is apparent.

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.

**Poultry welfare** concerns continue to be of high to very high concern due to continued activities by activist groups. The increase in concern over day old male euthanasia has come about by some companies stating they are going to require egg products from flocks where day old male euthanasia is not used.

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.
Unfortunately, this attempt at a national standard did not proceed to fruition and died. This reopens the possibility of ballot initiatives that were planned by HSUS in WA and OR. Lawsuits by attorney generals of 6 states against CA have been issued and are being debated in federal courts. Beginning January 1, 2015, all shell eggs sold in CA must be from hens that are given 116 sq. in. floor space and comply with additional regulations above the FDA Egg Safety Plan regarding SE testing and vaccination that are required by CA.

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 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 third year that the AVEP members have been asked for their ideas as to research needs for the layer industry. A summary of the top 5 responses of the 17 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>8</td>
</tr>
<tr>
<td>2 – Salmonella control aspects</td>
<td>7</td>
</tr>
<tr>
<td>3 – ILT</td>
<td>4</td>
</tr>
<tr>
<td>4 – Avian Intestinal Spirochetosis</td>
<td>3</td>
</tr>
<tr>
<td>5 – Mycotoxicosis</td>
<td>2</td>
</tr>
<tr>
<td>6 – Coccidiosis/necrotic enteritis</td>
<td>2</td>
</tr>
</tbody>
</table>

This list is similar to last year except for the introduction of avian intestinal spirochetosis due to *Brachyspira spp.* in some white and brown egg flocks.

The egg industry has experienced unprecedented profits for the past 12 months. For the 12 months from October 2013 through September 2014, the average egg producer according to the Egg Industry Center has made $6.73 per bird. Normally, the average for a 10-year period is $1 per bird. Exports of eggs to Mexico due their losses of birds due to AI have buoyed the egg prices. Expansion of the egg layer population has been suppressed by uncertainties of housing needs. Feed price decreases in late 2013 and 2014 aided greatly in increasing profits. Exports as a percent of total production averaged 4.8% so far in 2014 compared to 4.5% in 2013.

Iowa (57.7 million) continues to be the lead state in egg production followed by Ohio (29.9 million), Indiana (26.5 million), Pennsylvania (23.9 million), California (15.3 million) and Texas (14.7 million) according to the National Agricultural Statistics Service for August 2014. Total commercial egg layer numbers were 296 million in August 2014, up from 290 million in August of 2013.
Turkey Industry Annual Report – Current Issues Facing the U.S. Turkey Industry
Steven Clark, Zoetis
Andrew Bailey, National Turkey Federation, Washington, DC

In preparation for this report to the USAHA Committee on the Transmissible Diseases of Poultry & Other Avian Species, the subcommittee chairman, Dr. Clark, surveyed turkey industry professionals and veterinarians representing a majority (n=28) of the U.S. turkey production regarding the health status of turkeys produced in August 2013 through August 2014. 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 2014 are issues with lack of efficacious drugs, clostridial dermatitis, bordetellosis, blackhead, reovirus digital flexor tendon rupture (TR-DFTR) and colibacillosis.

The “lack of approved efficacious drugs” continues to be the top health 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 since 2009), or fowl cholera (ranked #12 from #17). In July 2011 the sale of roxarsone was suspended; September 30, 2013, the FDA marketing authorization NADA was 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 3.5 (from 3.6 in prior year) and ranked #2 (no change), from 3.8 (#2), 3.9 (#2), 4.0 (#2), 3.8 (#2) and 3.3 (#3) in 2012, 2011, 2010, 2009 and 2008, respectively. Analysis indicates range of concern; 50% of respondents score CD a 4 or 5 (severe), 32% score it a 2 or 1 (mild); it was 62%, 76% and 27%, 20%, respectively for the prior two years (2013, 2012). 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 clinical 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. Recently, a novel litter amendment has shown some success.

**Poultr enteritis of unknown etiologies** has decreased in importance, to position #10 from #7, with a score of 2.4 (from 2.8). Turkey Coronavirus (TCV), as a defined cause of enteritis, was ranked #27 (Table 1), unchanged from #27, with reported cases (Table 2); we began reporting in 2008 with 10 cases (2013, 420). Majority of TCV cases were limited to one geographic area. We conducted an Enteric Health supplemental survey in April 2012; the survey was not conducted this year.

**Protozoal Enteritis**, attributed to flagellated protozoa, Cochlosoma, Tetratrichomonas and Hexamita, ranked #23 (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, Tetratrichomonas 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 Tetratrichomonas, 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 2014, 55% of brooding was single age, compared to 44% in 2008. Single age brooding is more common in the Southeastern U.S. 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 U.S.

**Late mortality** ranked fourth (#4) health issue and changed from #5 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 (#6, prior year was #4) 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 2014 TR-DFTR ranked #18 with 150 cases (2013, #26, 39; 2012, #28, 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 poults 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. Increased recognition of TR-DFTR in 2014 is under investigation but it is suspected that the reovirus has mutated.

Blackhead, also known as Histomoniasis, increased to position #11 (#16 prior year). It is one disease with no efficacious drug approved for use in turkeys. There were 61 reported cases of blackhead (Table 2) an increase from 52 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.

Heat stress ranked #29 following another hot summer, compared to #12 the prior year. Poult Enteritis Mortality Syndrome (PEMS) ranked #34 versus #31 previously, Ornithobacterium rhinotracheale (ORT) ranked #9 versus
TRANSMISSIBLE DISEASES OF POULTRY AND OTHER AVIAN SPECIES

In 2014, *Bordetella avium* became of significant respiratory disease challenge in several geographic regions; bordetellosis ranked #5 (2.9 score) in 2014 compared to #8 (2.5) the prior year.

*Mycoplasma* Synoviae (MS, infectious synovitis) infections, ranked #25 (#24, 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 41 cases of MS reported (Table 2). 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 17 cases of MG reported (Table 2).

Over the past 15 years the U.S. 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.

In late 2013, Congress passed the Animal Drug User Fee Act (ADUFA) to renew user fees for animal drugs. The bill, S. 622, has now been signed into law by the President. ADUFA reauthorizes fees for brand-name and generic drugs for animals through 2018. Under the bill, brand-name animal drug manufacturers would pay $23.6 million in fiscal 2014 and $21.6 million each subsequent year through fiscal 2018. The generic animal drugs industry would pay $7.3 million in fiscal 2014 and $30 million over the next four years. Reauthorization was a top priority for the turkey industry.

Among the industry’s primary focuses in 2013 - 2014 continues to be the health of turkeys and ability to utilize approved drugs, especially in light of increased scrutiny from special interests regarding antibiotic resistance. The first related guidance was published 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.” Since
then there has been a great deal of discussion around antibiotic resistance leading to numerous efforts by the Food and Drug Administration's Center for Veterinary Medicine (FDA/CVM) beginning in 2012 with the Guidance for Industry (GFI) #209 "The Judicious Use of Medically Important Antimicrobial Drugs in Food-Producing Animals." In 2013, FDA/CVM published the proposed rule for the Veterinary Feed Directive and 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”. Guidance #213 provides recommendations for drug companies to voluntarily eliminate production drugs or transition from "production" (growth promotion and feed efficiency) claims to “therapeutic” claims, in order to conform to Guidance #209. All 26 animal drug manufacturers have agreed to comply. In conjunction with this guidance, the Veterinary Feed Directive (VFD), which is expected to be published as a final rule in 2015, will increase the veterinary oversight of the administration of drugs. Given FDA/CVM continues to work through the details of VFD, 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.

Though antibiotic resistance has been a key focus throughout the Obama Administration, recently they have announced some several high level actions. The CDC recently released a report on antibiotic resistance calling for immediate action to address the issue due to its severity. Though there was discussion of human medicine, animal antibiotics received significant attention. Following on the heels of this report the President’s Council of Advisors on Science and Technology (PCAST) published a report on antibiotic use in human medicine and agriculture -- Combating Antibiotic Resistant Bacteria (CARB). The report includes an Executive Order which calls for a national response to antibiotic resistance by establishing a Presidential Advisory Council run by HHS in consultation with USDA and Department of Defense. This group, along with a task force, is supposed to establish a National Action Plan by February 15, 2015 to achieve five goals: (1) slow the emergence and spread of antibiotic resistance; (2) strengthen surveillance; (3) identify rapid diagnostics for resistant pathogens; (4) facilitate the development of new treatment and control method; and (5) improve collaboration across agencies. To collect better data to inform these goals, USDA's Food Safety Inspection Service (FSIS), Agricultural Research Service (ARS) and Animal and Plant Health Inspection Service (APHIS) are working with FDA/CVM. The industry will work closely with these Agencies on determining what data should be collected and how it will be done.

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 turkeys’ 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 the U.S. (including in turkeys), as well as its continued 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 hired additional staff for the program in 2014, and maintaining their officers in Conyers, Georgia, instead of moving it to the Washington, D.C. area. The industry is also supportive of federal efforts to update and modernize ARS’ Southeast Poultry Research Laboratory in Athens, Georgia.

In August of 2014, the Food Safety and Inspection Service (FSIS) published the final New Poultry Inspection System (NPIS) rule, which will modernize the inspection of turkeys and other poultry in the United States. In establishments that volunteer to transition to the new inspection system, FSIS inspectors will be allowed more flexibility to patrol the plant and provide scientific oversight to ensure the plant is meeting the required food safety performance standards. Federal inspectors will be stationed at the end of the production line to verify every poultry carcass meets the federal regulations, and plant employees will have an expanded role in inspecting carcasses for quality standards on the inspection line.

In 2013, turkey production decreased to 7,276.800 from 7,561.905 million pounds (live weight) in 2012. Overall domestic per capita consumption for turkey products remained flat at 16.00 lbs in both 2012 and 2013. The
preliminary number for 2014 is 15.70 lbs turkey consumption per capita, which is the lowest level since 1988. Production in 2013 decreased to 240.00 million head with an average live weight of 30.32 lbs. In 2012, 253,500 million head were produced with an average live weight of 30.32 lbs. (Reference: National Turkey Federation Sourcebook, October 2014).

**Upland Gamebird Industry Report**

Bill MacFarlane, MacFarlane Pheasants

Founded in 1929, MacFarlane Pheasants is the largest pheasant producer in the United States, hatching nearly 2 million pheasants and partridges yearly and raising over 500,000 to maturity.

Most large Gamebird producers belong to a trade association, called the North American Gamebird Association (NAGA). NAGA was founded 83 years ago in 1931 to represent producers and gamebird hunt club businesses. NAGA publishes a magazine for members as well as regular communications providing information on regulatory and legislative issues in Washington and the states. The group shares business tips and best practices among members. NAGA helps to connect the industry that is spread across the country and represents the community to the public and to the government.

Gamebird producers are acutely aware of the part they play in protecting the U.S. poultry industry from avian disease. In addition, these producers face scrutiny by sectors of the public because they raise birds in captivity for consumption as well as for hunting, activities that some do not support. Though some in the larger poultry industry have not seen benefit in interacting with the gamebird industry, continued dialogue and coordination will allow the two industries to join forces on equally beneficial programs. NAGA advocates for open and active dialogue with other poultry producer segments as it recognizes the need to be a responsible partner with the larger poultry industry. Disease concerns have led most gamebird hatcheries and breeders to become NPIP monitored. NAGA has encouraged NPIP participation, resulting in a steady increase in desire to be a part of disease prevention programs.

NAGA represents the entire gamebird industry supply chain including hatcheries and breeder flocks, terminal producers who grow birds to market age from day old chicks, hunting preserves who buy birds from terminal producers for release and finally meat producers and processors. In many cases the gamebird industry is vertically integrated, similar to the larger poultry industry.

The gamebird industry is a thriving one with a product that has real market value. Overall, more than 5 million pheasant are sold each year to hunt clubs or for consumption. Bobwhite and Coturnix quail account for 15 million additional birds, and Chukars add another 3 million. Kansas, Minnesota, Ohio, Pennsylvania, South Dakota, and Wisconsin make up the largest of the pheasant producing states. Alabama, Georgia, North Carolina, and Texas represent the top quail producing states.
The modern gamebird industry is growing and striving to improve in every aspect of the business, including bio-security and disease concerns, and hopes to continue to partner with the larger poultry industry to address these concerns.

Backyard and Small Commercial Poultry Industry Report
Julie Helm, Clemson University Livestock Poultry Health

The number of backyard and small poultry production flocks continue to increase in many states in the U.S. Along with this growth are diseases that are infrequently seen in the commercial integrated poultry flocks due to current management and biosecurity practices. Very little information is known collectively about these small flocks and their disease status. In 2012-2014, a survey was distributed to state and university diagnostic laboratories to get more information on the common diseases routinely found in their small poultry flock submissions. In the 2014 disease survey, nineteen laboratories in seventeen states responded with backyard and small production (<1,000 birds) poultry flocks diagnoses in cases they received from August 1, 2013 through July 31, 2014. This information was compiled from 1,628 diagnoses collected from Alabama, Arkansas, Delaware, Georgia, Illinois, Kansas, Louisiana, Maryland, Minnesota, Missouri, New Jersey, New York, Pennsylvania, South Carolina, Texas, Virginia and Wyoming. In the 2012 and 2013 surveys, 623 total diagnoses were collected from 12 states, and 1,034 total diagnoses were collected from 9 states, respectively (Table 1).

Table 1: State and University Animal Diagnostic Laboratories Survey Participants by Year.

| Year | AL | AR | CA | CO | DE | GA | IL | KS | LA | ME | MD | MI | MN | MO | NC | NJ | NY | PA | SC | TX | VA | WV | WY | No. of Diag. |
|------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|------|
| 2014 | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | 1,628 |
| 2013 | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | 1,034 |
| 2012 | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | X  | 623   |
The survey was separated into disease/condition categories (including bacterial, fungal, metabolic, neoplastic, non-neoplastic viral, nutritional, parasitic, and other type diagnoses) and by avian group type (chicken, turkey, game bird, duck, pigeon and other types of poultry). One laboratory submission case could contain multiple significant disease or condition diagnoses. The number of birds submitted and the number of submitted cases were not recorded.

In the disease/condition categories during the last three years, the top three diagnoses continue to be bacterial, parasitic and neoplastic type diseases with 608 bacterial diagnoses (37%), 459 parasitic diagnoses (28%), and 188 neoplastic diagnoses (12%) included in the 2014 survey. The numbers of total diagnoses within each disease/condition category for the 2012-2014 surveys are shown in Table 2.

Table 2: Numbers of Total Diagnoses by Diagnosis Category for 2012-2014.

<table>
<thead>
<tr>
<th>Diagnosis Category</th>
<th>2014</th>
<th>2013</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bacterial</td>
<td>608 (37%)</td>
<td>241 (23%)</td>
<td>217 (35%)</td>
</tr>
<tr>
<td>Parasitic</td>
<td>459 (28%)</td>
<td>267 (26%)</td>
<td>243 (39%)</td>
</tr>
<tr>
<td>Neoplastic</td>
<td>188 (12%)</td>
<td>249 (24%)</td>
<td>56 (9%)</td>
</tr>
<tr>
<td>Viral (Non-neoplastic)</td>
<td>144 (9%)</td>
<td>80 (8%)</td>
<td>45 (7%)</td>
</tr>
<tr>
<td>Metabolic</td>
<td>82 (5%)</td>
<td>63 (6%)</td>
<td>*</td>
</tr>
<tr>
<td>Other</td>
<td>60 (4%)</td>
<td>71 (7%)</td>
<td>18 (3%)</td>
</tr>
<tr>
<td>Fungal</td>
<td>57 (4%)</td>
<td>39 (4%)</td>
<td>21 (3%)</td>
</tr>
<tr>
<td>Nutritional</td>
<td>30 (2%)</td>
<td>24 (2%)</td>
<td>23 (4%)</td>
</tr>
<tr>
<td>Total</td>
<td>1,628</td>
<td>1,034</td>
<td>623</td>
</tr>
</tbody>
</table>

*Not included in 2012 survey as a separate category

The top ten diseases/conditions for the 2014 survey, in descending order, include: mycoplasmosis at 16% of the total diagnoses, coccidiosis (11%), nematodes (10%), colibacillosis (7%), Marek’s Disease (6%), salmonellosis (4%), adenocarcinomas (3%), ascites (3%), candidiasis (2%), and staphylococcosis/cestodes (2%). Chickens were the largest avian group with 75% of all the disease/condition diagnoses, probably since chickens are more routinely submitted to laboratories for necropsies than any other avian group. Lower on the list of number of diagnoses were game birds (9%), turkey (8%), pigeon and duck (3% each), and other types (2%) (Table 3).
Table 3: 2014 – Numbers of Total Diagnoses in Diagnosis Category Separated by Avian Group

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Chicken</th>
<th>Game-bird (12%)</th>
<th>Turkey</th>
<th>Pigeon</th>
<th>Duck</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bacterial</td>
<td>467</td>
<td>(38%)</td>
<td>31</td>
<td>(21%)</td>
<td>75</td>
<td>(56%)</td>
</tr>
<tr>
<td>Parasitic</td>
<td>344</td>
<td>(28%)</td>
<td>51</td>
<td>(35%)</td>
<td>45</td>
<td>(33%)</td>
</tr>
<tr>
<td>Neoplastic</td>
<td>180</td>
<td>(15%)</td>
<td>1</td>
<td>(3%)</td>
<td>2</td>
<td>(7%)</td>
</tr>
<tr>
<td>Viral</td>
<td>99</td>
<td>(8%)</td>
<td>18</td>
<td>(12%)</td>
<td>9</td>
<td>(7%)</td>
</tr>
<tr>
<td>Metabolic</td>
<td>72</td>
<td>(6%)</td>
<td>9</td>
<td>(25%)</td>
<td>1</td>
<td>(4%)</td>
</tr>
<tr>
<td>Fungal</td>
<td>38</td>
<td>(3%)</td>
<td>13</td>
<td>(9%)</td>
<td>2</td>
<td>(1%)</td>
</tr>
<tr>
<td>Other</td>
<td>28</td>
<td>(28%)</td>
<td>14</td>
<td>(10%)</td>
<td>2</td>
<td>(1%)</td>
</tr>
<tr>
<td>Nutritional</td>
<td>12</td>
<td>(1%)</td>
<td>15</td>
<td>(10%)</td>
<td>2</td>
<td>(1%)</td>
</tr>
<tr>
<td>% of Total</td>
<td>75%</td>
<td>9%</td>
<td>8%</td>
<td>3%</td>
<td>3%</td>
<td>2%</td>
</tr>
</tbody>
</table>

The top bacterial diseases diagnosed in the 2014 survey include mycoplasmosis (M. synoviae and M. gallisepticum), found mostly in chickens, colibacillosis and salmonellosis. Two laboratories included comments of diagnosing Salmonella serogroup D in chickens in four of their cases, two of which were S. Enteritidis. Similar to last year, parasitic diseases accounted for over 28% of all diagnosed diseases with coccidiosis and nematodiasis being the most numerous. Marek’s Disease continues to be the top disease diagnosed in the neoplastic category in chickens. Interestingly, the incidence rate of neoplastic diseases category was half the amount this year at 12% of the total diagnoses compared to 24% in 2013, and 9% was reported in 2012. The top non-neoplastic viral diseases diagnosed included infectious laryngotracheitis, avian pox and infectious bronchitis primarily in chickens. Ascites was reported as the top metabolic condition (3% of all diagnoses) over fatty liver hemorrhagic syndrome (1%) that was reported as the top metabolic category last year. Candidiasis and aspergillosis continue to be the only diagnoses in the fungal category. For nutritional problems, rickets was the top diagnoses at 1%, found more in game birds than in chickens, and a few cases of specific vitamin (A, D, E) and calcium deficiencies in chickens and game birds. Other diseases and conditions diagnosed included toxicosis (including salt and sulfa drugs in game birds, and mycotoxins and lead poisoning in ducks, chickens and other species), trauma, and unknown etiology or no diagnosis found. (Table 4).
<table>
<thead>
<tr>
<th>Diagnosis Category</th>
<th>Disease or Condition</th>
<th>No. of Total Diagnoses</th>
<th>Percentag of Total Diagnoses</th>
<th>Avian Group Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bacterial</strong></td>
<td>Mycoplasmosis (M. Synoviae 130, M. Gallisepticum 127, not specified 5)</td>
<td>262</td>
<td>16%</td>
<td>C 15%</td>
</tr>
<tr>
<td></td>
<td>E. coli</td>
<td>120</td>
<td>7%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Salmonellosis</td>
<td>61</td>
<td>4%</td>
<td>C &gt; T &gt; GB</td>
</tr>
<tr>
<td></td>
<td>Staphylococcus</td>
<td>38</td>
<td>2%</td>
<td>C &gt; P &gt; D</td>
</tr>
<tr>
<td></td>
<td>Avibacterium</td>
<td>33</td>
<td>2%</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>Clostridia</td>
<td>28</td>
<td>2%</td>
<td>C &gt; GB &gt; T</td>
</tr>
<tr>
<td></td>
<td>Pasteurella Multocida</td>
<td>32</td>
<td>2%</td>
<td>C &gt; T &gt; O &gt; D</td>
</tr>
<tr>
<td></td>
<td>Mixed Bacterial Infections</td>
<td>22</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mycobacteriosis</td>
<td>4</td>
<td>&lt; 1%</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>Pseudomonas</td>
<td>3</td>
<td>&lt; 1%</td>
<td>D &gt; C</td>
</tr>
<tr>
<td></td>
<td>Listeriosis</td>
<td>2</td>
<td>&lt; 1%</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>Brevibacterium, Enterococcus, Erysipelas</td>
<td>1 each</td>
<td>&lt; 1%</td>
<td>C, C, GB</td>
</tr>
<tr>
<td><strong>Parasitic</strong></td>
<td>Coccidiosis</td>
<td>175</td>
<td>11%</td>
<td>C &gt; P &gt; O &gt; GB/T</td>
</tr>
<tr>
<td></td>
<td>Nematodes</td>
<td>156</td>
<td>10%</td>
<td>C &gt; GB &gt; T</td>
</tr>
<tr>
<td></td>
<td>Cestodes</td>
<td>38</td>
<td>2%</td>
<td>C &gt; GB</td>
</tr>
<tr>
<td></td>
<td>Mites</td>
<td>30</td>
<td>2%</td>
<td>C &gt; T</td>
</tr>
<tr>
<td></td>
<td>Lice</td>
<td>29</td>
<td>2%</td>
<td>C &gt; T</td>
</tr>
<tr>
<td></td>
<td>Histomononiasis</td>
<td>21</td>
<td>1%</td>
<td>T &gt; C &gt; GB &gt; O</td>
</tr>
<tr>
<td></td>
<td>Trematodes</td>
<td>4</td>
<td>&lt; 1%</td>
<td>D</td>
</tr>
<tr>
<td></td>
<td>Gnats, Toxoplasmosis</td>
<td>2 each</td>
<td>&lt; 1%</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>Sticktight Fleas, Trichomoniasis</td>
<td>1 each</td>
<td>&lt; 1%</td>
<td>C, P</td>
</tr>
<tr>
<td><strong>Neoplastic</strong></td>
<td>Marek's Disease</td>
<td>102</td>
<td>6%</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>Adenocarcinoma</td>
<td>56</td>
<td>3%</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>Leukosis/Sarcoma</td>
<td>27</td>
<td>2%</td>
<td>C &gt;</td>
</tr>
<tr>
<td>Category</td>
<td>Condition</td>
<td>Cases</td>
<td>Percentage</td>
<td>Priorities</td>
</tr>
<tr>
<td>----------------</td>
<td>----------------------------------------------</td>
<td>-------</td>
<td>------------</td>
<td>------------</td>
</tr>
<tr>
<td><strong>Viral</strong></td>
<td><strong>Leiomyoma, Reticulendotheliosis, Squamous Cell Carcinoma</strong></td>
<td>1 each</td>
<td>&lt; 1%</td>
<td>C, GB, D</td>
</tr>
<tr>
<td></td>
<td><strong>Infectious Laryngotracheitis</strong></td>
<td>35</td>
<td>2%</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td><strong>Avian Pox</strong></td>
<td>32</td>
<td>2%</td>
<td>C &gt; GB &gt; T</td>
</tr>
<tr>
<td></td>
<td><strong>Infectious Bronchitis</strong></td>
<td>26</td>
<td>2%</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td><strong>Pigeon PMV</strong></td>
<td>13</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Avian Influenza</strong></td>
<td>13</td>
<td>1%</td>
<td>C &gt; O</td>
</tr>
<tr>
<td></td>
<td><strong>Avian Reovirus</strong></td>
<td>5</td>
<td>&lt; 1%</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td><strong>Infectious Bursal Disease</strong></td>
<td>5</td>
<td>&lt; 1%</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td><strong>Chick Anemia Virus</strong></td>
<td>4</td>
<td>&lt; 1%</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td><strong>Marble Spleen Disease</strong></td>
<td>3</td>
<td>&lt; 1%</td>
<td>GB</td>
</tr>
<tr>
<td></td>
<td><strong>Quail Bronchitis</strong></td>
<td>5</td>
<td>&lt; 1%</td>
<td>GB</td>
</tr>
<tr>
<td></td>
<td><strong>Newcastle (APMV-1)</strong></td>
<td>2</td>
<td>&lt; 1%</td>
<td>GB</td>
</tr>
<tr>
<td></td>
<td><strong>West Nile Virus</strong></td>
<td>1</td>
<td>&lt; 1%</td>
<td>O</td>
</tr>
<tr>
<td><strong>Metabolic</strong></td>
<td><strong>Ascites</strong></td>
<td>52</td>
<td>3%</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td><strong>Fatty Liver Hemorrhagic Syndrome</strong></td>
<td>20</td>
<td>1%</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td><strong>Amyloid</strong></td>
<td>9</td>
<td>1%</td>
<td>D</td>
</tr>
<tr>
<td></td>
<td><strong>Hepatopathy</strong></td>
<td>1</td>
<td>&lt; 1%</td>
<td>O</td>
</tr>
<tr>
<td><strong>Fungal</strong></td>
<td><strong>Candidiasis</strong></td>
<td>39</td>
<td>2%</td>
<td>C &gt; GB &gt; O &gt; P</td>
</tr>
<tr>
<td></td>
<td><strong>Aspergillosis</strong></td>
<td>18</td>
<td>1%</td>
<td>C &gt; P &gt; T</td>
</tr>
<tr>
<td><strong>Nutritional</strong></td>
<td><strong>Rickets</strong></td>
<td>14</td>
<td>1%</td>
<td>GB &gt; C</td>
</tr>
<tr>
<td></td>
<td><strong>Vitamin D Deficiency</strong></td>
<td>5</td>
<td>&lt; 1%</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td><strong>Vitamin A Deficiency</strong></td>
<td>4</td>
<td>&lt; 1%</td>
<td>GB</td>
</tr>
<tr>
<td></td>
<td><strong>Calcium Deficiency</strong></td>
<td>3</td>
<td>&lt; 1%</td>
<td>GB</td>
</tr>
<tr>
<td></td>
<td><strong>Osteoporosis</strong></td>
<td>2</td>
<td>&lt; 1%</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td><strong>Vitamin E Deficiency</strong></td>
<td>2</td>
<td>&lt; 1%</td>
<td>C</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td><strong>Unknown or No Diagnosis</strong></td>
<td>14</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Toxicosis</strong></td>
<td>11</td>
<td>1%</td>
<td>D/GB &gt; C</td>
</tr>
<tr>
<td></td>
<td><strong>Trauma</strong></td>
<td>10</td>
<td>1%</td>
<td>C &gt; D &gt; GB &gt; O</td>
</tr>
<tr>
<td></td>
<td><strong>Impaction</strong></td>
<td>5</td>
<td>&lt; 1%</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Gout</strong></td>
<td>4</td>
<td>&lt; 1%</td>
<td>C &gt; GB</td>
</tr>
<tr>
<td></td>
<td><strong>Hatchery Management</strong></td>
<td>3</td>
<td>&lt; 1%</td>
<td>P</td>
</tr>
</tbody>
</table>
There were a few differences in the types and incidence rates of diagnoses between the laboratories located in the West-Midwest, South and Northeast areas of the U.S. The southern laboratories reported a little higher total number of bacterial diagnoses. Higher fungal and metabolic diagnoses were reported in the West-Midwest area and the Northeast area reported more non-neoplastic viral diagnoses (Figure 1).

*Note:* Statistical analysis was not performed on any of these data points.

**Figure 1:** 2014 - Percent Incidence of Diagnosis Category Separated by Area

**Avian Influenza and Newcastle Disease Sub-Committee Report**
David Suarez, USDA-ARS

A number of countries reported both low pathogenic avian influenza (LPAI) and highly pathogenic avian influenza (HPAI) in the last year. The Asian lineage H5N1 continues to be the most important with the virus endemic in China, Vietnam, Egypt, Indonesia and likely endemic in several other countries including Bangladesh, Nepal, and Cambodia. New outbreaks were reported in North Korea, Libya, India, and Russia. The appearance of re-assortment viruses, which have the Asian lineage H5 gene but different neuraminidase genes, appear more prevalent this year. At least three variants were reported including H5N2 in China, H5N6 in China, Laos, and Vietnam, and H5N8 in South Korea and Japan. The H5N6 variant is concerning because it has already been detected in three different countries. A different H5N2 was detected in Taiwan, but this virus is unrelated to the
other outbreaks. A H5N2 low pathogenic virus of Mexican H5N2 lineage has circulated in Taiwan since 2003, but in late 2012 the virus mutated to the HPAI form. The report in 2014 is a reoccurrence of the earlier outbreak.

A new H7N2 HPAI outbreak occurred in Australia from an apparent wild bird source and appears to be controlled. Multiple reports of LPAI have been reported, but mostly from the U.S. and Europe, which likely reflects either under reporting or lack of surveillance.

Multiple subtypes of virus have also been reported in humans in 2014. The human cases can be divided into a conjunctivitis with some flu-like symptoms or severe respiratory infection with atypical pneumonia and a high case fatality. The less serious human cases have been caused by both LPAI and HPAI, including H7N7 in Italy, H7N3 in Mexico, and H9N2 in Hong Kong. The severe disease can also be caused by LPAI and HPAI including H7N9, H10N8, and H5N6 in China and H5N1 in a number of different countries. The zoonotic potential of avian influenza continues to be an ongoing concern.

Newcastle disease virus remains endemic in a large part of the world. The virus, although a single serotype, has many different genotypes. A variant of genotype VII appears to be of some concern because it has been detected in Israel, Pakistan, and Indonesia in the last couple years. Although vaccines are widely available, outbreaks in vaccinated flocks continue to be a problem in endemic countries.

Dr. Suarez reported that the 9th International Avian Influenza Symposium will be held Sunday, April 12, 2015 – Wednesday, April 15, 2015 in Athens, GA. The 3rd International Symposium on Neglected Influenza Viruses will be April 15-17 2015 in Athens, GA.

Research Update Southeast Poultry Research Laboratory (SEPRL)
David Suarez, Darrell Kapczynski, Erica Spackman, Michael Day, and Qingzhong Yu, USDA-ARS

Dr. Suarez provided an update on the Biocontainment Laboratory and Consolidated Poultry Research Facility Modernization project. Funding has been requested in the FY14 and FY15 President’s budget. It is the only building project requested by ARS. It has not been included in either the House or Senate appropriations bill to date.

Avian influenza virus
The detection of HPAIV by antigen capture later flow devices (LFD) was evaluated at 12 hour intervals in chickens and detection was correlated with clinical condition. Dead birds were tested either immediately after being found dead or were held an additional 12 hours to simulate field conditions. Detection of virus correlated directly to virus shed, but not always with clinical condition. While the highest virus titers were frequently seen in sick and dead birds, apparently healthy birds could shed sufficient titers to be detected by the devices. Additionally, in rare cases, sick and dead birds did not shed sufficient virus for detection with LFD. Importantly, delaying testing of carcasses by 12 hours did not impact detection; in fact the highest titers
were recovered from this group. Current sample collection paradigms which target sick and dead birds are optimal, however it should be noted that samples from these populations can till yield false negative results.

Highly pathogenic avian influenza viruses (HPAIV’s) remain a threat to poultry worldwide. Avian influenza viruses, including HPAIV, are usually non-pathogenic for ducks and other wild aquatic birds, with the exception of some Asian lineage H5N1 HPAIVs which can cause severe disease in ducks. Ducks have been implicated in the dissemination of H5N1 HPAI, and some duck species, particularly mallards, can potentially be long-distance vectors of the virus. With the continuous occurrence of HPAI outbreaks in poultry it’s necessary to address the role of wild birds in the transmission and spreading of HPAIV’s. We conducted a study in which we inoculated 2-weeks-old mallard ducks (Anas platyrhynchos) intranasally with 106 EID50 of one of eleven strains of HPAIV subtypes H5 or H7, including isolates from different years and countries. Although no clinical signs or mortality were observed, ducks became infected with all of the viruses examined and transmitted the viruses to contacts. Viral shedding occurred by both the oropharyngeal and cloacal routes for more than 11 days in almost all ducks. Viruses that had circulated for longer periods of time in poultry, like the Mexican H5N2 HPAIV, were less infectious for ducks. These results raise concerns about possible spreading of HPAIV’s by infected wild ducks.

In June of 2012, a H7N3 highly pathogenic avian influenza (HPAI) virus was identified as the cause of a severe disease outbreak in commercial laying chicken farms in Jalisco, Mexico. This region is responsible for approximately 55% of the eggs produced in Mexico, and infection with this virus severely affects the reproductive tract resulting in misformed or shell-less eggs. The HPAI virus had high sequence similarity of greater than 97% to wild bird viruses from North America in all eight gene segments examined indicating a wild bird source for the LP to HP outbreak. Because of high sequence similarity to the HPAI virus, the Mexican government immediately identified a 2006 Cinnamon Teal H7N3 (A/CT/2006) isolate to use as part of a vaccine control program. Originally, three commercial laboratories were authorized to produce the inactivated vaccine, which was distributed by the Mexican authorities. At the end of 2012, with no new outbreaks reported there were hopes of eradication. However, by early 2013 multiple Mexican states reported new outbreaks of the virus. Many of the new outbreaks were from states outside of Jalisco, indicating the virus had escaped the original containment zone. In 2014, further H7N3 HPAI outbreaks were reported in Guanajuato, indicating the virus continues to persist. The government has subsequently increased the number of commercial vaccine companies authorized to produce the vaccine to approximately ten. Vaccination schedules for layer type birds in these affected regions range from 6-15 individual injections over the life of the bird, with swab samples submitted each month for flock surveillance testing. Thus, it does not appear that this virus will be eradicated from the region in the near term and continues to present a danger to the U.S. poultry industry.
In vaccine studies, both U.S. and Mexican H7 avian influenza virus (AIV) were tested as antigen in experimental vaccines and injected into chickens three weeks prior to challenge. All H7 vaccines tested provided >90% protection against clinical disease after challenge and decreased the number of birds shedding AIV and the titers of viral shedding. In a second experiment, 26 week-old egg-laying hens were vaccinated either singly or doubly with the A/CT/2006 vaccine and challenged against the HPAI virus. All vaccinated birds reduced shedding of virus compared to sham vaccinated birds and were protected against drops in egg production. These studies demonstrate origins of the 2012 Mexican H7N3 HPAI virus and provide support for vaccination of poultry as part of an eradication program against this virus.

**Infectious laryngotracheitis**

Chicken infectious laryngotracheitis (ILT) and Newcastle disease (ND) are two of the most economically important respiratory infectious diseases of poultry. The current commercial ILT vaccines are either not safe or less effective. Therefore, there is a pressing need to develop safer and more efficacious ILT vaccines. In the present study, we generated Newcastle disease virus (NDV) recombinants expressing the glycoproteins B (gB) or D (gD) of infectious laryngotracheitis virus (ILTV) using reverse genetics technology. These recombinant viruses were safe, stable and immunogenic, and replicated efficiently in birds. Vaccination of chickens with these recombinant viruses conferred complete clinical protection against ILTV and NDV challenge. These novel bivalent vaccines can potentially be mass-administered via aerosol or drinking water to large chicken populations at low cost, which will have a direct impact on poultry health, fitness and performance.

**Enteric diseases**

Characterization of the complex viral community present in the poultry gut continues, with three main areas of focus in the past year: 1) comparative metagenomics to determine the viruses and/or viral genes associated with enteric disease and performance problems in the field; 2) continuing molecular epidemiology to investigate novel and re-emerging cases of viral enteric disease in the field; and, 3) the design and validation of molecular diagnostic assays for the novel enteric viruses initially characterized at SEPRL using a metagenomic approach. A comparative metagenomic analysis of the complete viral and bacterial communities present in SPF chickens placed in the field on selected commercial and back yard broiler chicken farms revealed markedly altered enteric microbiomes compared to pre-placement intestinal samples. Of particular interest was the observation that the sentinel birds were colonized by members of the enteric Picornaviridae that were absent in the pre-contact birds. The bacterial community was altered as well, particularly among members of the Lachnospiracea/Clostridium and Lactobacillus families and genera. In collaboration with industry stakeholders, the re-emerging problem of turkey enteric coronavirus (TCoV) continues to be monitored in the Southeastern
United States. Real-time and conventional RT-PCR were used to monitor and characterize the rapidly spreading TCoV among numerous turkey flocks, revealing novel isolates of TCoV and ruling out infection with a variant infectious bronchitis virus (IBV) from adjacent chicken farms. A molecular characterization of novel turkey-origin picobirnavirus (PBV) using a fully validated RT-PCR assay developed at SEPRL revealed that the turkey PBV is unique among the PBVs and may not fit previously described genotyping categories developed for the mammalian PBVs. Finally, enteric samples received from several turkey flocks in Arkansas that were experiencing non-TCoV enteritis were confirmed to be enteric picornavirus positive using a novel RT-PCR assay developed at SEPRL. This assay was used to monitor the shedding of enteric picornavirus in experimental birds and to monitor attempts to propagate the picornaviruses in embryonated turkey eggs.

**Newcastle Disease Virus**

Virulent Newcastle disease virus (NDV) is not normally found in the United States and is considered a foreign animal disease. Because virulent NDV is found widely around the world, movement of the virus into U.S. poultry remains a constant threat. The U.S. strategy for new introductions are to rapidly detect outbreaks using real-time RT-PCR tests to detect virus through our NAHLN system of veterinary laboratories and then quickly eradicate infected flocks. The current rRT-PCR screening test targets a conserved region of the matrix gene and identifies most NDV viruses, both low and high virulent viruses. If the matrix test is positive, then a second test is reflexively used that can specifically identify virulent virus by targeting the fusion cleavage site. The matrix test, although performing well against Mexican lineage viruses, has been documented to have low sensitivity or even have false negatives for some viruses. Because of this concern alternative tests are needed to the matrix test to assure sensitive and specific assays are available. Using the large amount of NDV sequence found in the public databases, new rRT-PCR tests were developed using single nucleotide polymorphism (SNP) analysis to to identify the most conserved regions of the genome. A total of eight different regions that were highly conserved and were amenable to a rRT-PCR test were empirically tested to identify the most promising tests for additional study. Three tests were bench validated to have high sensitivity and specificity that will provide alternatives to the matrix test if needed.

**U.S. Poultry and Egg Association Research Update**

Gregorio Rosales, Aviagen, Inc., for John Glisson

The USPOULTRY research program, founded in 1963, has a long history of providing funding for practical applied research to supply solutions to important problems and stimulate innovation in the poultry industry. Throughout its history the research program has provided a list of research priorities to researchers so that they could be guided in choosing topics for research proposals that have been identified by the poultry industry as critically and currently important. The research proposals are evaluated by
the Foundation Research Advisory Committee (FRAC), a panel of fifteen industry experts, and the best proposals are recommended for funding. The research program is funded jointly by USPOULTRY and the USPOULTRY Foundation. The structure of the program has been refined over the years to successfully provide a system to stimulate the submission of high quality research proposals and provide an unbiased, thoughtful evaluation of the proposals.

In recent years the poultry industry has found itself facing new challenges for which research-based solutions are not yet available. USPOULTRY and the USPOULTRY Foundation developed a strategy to direct additional research funding toward particular critical research topics aimed at finding solutions for these new challenges. As part of this strategy, in the fall of 2013 a second research program, called the Board Research Initiative (BRI), was created. The BRI is designed to run alongside the traditional USPOULTRY program. The programs operate separately and do not compete for funding or resources.

The two USPOULTRY research programs operated similarly in many ways but there are some important differences. The traditional USPOULTRY research program has a standing request for proposals (RFP) each year on May 1 and November 1 to which researchers can submit research proposals on any topic on the USPOULTRY research priorities list. This research priorities list can be viewed on the USPOULTRY website and it is updated every two years. The BRI releases special RFPs on specific topics. These topics are chosen by the Boards of Directors of USPOULTRY and the USPOULTRY Foundation. The RFPs released by the BRI are very focused and specify the research questions and areas of focus sought in the research proposals. The Boards of USPOULTRY and the USPOULTRY foundation choose the topics for the BRI from a list developed for them by USPOULTRY staff. These topics originate from ideas submitted by USPOULTRY members. Topic ideas can be submitted anytime to John Glisson (jglisson@uspoultry.org) or John Starkey (jstarkey@uspoultry.org) for consideration as part of the BRI. Just like in the traditional USPOULTRY research program, research proposals are evaluated by the FRAC and the FRAC recommends which proposals should be funded by USPOULTRY and the USPOULTRY Foundation.

In its initial year the BRI released two RFPs, each funded at $125,000. The first RFP was titled, “Exploration of Systemic Salmonella Infection in Chickens and Turkeys and Determination of the Relationship with Salmonella in Finished Ground Product”. The research proposal funded from this RFP was from Auburn University and was titled, “Determining the Dose, Time and Route of Challenge and the Eventual Sites of Colonization of Two Salmonella Serovars”. The second RFP was titled, “Investigation of the Influence of Transportation Conditions on Chickens and Turkeys”. A research proposal from the University of Arkansas titled, “Characterizing thermal Micro-environment during Broiler Transportation” received funding on this topic.
This year two new topics have been chosen and RFPs on those topics will soon be released. The new BRI topics are, “Investigation of the Pathways for Introduction, Dissemination, and Detectability of Salmonella during Second Processing” and “Reduction of Salmonella Contamination of Commercial Eggs”. Both of these topics are very important to the poultry industry and research funded as a result of these RFPs promises to provide needed information to address these issues.

The USPOULTRY Board Research Initiative is an exciting new program which is putting the resources of the poultry industry to work to meet important challenges. USPOULTRY and the USPOULTRY Foundation are very pleased to be able to provide this important resource to the poultry industry.

NLRAD-NAHRS Update
Stan Bruntz, USDA-APHIS-VS

An update on the proposal for a United States National List of Reportable Animal Diseases (NLRAD) and on the NLRAD- National Animal Health Reporting System (NAHRS) was presented. A formal announcement through Gov Delivery has been sent out requesting review and input on the following documents: ‘Proposal for a U.S. National List of Reportable Animal Diseases (NLRAD)’ concept paper and the USDA-APHIS ‘VS Framework for Response to Emerging Animal Diseases in the United States’. A U.S. NLRAD will be a uniform, science- and policy-based, nationally supported standardized list of animal diseases. It will provide the basis for consistent reporting with uniform case findings and reporting criteria. The U.S. NLRAD will include both notifiable and monitored diseases. Notifiable diseases are high priority diseases that must be reported by anyone who identifies occurrence of the disease. Monitored diseases occurrence is routinely tracked and data reported to the federal government through State Animal Health Officials (SAHO’s). Support for a U.S. NLRAD has been expressed through multiple animal health organizations, including through AAVLD/USAHA, and NASAHO resolutions. A U.S. NLRAD will be initially implemented through Federal-State cooperation and eventually formalized through Federal regulatory action.

The NLRAD-NAHRS functions under the auspice of the joint USAHA/AAVLD Animal Health Surveillance and Information Systems Committee. The USAHA/AAVLD NLRAD-NAHRS Steering Committee includes representatives from the AAVLD, USAHA, USDA-APHIS-Veterinary Services (VS), SAHO’s, and experts representing major commodity groups. The NLRAD-NAHRS Steering Committee provides input to NLRAD-NAHRS on the U.S. NLRAD; NLRAD-NAHRS general operation; and direction of the NLRAD-NAHRS to meet the needs of animal health personnel. Dr. Bruntz presented activities and issues related to the NLRAD-NAHRS including implementation of a U.S. NLRAD; updates to the NLRAD-NAHRS Web Reporting Tool; and adapting VS representation on the NLRAD-NAHRS Steering Committee due to VS’s reorganization and other changes. Dr.
Bruntz announced that Dr. Bruce Stewart-Brown, who has been the poultry representative on the NLRAD-NAHRS Steering Committee for several years, has requested that due to work commitments he be replaced on the committee. Dr. Bruntz, on behalf of the NLRAD-NAHRS chairs, thanked Dr. Stewart-Brown for his work on the committee and strong support for taking the U.S. NLRAD concept forward. Members of the TDP Committee who may be interested in filling this open position are requested to contact either the TDP Chair or Vice Chair.

**National Animal Health Monitoring System/Layers 2013**

Lindsey Garber, USDA-APHIS-VS

*Salmonella* Enteritidis (SE) is a food-borne pathogen that is associated with illness following consumption of improperly prepared and/or undercooked eggs. In 2010, the Food and Drug Administration (FDA) implemented an egg rule to control SE on farms producing eggs for the table egg market. The FDA used information from a 1999 National Animal Health Monitoring System (NAHMS) Layer study in their assessment of the need for and economic impact of the egg rule. As practices have changed substantially since 1999, it was determined that updated information on practices would be useful to both the industry and government agencies. Therefore, NAHMS conducted a study in summer 2013 to estimate the prevalence and evaluate risk factors for SE on commercial layer farms, as well as to assess changes in management practices since 1999 relevant to SE control and prevention.

Although we attempted to keep differences in study design between the two studies to a minimum, there were some differences which may have had an effect on our ability to have comparable estimates. For the NAHMS Layers '99 study, a sample of farms was selected from the National Agricultural Statistics Service (NASS) list of operations with 30,000 or more laying hens in 15 states\(^a\). Severity of rodent problem on each participating farm was assessed by data collector observation. Additionally, swabs from manure, egg belts, elevators, and walkways were collected from poultry houses and submitted to the Agricultural Research Services (ARS) laboratory in Athens, GA for culture.

For the 2013 study, a sample of farms having 3,000 or more laying hens was selected from the FDA list of registered premises in 19 states\(^b\). An in-person questionnaire was administered that addressed management practices relevant to SE, such as biosecurity, rodent control, molting and vaccination. No biologic samples were collected. Producers were asked about testing for SE in the layer house environment between June 1, 2012 and May 31, 2013. Testing may have been by culture, PCR, or other rapid tests. Producers were guaranteed that their responses would be kept confidential. Only farms with 30,000 or more laying hens were included in the analysis for comparison to the 1999 study.
A higher percentage of farms fed pullets pre/probiotics in 2013 compared to 1999, while a lower percentage of farms gathered eggs by hand or molted their flocks. For farms that did molt in 2013, the most common procedure was to feed an alternative diet rather than to restrict or withhold feed. There was a significant increase in cage-free housing; 18.7% of farms had at least 1 cage-free house in 2013 (11.8% of houses) compared to 0.8% of farms (0.6% of houses) in 1999.

A higher percentage of farms processed eggs on farm in 2013 compared to 1999, and nearly all farms stored eggs at <50º F. Producers reported less severe problems with rodents in 2013 compared to 1999; traps and sticky tape were a more common rodent control method and cats were less common. Frequency of cleaning and disinfecting procedures for feeders, hoppers, water tanks, and houses were similar in both years.

In 2013, an increased percentage of farms monitored SE in pullets, routinely tested for SE in the layer house, and participated in a SE QA program compared to 1999. Vaccination of pullets against Salmonella was rarely performed in 1999 (5.4% of farms) whereas nearly all farms did so in 2013 (98.7%). The most common protocol was to give pullets a series of 2 live vaccines via spray followed by a bacterin injection, although many other protocols were used. For approximately half of the farms, the first vaccine was administered in the hatchery.

In the 1999 study, 7.1% of layer houses were environmentally positive for SE via culture. In the 2013 study, 1.0% of flocks tested between June 1, 2012 and May 31, 2013 tested positive for SE. No flocks from farms with <30,000 layers tested positive and 1.2% of flocks from larger farms were positive. The percentage of flocks positive for SE ranged from 0.3% in the Northeast region to 2.0% in the Central region.

Compared to negative farms, a higher percentage of positive farms had a rodent index of 11 or higher (moderate to high), routinely molted their flocks, and had a down time of 10 days or less. A lower percentage of positive flocks had been vaccinated against Salmonella as pullets compared to negative flocks.

a AL,AR,CA,FL,GA,IN,IA,MN,MO,NE,NC,OH,PA,TX,WA
b AL,AR,CA,FL,GA,IL,IN,IA,MI,MN,MO,NE,NC,OH,PA,TX,WA,WI, New England (considered as one state)
Avian Disease & Oncology Lab (ADOL) Research Update
John Dunn, Hans Cheng, Aly Fadly, Mohammad Heidari, Henry Hunt, and Huanmin Zhang, USDA-ARS Avian Disease and Oncology Laboratory (ADOL)

Employing Genomics, Epigenetics, and Immunogenetics to Control Diseases Induced by Avian Tumor Viruses

Marek’s disease (MD) is a T cell lymphoma disease of chickens induced by the Marek’s disease virus (MDV). Currently, the main control strategy is vaccination. However, it is likely that widespread usage of MD vaccination has led to the emergence of more virulent field strains. Selecting for MD genetic resistance is a sustainable and proven control strategy, and fits very well into the rapidly growing implementation of genomic selection. As genomic selection requires molecular markers associated with the trait of interest, such as MD resistance, the key is to identify these genetic markers.

Gene expression is a major factor accounting for phenotypic variation. Taking advantage of allele-specific expression (ASE) screens, we identified SNPs in specific genes using experimental layers. Analysis of an MD resource population genotyped with a custom SNP array yields a heritability estimate of 0.53 for MD genetic resistance while the ASE SNPs (genetic markers) alone account for 83+% of the genetic variance. To validate the association of ASE SNPs with MD genetic resistance, sires were genotyped, EBVs (estimated breeding values) based on SNPs and pedigree calculated, and then bi-directionally selected based on the SNP EBVs. Progeny tests demonstrate that after only one generation of selection, there was greater than 20% difference in MD incidence. Compared to pedigree, genomic selection on ASE SNPs was 61% higher, indicating that use of genetic markers is clearly superior. We conclude that ASE SNPs are functionally linked to causative polymorphisms that alter transcriptional levels in genes that manifest the changes in disease incidence, thus, showing variation in cis-regulatory elements is the major mechanism that accounts for variation in MD genetic resistance between these two experimental lines.

Studies were also conducted on the role of host genetics affecting MD vaccine efficacy. Earlier studies using B-congenic lines of chickens by scientists at ADOL showed the major histocompatibility complex (MHC) significantly affect MD vaccine protective efficacy. Research data showed chickens of similar genetic background, but carrying the B-haplotypes 2, 13, 15, or 21, respond to serotype 1 types of vaccine better, whereas chickens with B-haplotype 5 respond to serotype 2 types of vaccine better than serotype 1 vaccine, measured by MD incidence. Recent studies using inbred lines of the same MHC background chickens clearly showed both serotype 1 (CVI988/Rispens) and serotype 3 (HVT) vaccines are capable to convey equally good protection in chickens relatively resistant to MD. Strikingly different protection by HVT was observed between lines of chickens sharing a common MHC type but with known difference in resistance to MD, which indicate genes outside of the MHC domain also significantly affect vaccine protective efficacy.
Genetic and Biological Determinants of Avian Tumor Virus Pathogenicity, Transmission, and Evolution

The cloning of the MDV genome as an infectious bacterial artificial chromosome (BAC) clone has led to major advances through our ability to study individual gene function by making precise insertions and deletions in the viral genome. MDV BAC clones are likely to replace wild type MDV field strains used in all aspects of MDV research due to advantages that include 1) precise manipulation of the viral genome, 2) viral genomes that are stable and can be maintained independently of propagation in eukaryotic cells, and 3) shipping BAC-cloned viruses is significantly easier and cheaper than shipping cell-associated viruses. We acquired virulent MDV BAC clones that have been generated by researchers around the world and produced a standardized virulence rank. Clones were pathotyped to compare virulence rank to prototype field strains using the standard pathotyping assay. The results indicated viruses derived from BAC clones encompassed all three virulent pathotypes (vMDV, vvMDV and vv+MDV). By standardizing results through the use of BAC-cloned MDVs, future studies from various laboratories can be more easily compared between studies.

Studies were conducted on the influence of altering the di-codon bias of select MDV genes on pathogenicity of the virus. More than one set of three nucleotides (or codon) can produce the same amino acid, which are called synonymous codons. All species studied to date demonstrate a preference for certain codons over other synonymous codons (codon bias), a preference which is also observed for pairs of codons (di-codon bias). Previous studies using poliovirus and influenza virus as models have demonstrated the ability to cause attenuation by replacing frequently used di-codons with infrequently used synonymous di-codons. We analyzed di-codon usage in the 18,742 referenced chicken genes and 86 protein-coding genes in the Md5 strain of MDV and found a clear bias for preferential use of some di-codons and rare utilization of other di-codons. We replaced commonly used di-codons with synonymous uncommonly used di-codons for the MDV gene UL54 (ICP27), a transactivator of immediate early genes. This altered virus was less virulent with a pronounced decrease in tumors and increased survivability compared to the control. This is the first time this technique has been used to lower the virulence of any herpesvirus in animals or humans and it demonstrates that this could be a new way to generate vaccines used for diseases caused by herpesviruses, such as MD in chickens.

In previous studies, we have shown strain AF-227 of endogenous subgroup E avian leukosis virus (ALV-E) and serotype 2 MDV play an important role in the enhancement of spontaneous lymphoid leukemia (LL)-like tumors in an ADOL chicken line, named RFS. This line of chickens lacks all endogenous virus genes and is susceptible to infection with all subgroups of ALV including subgroup ALV-E. The results suggest that the incidence of spontaneous LL-like tumors in chickens that harbor endogenous ALV was higher than in chickens that lack ALV-E following vaccination with serotype 2 MDV at hatch.
We conducted studies to evaluate the protective efficacy of a high passage level of a recombinant MD virus vaccine candidate named rMd5 REV-LTR BAC. Based on results obtained from testing the pathogenicity of several passages of the virus in maternal antibody (Mab)-negative chickens, we determined that the optimal passage level of rMd5 REV-LTR BAC to be used in protective efficacy studies is passage 70. Three protective efficacy trials were conducted using rMd5 REV-LTR BAC at passage 70 along with two other experimental recombinant vaccines and commercially available MD vaccines. Groups of Mab-positive and Mab-negative 15I X 7 chickens were vaccinated at day of hatch with 2000 plaque forming units (pfu) of various vaccine viruses, and challenged at 5 days post-vaccination with 500 pfu of a very virulent plus (vv+) MDV, strain 686 at passage 10. Passage 70 of rMd5 REV-LTR BAC virus provided protection comparable to that provided by the most effective currently available commercial vaccine, namely Rispens following challenge with a vv+MDV, suggesting that this virus is a good candidate vaccine that can be used in flocks where a vv+MDV challenge is expected. Experiments to study the efficacy of rMd5 REV-LTR BAC in embryonically (in-ovo) vaccinated chickens are ongoing.

Studies were also conducted to investigate the effect of MDV infection on cecal tonsils (CT) structural changes and gene expression profiling in MD-susceptible and resistant chicken lines. The data analysis revealed that MDV causes the loss of germinal follicular centers within the CT of both lines during lytic infection. The atrophy the CT, however, was transient and there were no visible differences between the CT of the infected and control birds of either line by 21 days post infection. IFN-β and IFN-γ were up-regulated in the CT of both infected lines during lytic infection but the expression levels of both genes were much higher in the susceptible line than the resistant line. Similar pattern of expression was observed for IL-6, IL-10, IL-12, IL-18, IL-13, and iNOS. IL-8 was the only cytokine expressed at higher levels in the CT of the resistant line during the lytic and reactivation phases of infection. This study provides further insight into the mechanism of MDV pathogenesis and tissue specific immunological responses to viral infection.

**Industry Concerns with Al Response Plans**
David Shapiro, Perdue Foods LLC

I used to give a presentation circa 2006 in which I named the “Bird Flu PanicDemic”, explaining that while Avian Influenza did pose some threat to both humans and poultry, the dangers were wildly exaggerated by the media and in common perception. Today’s technology and surveillance are much greater than in those days, but now I am the one panicking as I think of how the next big Avian Influenza event will turn out.

The title says “Industry Concerns”. I don’t know if that is true. These are my concerns. They should be carefully considered by both industry and government so that we can improve our response plans.

Low-pathogenic avian influenza (LPAI) and highly pathogenic avian influenza (HPAI) events involve industry, state governments, and the federal
government. In the past, they tended to be industry events with varying amounts of state and government involvement. Now they are massive state/federal undertakings with the major stakeholder (the poultry industry) at risk of being a buffeted pawn rather than a key participant. All parties are well-intentioned but I worry that we are setting ourselves up for failure when next faced with a serious emergency poultry disease situation.

My concerns were elicited by the two recent LPAI events (small commercial turkey flock in Maryland and auction birds in Delaware). My main worries include the decreasing incident management by industry in favor of state and federal officials; overly complex and tortuous state plans; lack of discretionary and delegated authority for Incident Commanders and operational team leaders; certification madness; with all testing, disinfectants, participants too prescriptively defined; desire to plan for every eventuality rather than simply being prepared.

A detailed chart showing Lessons, Warnings and Suggested Tasks follows. This same presentation and chart were also presented at the 2014 National Meeting on Poultry Health and Processing in Ocean City, Maryland.
<table>
<thead>
<tr>
<th>LESSONS</th>
<th>WARNINGS</th>
<th>TASKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Due to increased complexity of state plans and increased state/federal</td>
<td>Incidents much less severe (disease-wise) than past events, could</td>
<td>State, Federal, and Industry need to immediately review State Plans.</td>
</tr>
<tr>
<td>oversight, two relatively minor incidents disrupted and diseased a large</td>
<td>damage the poultry industry much more.</td>
<td></td>
</tr>
<tr>
<td>portion of the USA turkey and broiler industries.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overly detailed and complex plans, put Incident Commanders in a bind</td>
<td>Same as above.</td>
<td>Same as above. Re-write with more discretionary flexibility to incident</td>
</tr>
<tr>
<td>with little flexibility to rely on veterinary discretion.</td>
<td></td>
<td>commanders.</td>
</tr>
<tr>
<td>Both farm parties involved lacked veterinary representation, and there</td>
<td>Everybody with an animal should have a veterinarian-officer.</td>
<td>Everybody with an animal should have a veterinarian-officer or be</td>
</tr>
<tr>
<td>is some question if they and their birds enjoyed adequate advocacy.</td>
<td></td>
<td>assigned one during emergencies.</td>
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<tr>
<td>Because of a challenging situation (high density of market age birds</td>
<td>You don’t want to be at the podium during the press conference when we</td>
<td>Don’t send birds to market with AI tests pending. Write plans to</td>
</tr>
<tr>
<td>and infectious state plan), IC was forced to work through exceptions</td>
<td>send birds with a positive LPAI isolate to market with AI testing</td>
<td>reduce this likelihood.</td>
</tr>
<tr>
<td>and send birds to market with AI testing pending.</td>
<td>pending.</td>
<td></td>
</tr>
<tr>
<td>Practice of using ELISA for most bird AI clearance and AGID only to</td>
<td>Serology for AI clearance of meat turkeys is asking for trouble. Using</td>
<td>Run antigens testing for most bird AI clearance with, at most,</td>
</tr>
<tr>
<td>rule out screening positives on ELISA is standard practice almost</td>
<td>AGID instead of ELISA for this is even more sensible.</td>
<td>targeted usage of ELISA.</td>
</tr>
<tr>
<td>everywhere due to higher frequency of false positives with AGID.</td>
<td></td>
<td></td>
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<tr>
<td>Unrestricted drawing of quarantine circles has unintended consequences</td>
<td>An incident involving lots of backyard traceback/re上世纪 could paralyze</td>
<td>Decontaminate backyard and auction compartments from commercial</td>
</tr>
<tr>
<td>of hindering chick-poultry placement and/or bird movement even when risk</td>
<td>a region, even though there could actually be zero or very little LPAI.</td>
<td>compartmental. Clear blips should be pursued but coupling these two</td>
</tr>
<tr>
<td>is very low.</td>
<td></td>
<td>compartments is not supported by past evidence.</td>
</tr>
<tr>
<td>We look harder than anyone else for LPAI. No surprise that we find</td>
<td>No good deed goes unpunished.</td>
<td>NCC and NTF and USDA need to re-examine the current 100% testing</td>
</tr>
<tr>
<td>more.</td>
<td></td>
<td>protocols.</td>
</tr>
<tr>
<td>The more information made readily available by email reduces the need</td>
<td>If everyone is paralyzed waiting for the next conference call, we are</td>
<td>Electronic communication should be used more than</td>
</tr>
<tr>
<td>for conference calls.</td>
<td>not effectively utilizing technology.</td>
<td>consulates or face-to-face meetings.</td>
</tr>
<tr>
<td>Desire for overzealous testing puts everyone and the birds in a bind.</td>
<td>Don’t send in massive samples just to satisfy scientific curiosity.</td>
<td>USDA needs to negotiate better trade arrangements with countries</td>
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<td></td>
<td>Sampling and testing should focus on determining positive or negative</td>
<td>regarding OIE reporting and AI detection, especially with those</td>
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<td></td>
<td>status.</td>
<td>countries which have fast initial testing and reporting requirements</td>
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<tr>
<td></td>
<td></td>
<td>than those which would be all of them.</td>
</tr>
<tr>
<td>Ambiguous test results are one of the major causes of prolonged events</td>
<td>Re-testing of “suspicious” samples rather than re-sampling will paint</td>
<td>“suspicious” results (and samples) should be</td>
</tr>
<tr>
<td></td>
<td>us in a corner one day from which we will have difficulty in escaping.</td>
<td>thrown out and the flock re-sampled, rather than just</td>
</tr>
<tr>
<td></td>
<td></td>
<td>re-testing the suspect sample, delaying movements and extending</td>
</tr>
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<td></td>
<td></td>
<td>quantities.</td>
</tr>
<tr>
<td>Counties and addresses are not locations. They increase anxiety and the</td>
<td>If we don’t increase transparency, we will lose credibility among</td>
<td>Use decimal latitude coordinates. There is no excuse</td>
</tr>
<tr>
<td>effective responses.</td>
<td></td>
<td>for anything else.</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>We already know how to get to Carnegie Hall.</td>
<td>We have done more paperwork than beta-testing with</td>
<td>A few tabletop might open our eyes as to the tasks we’ve set</td>
</tr>
<tr>
<td></td>
<td>the new plan compared to the old plans.</td>
<td>for ourselves. Keep those IC structures current!</td>
</tr>
</tbody>
</table>

Shapiro/reduced VEETF Meeting Presentation Notes / June 19, 2014 / regarding recent MD and DPAI incidents
Low Pathogenicity Avian Influenza (LPAI) H5N8 in Stanislaus County, California
Sarah Mize, California Department of Food and Agriculture

**Background:** On April 14, 2014 five live and four dead adult quail from a commercial Japanese quail (*Coturnix japonica*) layer flock were submitted to the California Health and Food Safety Laboratory in Turlock, California, due to increased mortality in the flock. Pharyngeal swabs were tested for avian influenza virus (AIV) by rRT-PCR and reported positive for AIV H5 subtype and negative for AIV H7 subtype on April 18th. Swabs were then submitted to the National Veterinary Services Laboratory (NVSL). On April 19th, NVSL reported that pharyngeal swabs tested by rRT-PCR were positive for the AIV H5 subtype and negative for the AIV H7 and N1 subtypes. The amino acid sequence at the hemagglutinin protein cleavage site was compatible with North American LPAI virus. The sequence was 99.1% similar to A/American green-winged teal/Wisconsin/10OS3127/2010. An H5N8 virus was isolated from the specimen. The H5 is 98.2% similar to A/mallard/California/1435/2013 (H5N5) based on sequence from the complete hemagglutinin gene. Chicken pathogenicity testing was compatible with LPAI virus. Full genome sequencing was performed by Dr. Webby’s group at St. Jude in Memphis, Tennessee. The California H5N8 was compared to the Korea H5N8 (HPAI) and no relationship was detected. A short stalk in the N8 sequence indicated that the quail virus would adapt to chickens.

**Epidemiology:** A Foreign Animal Disease Diagnostician began the initial outbreak investigation on April 18. The index premises consisted of a quail flock and a Peking duck flock. The quail flock consisted of two (2) houses (a layer and a brooder). The affected quail layer house contained approximately 50,000 laying hens and 6000 adult males. The cages were in rows and the quails in each row were of the same age group. Quails were hatched at approximately nine (9) week intervals and placed in the quail brooder house. The quail brooder house contained 32,000 quails (three weeks old) and 7,000 (eleven weeks old) males. There were nine (9) additional houses on this premises that housed Peking ducks for egg production. Each house contained approximately 2,000 adult layers and 400 adult males of the same age group for a total of 21,600 ducks. Replacement ducks were hatched at five (5) weeks intervals. Breeders for both species were selected from the existing populations randomly. Two lagoons were utilized for flushing waste from the quail houses and some areas of the duck houses. The index farm has an incinerator and daily mortality for all species was incinerated.

There were two contact premises (a brooder and a layer) with Peking duck flocks owned by the same company as the index farm and considered to be epidemiologically linked but not affected. The brooder premises contained approximately 16,500 Peking ducks (14,000 female and 2,500 male). The layer premises contained 22,000 Peking ducks (18,000 female and 4,000 male). Daily mortality was transported from the contact premises.
to the index farm for incineration. The index premises and the contact premises were quarantined on April 18.

The hatchery and an egg washing facility were located on the index premises. At approximately five week intervals, day old ducklings were transported from the index premises to the brooder premises. Cull male ducklings were frozen and donated to a local wildlife rehabilitation center. Ducks were returned to the index premises from the brooder premises to begin egg production. At the conclusion of a 45 week production cycle at the index premises, each cohort was molted and transported from the index premises to the associated layer premises to complete a second 45 week production cycle. Spent ducks were transferred from the associated layer premises to a slaughter plant. The carcasses were then processed for pet food. The eggs were transported to the index premises for processing.

Cull quail (spent hens and males) were frozen in a commercial freezer and sold to falconers. Duck eggs were sanitized at the egg washing facility and the majority of duck eggs were moved to the incubators for balut production or for hatching replacement ducklings. Some duck eggs were diverted to be sold as salted eggs. Peewees and eggs with double yolks were sold fresh. Quail eggs, duck eggs and quail carcasses were sold wholesale to interstate and intrastate distributors and markets.

**Eradication:** Depopulation via euthanasia (CO₂) began on April 21, 2014 and completed on April 25, 2014. Disposal of carcasses, frozen carcasses and eggs were via landfill. The litter was composted on site and disked into a fallow field. The houses were cleaned and disinfected and left empty for thirty days. Restocking was permitted following negative environmental tests. Flocks were tested 30 days after placement.

**Surveillance:** Contact premises were tested weekly for four weeks and then released from quarantine. Commercial poultry in the ten kilometer zone were tested twice. Non-commercial premises in the three kilometer zone were tested. In addition, poultry premises on feed truck delivery route were tested.

**Conclusion:** The objective of the response was to contain the H5N8 LPAI virus to the affected premises and prevent transmission to commercial or backyard poultry operations. Mission accomplished.

**Off-Site Carcass Disposal Challenges in FAD Outbreaks**

Jimmy Tickel, North Carolina Department of Agriculture and Consumer Services, Emergency Programs Division

Disposal of animal carcasses after a catastrophic event, whether disease or natural disaster related can often create unique and difficult challenges to State and Local officials. Options for carcass disposal include on farm options such as composting and burial as well as off-site options such as rendering and landfill. The biosecurity and transport challenges associated with using offsite resources such as rendering and landfills require additional planning and logistical considerations to allow those options to be used especially for events such as FAD outbreaks. The North Carolina
Department of Agriculture and Consumer Services (NCDA & CS) worked collaboratively with West Texas A&M, USDA APHIS, Department of Homeland Security (DHS) and other State and Industry SME’s to explore logistical challenges, identify resource gaps, and produce guidance for utilizing off-site disposal resources (rendering and landfills) specifically for a Foot and Mouth Disease Outbreak. Though the Poultry Industry has worked many of these issues for avian diseases, one tool that was developed as part of the project likely has benefit in avian disease response planning. The Carcass disposal calculator tool assists response personnel as they work through the logistics for events with large scale carcass disposal challenges.

**Notifiable Avian Influenza: A Practical Response and Tabletop Exercise in Minnesota**

Shauna Voss, Minnesota Board of Animal Health

A series of avian influenza and broiler movement activities were organized by the Minnesota Board of Animal Health (BAH) and the University of Minnesota (UMN) to enhance preparedness for possible Notifiable Avian Influenza (NAI) events in Minnesota. The activities were held in January and February of 2014 and focused on normal poultry movements and the risks of these movements during an NAI event. These types of exercises highlight the impact that disease events can have on companies and communities, facilitate successful communication during an event, and cultivate a cohesive public-private partnership.

The first activity was an Incident Command System (ICS) and Communications Workshop held for Minnesota’s Emergency Disease Management Committee (EDMC). The Minnesota H5/H7 Low Pathogenic Avian Influenza (LPAI) Initial State Response and Containment Plan (ISRCP) require the use of an ICS to manage an H5 or H7 LPAI event. In order for the EDMC to become familiar with ICS, an Executive’s version of ICS was presented that provided an overview of the ICS structure and chain of command for a unified response. For the communications section of the workshop, a panel of poultry industry and public communications experts was assembled to identify communication needs during an NAI event and discuss how communications can impact business continuity and disease response.

The follow up activity was a three-day event that started out with a business continuity panel discussion with Minnesota poultry industry Chief Executive Officers (CEOs). The panel reviewed the normal product flow of commodities in their companies, the impacts of movement restrictions during an AI event and the need for a coordinated response. The following day the poultry movement discussions continued with a series of presentations from industry and state and federal government personnel. Topics covered included Minnesota’s diverse poultry industry, regulatory responses, risk assessment use during a NAI response and the Highly Pathogenic Avian Influenza Secure Broiler Supply Plan. To enhance stakeholders understanding of poultry movement, participants had an opportunity to visit
broiler facilities including a hatchery, a broiler farm, and a processing plant. These visits were facilitated by broiler company personnel and included in-depth discussions of the processes and movements involved with each operation. The three-day event concluded with a tabletop exercise designed by the Minnesota Board of Animal Health with input from the United States Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services (USDA-APHIS-VS) titled “Notifiable Avian Influenza: A Practical Response in Minnesota.” The goal of the tabletop exercise was to demonstrate implementation of Minnesota’s ISCRP, also known as “The Minnesota Plan” and practice responding as a unified force to a H5/H7 LPAI introduction with collaboration from all stakeholders. The exercise was designed to illustrate the first seven days of a response to an H5/H7 LPAI introduction in Minnesota. Each day of the fictitious scenario new findings were presented by the moderator and questions were posed to the participants. Time was allowed for discussion, interaction and comments in small groups with major decisions captured at the end of each section. Various documents were used as exhibits throughout the exercise including disease alerts, quarantine documents, premises mapping and press releases. These exhibits helped to simulate actual communication tools that may be used during an NAI response and to aid the participants in their decisions.

Results from written evaluations revealed that this exercise was valuable in terms of the opportunities provided for hands-on learning and in-person interaction with other animal health professionals. These types of exercises and the working relationships that develop with other stakeholders help build the foundation for a unified, practical and responsible response to an NAI event in Minnesota.

Secure Food Supply Plans for the Poultry Industry- 2014 Update
Timothy J. Goldsmith, Sasidhar Malladi, Justin G. Bergeron, Ong-Orn Prasarnphanich, Jamie Slingluff, Mary Hourigan, Catherine Alexander, David A. Halvorson, University of Minnesota, Center for Animal Health and Food Safety
Todd Weaver, USDA-APHIS-VS-CEAH
James Roth, Iowa State University, Center for Food Security and Public Health

Since 2006 there has been an effort through a public-private partnership approach that involves government, industry and academic representatives to develop plans to support continuity of business (COB) for the poultry industry. These Secure Food Supply Plans are meant to reduce the unintended consequences that a standard response to an outbreak of highly pathogenic avian influenza (HPAI), likely involving quarantine and stop movement orders, would have on the poultry industry. These plans seek to support the resiliency of the poultry industry and address the preparedness and response goals of the United States Department of Agriculture (USDA) Animal Plant Inspection Service (APHIS) Veterinary Services (VS).
Ultimately the plans provide for the managed movement of key animals and commodities from non-infected flocks under permit, through science and risk based approaches that allow continuity of operations for the industry while maintaining and ideally enhancing HPAI control.

The secure food supply plans for the poultry industry are broken down into three groups: Secure Egg Supply Plan (SES), Secure Broiler Supply Plan (SBS), and Secure Turkey Supply Plan (STS). Each plan consists of industry segment specific working groups that involve representatives from industry, government and academia who meet periodically to update and refine the plans as necessary. A key component to the plans is the development of proactive risk assessments, looking at a commodity or live bird movement in their respective production cycles. The risk assessments utilize quantitative and qualitative risk estimations to evaluate the possibility of transmission of HPAI from infected but undetected poultry through the movement of live birds or poultry products. These assessments are then used to guide the development of mitigations needed to move that commodity or live bird for that production segment with an acceptable level of risk. This includes the development or evaluation of process guidelines and tools that support the managed movement and the proposed components including surveillance, elevated biosecurity, holding periods, etc. that are needed to allow the managed movement of that commodity. Developed guidelines can be used by an incident commander to issue movement permits. These permits would be used to manage movement of commodities and live poultry into, within and out of a control area.

The Broiler Sector Working Group has made great progress focusing on the movement of live broilers located in a control area to slaughter during a HPAI outbreak. Assessment of the risk pathways is complete, and measures and protocols to be implemented during an outbreak have been developed, including active surveillance protocol options, establishment of a pre-movement isolation period (PMIP), and biosecurity measures for critical operational visits during the PMIP. A related outreach/education effort was held in February, 2014 through a joint APHIS, Minnesota Board of Animal Health, Industry and University of Minnesota effort. The event focused on broiler movement, with participation of academia, state and federal officials, and industry stakeholders. The outcomes of the exercise were: (1) a deeper understanding of the constrains that govern the HPAI outbreak events, (2) identified gaps in the Secure Broiler Supply Plan and explored ways to address them, (3) educated stakeholders about working through a difficult scenario.

The Turkey Sector Working Group has made significant progress looking at the movement of Day-Old Poults and Hatching Eggs within and out of a control area during a HPAI outbreak. The results and associated procedures and guidelines are being incorporated into the Secure Turkey Supply Plan. Current focus is on the movement of live birds to slaughter: data collection and evaluation is ongoing for incorporation into the risk assessment and
formulation of movement guidelines. The website is in development, with launch anticipated later this year. The Egg Sector work has focused on outreach to industry and government stakeholders. As the SES plan is the most mature of all the secure food supply plans, there is ongoing effort focused on education and adoption of the SES plan with industry and regulatory stakeholders. Current focus is on the top ten egg producing states as well as interested/engaged states. Outreach has utilized a “tri-state” model in which three neighboring states are brought together with the objectives to: further educate attendees about the SES plan; focus on the movement of egg products during a HPAI outbreak; encourage networking; and plan next steps for action considering a HPAI outbreak for that tri-state region. This approach was used previously with Iowa, Minnesota and Wisconsin, and was used most recently with Indiana, Michigan and Ohio in June 2014. The workshop included a total of 58 people representing industry, state and federal officials, and academia. Additional efforts related to the SES include, work to increase the ability for states participate in the SES preparedness component are underway to starting with attempts to identify an appropriate independent third party auditing firm to conduct biosecurity audits under the authority of the state and to develop the SES data portal to be used nationally.

In October 2014, a cooperative agreement was established with Colorado State University, department of Agricultural and Resource Economics to begin work on an economic and consequence assessment. Although the current secure food supply plan control measures are considered to be voluntary guidelines and are appended to existing HPAI response plans, if HPAI outbreak response results in regulatory rulemaking, analyses that result in potential regulatory decisions that would have an impact on the public must be in compliance with relevant statutory requirements and international guidelines. The economic assessment will be conducted with support and oversight from the Center for Epidemiology and Animal Health, Epidemiological and Economic Modeling and Risk Assessment teams, and will work through existing secure food supply poultry sector working groups lead by the University of Minnesota, Center for Animal Health and Food Safety.

In summary, work is progressing well in the development of secure food supply plans for movement of poultry and egg industry products in the face of an HPAI outbreak. The work is dependent on being an inclusive process, with the participation of multiple stakeholders through the public-private partnership model. This collaborative effort leads to accurate risk and science based plans and guidelines to inform risk management decisions associated with the managed movement of live birds and poultry commodities key to maintaining continuity of business during a HPAI outbreak.

2014 Activities- Broiler Sector Working Group

- Secure Broiler Supply Website
  - Available at www.securebroilersupply.com
REPORT OF THE COMMITTEE

- Broiler Hatching Egg Risk Assessment and Broiler Day Old Chick Risk Assessment
  o Available at www.securebroilersupply.com
- Broilers to Slaughter Risk Assessment
  o Risk Assessment (release and exposure pathways): completed (September 2014)
  o Development of measures and protocols implemented during an outbreak: complete (May 2014)
  o Writing: started (August 2014)
- Broiler HPAI Exercise
  o Successfully held in MN (February 2014)

2014 Activities- Turkey Sector Working Group

- Secure Turkey Supply Website
  o In Beta mode, anticipated launch spring 2015
- Turkey Hatching Egg Risk Assessment
  o Risk Assessment draft in review, CEAH (Sept 2014)
  o Manuscript in review for publication
- Turkey Day Old Poults Risk Assessment
  o Risk Assessment revised draft in review, CEAH (Aug 2014)
- Turkeys to Slaughter Risk Assessment
  o Expert Opinion Survey on biosecurity, aerosol and local area spread (Spring 2014)
  o Normal mortality modeling in progress
  o Updating of recommended guidelines in progress

2014 Activities- Egg Sector Working Group

- Secure Egg Supply Website
  o Available at www.secureeggsupply.com
- Outreach
  o Tri state SES conference with Indiana, Michigan, and Ohio June, 2014.

The World Organization for Animal Health (OIE) Update – Poultry
Michael J. David, National Director International Animal Health Standards, National Import Export Services, USDA-APHIS, Veterinary Services

Every year, the World Organization for Animal Health (OIE) updates existing terrestrial animal code chapters or drafts new ones. At its May 2014 General Session, the World Assembly of Delegates adopted new text to several existing chapters. Pertinent to the poultry industry are the following updated Code chapters:

Animal Welfare: In 2013 a new chapter on Animal Welfare and Broiler Chicken Production was adopted. This year, this chapter received some minor updates and corrections to clarify several of its articles.

Responsible and Prudent Use of Antimicrobial Agents in Veterinary Medicine: This chapter continues to be updated to improve its
understanding and readability. The United States has commented and intervened several times during the past 3 years to address the fact that the OIE recommendations related to the prescription of antimicrobial agents are in conflict with our current legislation. In the United States a number of antimicrobial products are available to producers of livestock and poultry as over-the-counter medications. These products are legally available and require neither a prescription nor oversight by a veterinarian. While veterinary oversight is strongly encouraged in the United States for all uses of antimicrobial products and, in many cases producers have a strong and durable relationship with their veterinarian, these products are legally available for use without these requirements. As such, the OIE guidelines would ask the United States to make policy that is in conflict with the legal statutes in this country.

**Infection with Avian Influenza and Newcastle Disease Viruses:** The Code Commission recommended some changes in treatment procedures to inactivate the AI and Newcastle disease viruses in products such as feathers, poultry meal and feather meal. These changes were incorporated into the corresponding Articles of their respective code chapters and adopted.

**National Poultry Improvement Plan 2014 Annual Report**

Dr. Denise L. Brinson, USDA-APHIS-VS-NPIP


Pullorum-Typhoid Status: There were no isolations of Salmonella Pullorum in commercial poultry in FY2011, FY2012, FY2013, or FY2014. There were no isolations of Salmonella Pullorum in backyard birds in FY2013 or FY2014. There have been no isolations of Salmonella Gallinarum since 1987 in any type of poultry in the U.S. U.S. Pullorum-Typhoid Clean participating hatcheries include: 225 egg and meat-type chicken hatcheries, 37 turkey hatcheries, and 734 waterfowl, exhibition poultry and game bird hatcheries.

**NPIP U.S. Pullorum-Typhoid Clean Participating Breeding Flocks and Number of Birds are listed below:**

**Egg-Type Chickens**
237 Flocks with 6,233,761 birds

**Meat-Type Chickens**
3,192 Flocks with 72,671,121 birds
REPORT OF THE COMMITTEE

**Turkeys**
492 Flocks with 4,886,147 birds

**Waterfowl, Exhibition Poultry, and Game Birds**
5,601 Flocks with 1,574,450 birds

**Meat-Type Waterfowl**
93 Flocks with 213,191 birds

**Avian Influenza Status:** In FY2014 (July 1, 2013-June 30, 2014), there were two isolations of Avian Influenza in commercial poultry in the U.S.:
- H7N3 isolated in a New Jersey commercial game bird hunting preserve/breeding farm
- H5N8 isolated in a California commercial quail layer flock

**Table 1: 2014 NPIP U.S. Avian Influenza Clean and U.S. H5/H7 Clean Participating Breeding Flocks; and U.S. H5/H7 Avian Influenza Monitored Participating Commercial Flocks:**

<table>
<thead>
<tr>
<th>Subpart</th>
<th>Flocks</th>
<th>Birds</th>
<th>Tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Egg-Type Chicken Breeders</td>
<td>285</td>
<td>4,767,282</td>
<td>25,196</td>
</tr>
<tr>
<td>Table-Egg Layers-Commercial</td>
<td>5,151</td>
<td>1,287,343,146</td>
<td>78,217</td>
</tr>
<tr>
<td>Chicken Breeders</td>
<td>5,921</td>
<td>100,934,447</td>
<td>304,670</td>
</tr>
<tr>
<td>Chickens-Commercial</td>
<td>76,823</td>
<td>6,181,374,286</td>
<td>1,145,549</td>
</tr>
<tr>
<td>Turkey Breeders</td>
<td>949</td>
<td>8,785,331</td>
<td>36,575</td>
</tr>
<tr>
<td>Turkeys-Commercial</td>
<td>19,275</td>
<td>323,465,462</td>
<td>170,558</td>
</tr>
<tr>
<td>Waterfowl, Upland Game birds, Ex. Poultry</td>
<td>2,123</td>
<td>1,152,151</td>
<td>34,384</td>
</tr>
<tr>
<td>Upland Game birds, Waterfowl, Raised for Release Upland Game birds, Raised for Release Waterfowl-Commercial</td>
<td>2,563</td>
<td>37,502,099</td>
<td>33,294</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>113,090</td>
<td>7,945,324,204</td>
<td>1,828,443</td>
</tr>
</tbody>
</table>
**Mycoplasma gallisepticum, Mycoplasma synoviae, and Mycoplasma meleagridis** positive breeding flocks - National Poultry Improvement Plan FY2014

<table>
<thead>
<tr>
<th></th>
<th>WEGBY</th>
<th>Egg-Type</th>
<th>Meat-Type</th>
<th>Turkeys</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>M. gallisepticum</em></td>
<td>30</td>
<td>2</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td><em>M. synoviae</em></td>
<td>15</td>
<td>14</td>
<td>50</td>
<td>2</td>
</tr>
<tr>
<td><em>M. meleagridis</em></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

**Authorized Laboratories Activities:** The University of Georgia Poultry Diagnostic & Research Center provides a quality assurance panel of convalescent contact infected chicken sera against MG and MS to authorized laboratories as a check test tool as well as a MG/MS PCR check test. The National Veterinary Services Laboratories issues a group D Salmonella check test, Salmonella serotype proficiency check test and an Avian Influenza check test for the Agar Gel Immunodiffusion test annually for Authorized Labs of the NPIP. Laboratory training provided to the authorized laboratories included a Salmonella Isolation and Identification Workshops, a Mycoplasma Diagnostic Workshop, and an Avian Influenza Diagnostic Workshop during FY2014 in Georgia.

**NVSL Avian Influenza and Newcastle Disease Activities Report - FY 2013**

Mia Kim-Torchetti, Diagnostic Virology Laboratory, National Veterinary Services Laboratory

The National Veterinary Services Laboratories (NVSL) in Ames, IA, in coordination with the National Animal Health Laboratory Network (NAHLN), received avian samples for testing in fiscal year (FY) 2014 arising from National Poultry Improvement Plan (NPIP) and Live Bird Market (LBM-BYD) surveillance programs, foreign animal disease (FAD) investigations, import and export activities, wild bird surveillance, and other diagnostics. While the majority of the samples are received for confirmation testing, it is currently not possible to separate confirmations from other testing due to limitations of the laboratory information management system and inconsistent information received on submission forms. Ability to discriminate such testing will improve future analyses and will contribute to better understanding of surveillance data.

This summary focuses on avian influenza (AI) and Newcastle disease (ND) detection in domestic poultry. For FY2014, the number of samples received for molecular testing and virus isolation by purpose is summarized in Table 1. A decrease noted in samples received for import testing between
FY2013 and FY2014 is the result of a large import effort in FY2013 and does not represent a decrease in routine testing. Pet bird and psittacines made up the majority of import testing, while export testing is conducted predominantly for chickens (~400 tests per year). All import and export samples tested for FY2014 (n=2081) were negative for AI and ND.

**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 NVSL tested 658 specimens in 260 submissions from 24 states (AL, CA, CT, DE, FL, KS, LA, MA, MD, ME, MO, NH, NV, NY, OH, OK, OR, PA, RI, SD, TX, VA, WA, WY) by virus isolation in embryonated chicken eggs and, when appropriate, by real-time RT-PCR (rRT-PCR). All remaining LBMS surveillance specimens were tested at the State level. In FY2014, AIV (n=11) or APMV-1 (n=29) was isolated from 6.5% (29/658) of specimens tested. For low pathogenic avian influenza (LPAI; Table 2), an LPAI H7N2 was isolated from chickens in a PA poultry auction/backyard flock similar to a 1999 NY LBM virus (first confirmed H7 in PA since 2007), LPAI H7N7 was isolated from chickens at a poultry auction in DE, and there were molecular detections of H5 (LPAI by sequence analysis of swab material) from LBM Muscovy ducks in PA and quail and guinea hens at a poultry auction in NJ (no virus was isolated). Other AIV isolated are listed by H-type in Table 2. 29 APMV-1 viruses were isolated from 10 states (CA, DE, FL, MA, MD, NJ, NY, OH, PA, RI). Pathogenicity of representative APMV-1 isolates obtained from birds was determined by the intracerebral pathogenicity index (ICPI) test and/or by analysis of the deduced amino acid profile at the fusion protein cleavage site. All were characterized as low virulent (lentogenic pathotype) strains.

**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 FY2014, there was a serologic detection of H5N2 in a flock of turkeys reporting previous clinical signs (no virus was detected); an LPAI H5N8 of wild bird origin was detected in quail; and an LPAI H7N3 also of wild bird origin in pheasants sampled under the H5/H7 Clean program. Other AIV isolated are listed by H-type in Table 2.

**AI Antibody Subtyping.** The NVSL received 254 submissions (1578 sera) for AI antibody confirmation and subtyping in FY2014 from 28 states predominantly from chickens and turkeys. Antibodies to influenza H1 and/or H3, with N1 and/or N2 antibodies were detected predominantly in turkey samples (97%) where vaccination is common; over two thirds of samples were from OH with sporadic detections from 20 other states (AL, CT, FL, IA, KS, MA, MI, MN, MO, NC, NH, NV, PA, SC, SD, TN, TX, VA, VT, WI). Antibody was also detected as follows: H2 (NH: chicken, MN: turkey), H4 (MN: turkey; virus isolated – refer to Table 2), H5N2 (PA: turkey – serologic...
only detection; listed above in Commercial), H6 (PA: chicken, TX: mixed), H6N8 (MN: turkey; virus isolated – refer to Table 2), and H7 (NY: chicken [pet], NV: Sage Grouse [captive wild bird] – both serologic only).

**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 FY2014, 591 wild bird specimens were received for confirmation, subtyping and characterization, and from mortality events for VI and rRT-PCR. Of these 395 AIV viruses were isolated (Table 3); all H5 and H7 AIVs were characterized as LPAI viruses of North American lineage and no highly pathogenic avian influenza (HPAI) was detected. The list of H5 and H7 subtypes is in Table 4.

**Avian paramyxovirus serotype-1 (APMV-1).** In FY2014 a total of 86 APMV-1 viruses were isolated from 17 states (AL CA DE FL ID IL MA MD ME MN NC NJ OH PA RI WI WY; includes the 29 LBM isolates mentioned above). Pathogenicity of representative APMV-1 isolates obtained from birds was determined by the intracerebral pathogenicity index (ICPI) test and/or by analysis of the deduced amino acid profile at the fusion protein cleavage site. In FY2014, no vNDV was isolated. Of the 86 isolates, 57 were characterized as low virulent NDV (loNDV) and 22 were identified as pigeon paramyxovirus type-1 (PPMV-1) from racing and other pigeons in 6 states (CA FL ME PA RI WY). PPMV-1 isolates were identified by the HI test with monoclonal antibodies specific for PPMV-1 and sequence analysis of fusion protein cleavage site.

**Proficiency Test Panels.** For AGID, 129 laboratories were invited to participate in the voluntary proficiency test (PT); 70 panels were shipped (including Mexico (1) and El Salvador (1)). A total of 65 laboratories from 35 states plus Puerto Rico passed with a score of 90% or better. The NAHLN laboratories conducting surveillance testing for AI and/or ND are required to have one or more diagnosticians pass an annual PT to perform official rRT-PCR testing. In FY 2014, AI (matrix/H5/H7) PTs were distributed/approved for 244/246 diagnosticians in 56 laboratories and for 234/242 diagnosticians in 54 laboratories for APMV-1 (Newcastle disease) rRT-PCR. In addition to NAHLN laboratories, AI and ND rRT-PCR proficiency panels were distributed to Canada and Mexico as part of the North American Animal Health Laboratory Network (NAAHLN) harmonization, as well as one to the Dominican Republic. The 2014 international OFFLU AI Ring Trial was also coordinated, prepared and shipped by the NVSL in coordination with the Frederich Loeffler Institute. The panel included 15 samples and participants were expected to conduct Type A, H5 and H7 subtyping rRT-PCR, as well as sequence analysis for molecular pathotyping. Participants included 20 laboratories (representing 20 countries), including 9 OIE/FAO Reference
Centers and 11 Regional Laboratories. While the majority of laboratories accurately detected influenza A; subtyping by PCR was challenging.

**AI Diagnostic Reagents Supplied by the NVSL.** The following reagents were distributed for rRT-PCR testing and support of NPIP and LBM surveillance during FY 2014:

**AGID Diagnostic Reagents:**
- 11,645 units of AGID reagents (antigen and enhancement serum) were shipped to 59 state, university, and private laboratories in 33 states sufficient for approximately 1,397,400 AGID tests
- An additional 543 units (65,160 tests) were shipped to 10 international laboratories (10 countries)

**AIV Diagnostic Reagents:**
- AIV-1 rRT-PCR Controls
  - 81 vials of positive amplification control (M, H5 & H7) 19 states; 28 internationally to 6 countries
  - 318 vials of positive extraction control 35 states; 7 internationally to 6 countries
  - 413 vials of negative extraction control 36 states

**APMV-1 Diagnostic Reagents:**
- LaSota Antigen (inactivated)
  - 116 vials (2 ml) to 7 national and 4 international laboratories
- APMV-1 Antiserum
  - 65 vials (2 ml) to 4 national and 5 international laboratories
- APMV-1 rRT-PCR Controls
  - 27 vials of positive amplification control to 16 states; 8 vials internationally (4 countries)
  - 118 vials of positive extraction control to 25 states; 5 vials internationally (4 countries)

---

**Table 1. Samples received for avian influenza and Newcastle disease testing during FY2013-14 by purpose.**

<table>
<thead>
<tr>
<th></th>
<th>FY2013</th>
<th>FY2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMPORT</td>
<td>4944</td>
<td>1562</td>
</tr>
<tr>
<td>EXPORT</td>
<td>378</td>
<td>519</td>
</tr>
<tr>
<td>LBM-BYD</td>
<td>649</td>
<td>658</td>
</tr>
<tr>
<td>COMMERCIAL</td>
<td>266</td>
<td>283</td>
</tr>
</tbody>
</table>
Table 2. FY2014 AIV isolates from LBM, backyard, and commercial submissions by state and H-type.

<table>
<thead>
<tr>
<th>Purpose</th>
<th>Subtype</th>
<th>Source</th>
<th>State</th>
</tr>
</thead>
<tbody>
<tr>
<td>LBM/ backyard</td>
<td>H2N5</td>
<td>Duck</td>
<td>WA</td>
</tr>
<tr>
<td></td>
<td>H3N8</td>
<td>Duck</td>
<td>TX</td>
</tr>
<tr>
<td></td>
<td>H4N6</td>
<td>Duck</td>
<td>WA</td>
</tr>
<tr>
<td></td>
<td>H6N2</td>
<td>Chicken</td>
<td>FL</td>
</tr>
<tr>
<td></td>
<td>H6N5</td>
<td>Chicken</td>
<td>TX</td>
</tr>
<tr>
<td></td>
<td>LPAI H7N2</td>
<td>Chicken</td>
<td>PA</td>
</tr>
<tr>
<td></td>
<td>LPAI H7N7</td>
<td>Chicken</td>
<td>DE</td>
</tr>
<tr>
<td>Other Commercial</td>
<td>H1N1</td>
<td>Turkey</td>
<td>VA</td>
</tr>
<tr>
<td></td>
<td>H4N2</td>
<td>Turkey</td>
<td>MN</td>
</tr>
<tr>
<td></td>
<td>H6N8</td>
<td>Turkey</td>
<td>MN</td>
</tr>
<tr>
<td></td>
<td>LPAI H5N8</td>
<td>Quail</td>
<td>CA</td>
</tr>
<tr>
<td></td>
<td>LPAI H7N3</td>
<td>Pheasant</td>
<td>NJ</td>
</tr>
</tbody>
</table>

Table 3. Avian influenza isolates from wild birds by state and H-type (n=395; collection dates range from 2012-14).

<table>
<thead>
<tr>
<th>State (# isolates)</th>
<th>H-type (n=395)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AK (1)</td>
<td>H3</td>
</tr>
<tr>
<td>AR (3)</td>
<td>H5, H11</td>
</tr>
<tr>
<td>IA (20)</td>
<td>H3, H4, H7</td>
</tr>
<tr>
<td>ID (8)</td>
<td>H1, H3, H4</td>
</tr>
<tr>
<td>IL (15)</td>
<td>H3, H4, H5, H11</td>
</tr>
<tr>
<td>IN (2)</td>
<td>H1, H5</td>
</tr>
<tr>
<td>KS (1)</td>
<td>H3</td>
</tr>
<tr>
<td>LA (55)</td>
<td>H7 (N1, N3, N7)</td>
</tr>
<tr>
<td>MD (35)</td>
<td>H1, H2, H3, H4, H5, H6, H9, H10, H11</td>
</tr>
<tr>
<td>ME (1)</td>
<td>H13</td>
</tr>
<tr>
<td>MN (1)</td>
<td>H11</td>
</tr>
<tr>
<td>MO (35)</td>
<td>H1, H2, H4, H5, H6, H9, H10, H11</td>
</tr>
<tr>
<td>MS (13)</td>
<td>H1, H5, H7, H8, H10, H11</td>
</tr>
<tr>
<td>MT (1)</td>
<td>H3</td>
</tr>
<tr>
<td>NJ (7)</td>
<td>H4, H7</td>
</tr>
<tr>
<td>OH (159)</td>
<td>H1, H2, H3, H4, H5, H6, H7, H9, H10, H11</td>
</tr>
</tbody>
</table>
Table 4. Low pathogenic avian influenza (LPAI) subtypes received in FY2014 from wild birds by state (n=90; collection dates range from 2012-14).

<table>
<thead>
<tr>
<th>LPAI Subtype (# isolates)</th>
<th>State</th>
</tr>
</thead>
<tbody>
<tr>
<td>H5N2 (12)</td>
<td>AR, IL, IN, MD, MO, MS, OH</td>
</tr>
<tr>
<td>H5N4 (1)</td>
<td>MS</td>
</tr>
<tr>
<td>H7N1 (1)</td>
<td>OH</td>
</tr>
<tr>
<td>H7N1,3 or 4 (8)</td>
<td>IA, LA, MD, MS, OH, WI</td>
</tr>
<tr>
<td>H7N1,7 (31)</td>
<td>LA, NJ, OH</td>
</tr>
<tr>
<td>H7N2 (1)</td>
<td>MS</td>
</tr>
<tr>
<td>H7N3 (9)</td>
<td>LA, MS, OH, SC</td>
</tr>
<tr>
<td>H7N7 (24)</td>
<td>LA, TX</td>
</tr>
<tr>
<td>H7N7 (3)</td>
<td>LA</td>
</tr>
</tbody>
</table>

Poultry *Salmonella, Mycoplasma, and Pasteurella* Diagnostics at NVSL
B.R. Morningstar-Shaw, LK Cox, K Lantz, CL Tichenor, KA Toot, Diagnostic Bacteriology Laboratory, National Veterinary Services Laboratory

*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, 2013 originating from poultry. *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.

*Salmonella* serotyping at the NVSL is an ISO 17025 accredited test. Salmonellae are typed using polyvalent and single factor antisera to determine the O and H antigens. Approximately 60% of the sera used at the NVSL are produced in house as previously described. (Ewing) The remaining antisera are purchased from commercial vendors. All sera are subject to
extensive quality control testing prior to use. *Salmonella* antigenic formulae
are determined as previously described (Ewing) and interpreted via the
White-Kauffmann-Le Minor scheme (Grimont). The subspecies designation
precedes the antigenic formula for those serotypes other than subspecies I.

From January 1 to December 31, 2013 there were 3912 isolates from
chicken sources and 1378 isolates from turkey sources submitted to the
NVSL for *Salmonella* serotyping. The most common isolates from chickens
and turkeys are listed in Tables 1 and 2 respectively.

The NVSL provided a *Salmonella* Group D proficiency test to assess the
ability of laboratories to isolate *Salmonella* from environmental samples and
determine the serogroup (specifically group D) of any *Salmonella* isolated.
The samples consisted of drag swabs spiked with *Salmonella* and/or
common contaminants. The 2013 test included *Salmonella* serotypes
Enteritidis, Javiana, Saintpaul, Anatam, Oranienburg, Heidelberg, Ouakam,
Virchow, 9,12:non-motile, and an *sdf* negative Enteritidis. Contaminant
bacteria included *Enterobacter cloacae*, *Escherichia coli*, *Citrobacter freundii*,
*Pseudomonas aeruginosa*, and *Providencia* sp. The test consisted of 10
samples which were shipped to laboratories overnight on ice packs.
Laboratories were instructed to use their current protocols to test and were
asked to report the results within three weeks. The NVSL randomly retained
8% of the test kits and tested them blindly for quality assurance purposes.
The results of the proficiency test are shown in Table 3.

Additionally, the NVSL offered *Salmonella* serotyping proficiency tests to
allow laboratories to assess their ability to serogroup or serotype *Salmonella*.
The panel consisted of ten pure *Salmonella* isolates, including *Salmonella*
serotypes Heidelberg, Senftenberg, Enteritidis, Kentucky, Mbandaka,
Anatum, Give, Typhimurium, Berta and Agona. Participants were given the
option to perform serogrouping, partial serotyping, or full serotyping of the
isolates and were graded based on appropriate identification to the level of
typing they performed. The NVSL randomly retained 19% of the test kits and
tested them blindly for QA purposes. The results of the proficiency test are
shown in Table 4.

### Table 1: Most common serotypes in 2013: Chicken

<table>
<thead>
<tr>
<th>Serotype</th>
<th>No. Isolates</th>
<th>Serotype</th>
<th>No. Isolates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enteritidis</td>
<td>71</td>
<td>Senftenberg</td>
<td>570</td>
</tr>
<tr>
<td>Kentucky</td>
<td>21</td>
<td>Kentucky</td>
<td>505</td>
</tr>
<tr>
<td>Typhimurium</td>
<td>15</td>
<td>Mbandaka</td>
<td>429</td>
</tr>
<tr>
<td>Heidelberg</td>
<td>9</td>
<td>Heidelberg</td>
<td>371</td>
</tr>
<tr>
<td>Mbandaka</td>
<td>8</td>
<td>Enteritidis</td>
<td>329</td>
</tr>
<tr>
<td>All others</td>
<td>58</td>
<td>Typhimurium</td>
<td>201</td>
</tr>
<tr>
<td>Infantis</td>
<td>74</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cerro</td>
<td>67</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Newport</td>
<td>65</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 2: Most common serotypes in 2013: Turkeys

<table>
<thead>
<tr>
<th>Serotype</th>
<th>No. Isolates</th>
<th>Serotype</th>
<th>No. Isolates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical</td>
<td></td>
<td>Non-Clinical</td>
<td></td>
</tr>
<tr>
<td>Senftenberg</td>
<td>135</td>
<td>Senftenberg</td>
<td>228</td>
</tr>
<tr>
<td>Albany</td>
<td>58</td>
<td>Hadar</td>
<td>115</td>
</tr>
<tr>
<td>Bredeney</td>
<td>32</td>
<td>Anatum</td>
<td>109</td>
</tr>
<tr>
<td>Montevideo</td>
<td>32</td>
<td>Albany</td>
<td>78</td>
</tr>
<tr>
<td>Ouakam</td>
<td>29</td>
<td>Muenster</td>
<td>73</td>
</tr>
<tr>
<td>Heidelberg</td>
<td>28</td>
<td>Agona</td>
<td>70</td>
</tr>
<tr>
<td>All others</td>
<td>106</td>
<td>Cerro</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Saintpaul</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Kentucky</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4,(5),12:-</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td></td>
<td>All others</td>
<td>193</td>
</tr>
<tr>
<td>Total</td>
<td>420</td>
<td>Total</td>
<td>958</td>
</tr>
</tbody>
</table>

Table 3: Summary of NVSL Salmonella Group D proficiency test

<table>
<thead>
<tr>
<th></th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participants</td>
<td>40</td>
<td>55</td>
<td>70</td>
<td>73</td>
<td>61</td>
</tr>
<tr>
<td>Mean Score</td>
<td>93%</td>
<td>92%</td>
<td>97%</td>
<td>92%</td>
<td>94%</td>
</tr>
<tr>
<td>Score Range</td>
<td>100-44%</td>
<td>100-44%</td>
<td>100-85%</td>
<td>100%-29%</td>
<td>100-68%</td>
</tr>
<tr>
<td>Below Passing</td>
<td>4</td>
<td>3</td>
<td>0</td>
<td>N/A*</td>
<td>N/A**</td>
</tr>
</tbody>
</table>

Because of the change in grading method, a pass/fail designation was not assigned.

- 2012 Seven participants scored less than 80%.
- 2013 Four laboratories scored less than 80%

Table 4: Summary of NVSL Salmonella Serotyping proficiency test

<table>
<thead>
<tr>
<th></th>
<th>Serogrouping 2012</th>
<th>Serotyping 2012</th>
<th>Serogrouping 2013</th>
<th>Serotyping 2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participants</td>
<td>22</td>
<td>13</td>
<td>18</td>
<td>14</td>
</tr>
<tr>
<td>Mean Score</td>
<td>98%</td>
<td>92%</td>
<td>98%</td>
<td>98.50%</td>
</tr>
<tr>
<td>Score Range</td>
<td>100-90%</td>
<td>100-70%</td>
<td>100-90%</td>
<td>100-90%</td>
</tr>
</tbody>
</table>
Salmonella Enteritidis

The number of Salmonella Enteritidis (SE) isolates submitted from chickens in 2013 is shown in Table 5. The most common SE phage types are shown in Table 6.

Table 5: Number of chickens Salmonella Enteritidis isolates per calendar year at the NVSL

<table>
<thead>
<tr>
<th></th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. chicken isolates</td>
<td>4761</td>
<td>4987</td>
<td>3940</td>
<td>3502</td>
<td>3912</td>
</tr>
<tr>
<td>No. chicken SE isolates</td>
<td>993</td>
<td>1500</td>
<td>776</td>
<td>507</td>
<td>400</td>
</tr>
<tr>
<td>SE percent of all isolates</td>
<td>20.9%</td>
<td>30.1%</td>
<td>19.7%</td>
<td>14.5%</td>
<td>10.2%</td>
</tr>
</tbody>
</table>

Table 6: Most common Salmonella Enteritidis phage types from chicken sources per calendar year

<table>
<thead>
<tr>
<th>Rank</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>2</td>
<td>13</td>
<td>13</td>
<td>13a</td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td>3</td>
<td>13a</td>
<td>13a</td>
<td>13</td>
<td>RDNC</td>
<td>13a</td>
</tr>
<tr>
<td>4</td>
<td>23</td>
<td>RDNC</td>
<td>RDNC</td>
<td>13a</td>
<td>RDNC</td>
</tr>
<tr>
<td>5</td>
<td>RDNC</td>
<td>23</td>
<td>23</td>
<td>23</td>
<td>23</td>
</tr>
</tbody>
</table>

RDNC = reacts, does not conform

Salmonella Pullorum and Gallinarum

The NVSL provided 2250 ml of S. Pullorum tube antigen, 1575 ml of S. Pullorum stained microtiter antigen, and 502 ml of antisera to testing laboratories between January 1 and December 31, 2013. The NVSL conducted 331 S. Pullorum microtiter tests in 2013. The NVSL did not identify any Salmonella Pullorum isolates in 2013.

Pasteurella and Mycoplasma

The NVSL received 145 isolates for somatic typing in 2013. The NVSL also supplied 85 ml of P. multocida typing sera.

The amount of Mycoplasma reagents are shown in Tables 7 and 8.

Table 6: Pasteurella Multocida somatic typing. Table shows number of isolates per fiscal year for each type.

<table>
<thead>
<tr>
<th></th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type 3</td>
<td>54</td>
<td>38</td>
<td>25</td>
<td>38</td>
<td>28</td>
</tr>
<tr>
<td>Type 3,4</td>
<td>33</td>
<td>27</td>
<td>12</td>
<td>33</td>
<td>17</td>
</tr>
<tr>
<td>Type 1</td>
<td>14</td>
<td>25</td>
<td>17</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>All other</td>
<td>62</td>
<td>70</td>
<td>52</td>
<td>100</td>
<td>90</td>
</tr>
<tr>
<td>TOTAL</td>
<td>163</td>
<td>160</td>
<td>106</td>
<td>181</td>
<td>145</td>
</tr>
</tbody>
</table>
REPORT OF THE COMMITTEE

<table>
<thead>
<tr>
<th>Antisera</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>M. gallisepticum</em></td>
<td>266</td>
<td>256</td>
<td>306</td>
<td>274</td>
<td>532</td>
</tr>
<tr>
<td><em>M. meleagridis</em></td>
<td>54</td>
<td>32</td>
<td>54</td>
<td>40</td>
<td>108</td>
</tr>
<tr>
<td><em>M. synoviae</em></td>
<td>222</td>
<td>256</td>
<td>326</td>
<td>342</td>
<td>672</td>
</tr>
<tr>
<td>Negative</td>
<td>162</td>
<td>222</td>
<td>150</td>
<td>175</td>
<td>344</td>
</tr>
<tr>
<td>Total</td>
<td>704</td>
<td>766</td>
<td>836</td>
<td>831</td>
<td>1656</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Antigen</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>M. gallisepticum</em></td>
<td>190</td>
<td>150</td>
<td>195</td>
<td>175</td>
<td>245</td>
</tr>
<tr>
<td><em>M. meleagridis</em></td>
<td>75</td>
<td>75</td>
<td>95</td>
<td>80</td>
<td>40</td>
</tr>
<tr>
<td><em>M. synoviae</em></td>
<td>200</td>
<td>215</td>
<td>220</td>
<td>245</td>
<td>290</td>
</tr>
<tr>
<td>Total</td>
<td>465</td>
<td>440</td>
<td>510</td>
<td>500</td>
<td>555</td>
</tr>
</tbody>
</table>


WHO Collaborating Centre for Reference and Research on *Salmonella*. Paris, France.


Dr. Elena Behnke for Dr. Fidelis N. Hegngi, Surveillance, Preparedness and Response Services, Avian, Swine and Aquatic Animal Health Center, USDA-APHIS-VS

Beginning in 1994, low pathogenicity avian influenza (LPAI) H7N2 proved to be endemic in live bird markets (LBM) in the northeastern United States. In 1999, the United States Department of Agriculture (USDA) established a LBMS working group to provide support to the states wanting to eliminate LPAI H7N2 that was persistent in the LBMs. In October 2004, the USDA, Animal and Plant Health Inspection Service (APHIS) Veterinary Services (VS) published Uniform Standards for AI Prevention and Control in the LBMS to establish a more consistent approach by participating States in the control of AI in the LBMS. In August 2012, VS published an updated edition of the Uniform Standards.

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 2014, the annual LBMS working group business meeting was held in Philadelphia, PA, to address the LBMS AI Prevention and Control program concerns. More than 71 participants representing 31 States attended the meeting, including 18 representatives from USDA, APHIS Veterinary Services; two representatives from universities; 38 State Department of Agriculture representatives; eight LBMS/poultry industry stakeholders; and four representatives from animal health diagnostic laboratories. 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) the reorganization of APHIS, VS; (2) an overview of the game bird industry (pheasants/chukars) production; (3) the Avian Health line item budget; (4) the FY2014 Avian Health umbrella cooperative agreement work plans; (5) new LBMS spreadsheet for cooperative agreement surveillance data collection; (6) an update of avian influenza A (H7N9) in China; (7) the VS guidance document on indemnity requirements and process issues/procedures for flock plans, compliance agreements, and indemnity claims in cases of H5/H7 LPAI infection in poultry; (8) an update on H7N3 HPAI outbreak in Mexico; (9) an update on the National Veterinary Services Laboratories (NVSL) avian influenza surveillance testing, current nationwide findings and recommended AI diagnostic tests and reporting of results; (10) an update on Zoetis Flu Detect avian influenza rapid test; (11) an update on the NPIP program and preparing for the 42nd Biennial Conference; (12) the review of 2013 LBMS continuing education training held in Pomona, CA; and (13) an update on the Pennsylvania Poultry Handling Transportation Quality Assurance program. Special presentations were given on avian influenza surveillance, LBMS reviews and accomplishment reports; in Pennsylvania, New York, New Jersey, California, Texas, Florida, Minnesota and New England states; and human Salmonella infections associated with live bird markets. In addition, personnel from the Southeast Poultry Research Laboratory (SEPRL), USDA Agricultural Research Service discussed avian influenza research updates. The working group received an update from the Centers for Disease Control (CDC) on a publication on Salmonella and live bird/animal markets and the launching of a CDC website to provide educational materials.

In FY2014, USDA’s Biosecurity for Birds campaign continued its efforts to educate the backyard poultry community about ways they can help protect and maintain the health of their birds. Activities included a photo contest with hundreds of entries, the annual calendar, Bird Health Awareness Week in February, two webinars and concurrent twitter chats, fair packages and social media outreach. Social media has been one of the largest growth areas. The campaign launched a Healthy Harry Facebook page and gained more than 2,000 likes in the first week. Now this page is approaching 4,000 likes. The campaign’s Twitter account has also grown from around 600
followers to more than 1,100. The Biosecurity for the Birds campaign is also working on plans for FY15, including the development and launch of three new Healthy Harry videos for YouTube.

In fiscal year (FY) 2013, approximately 212,280 tests were conducted for AI surveillance in the LBMS. In fiscal year (FY) 2014, surveillance in the LBMS remains a high priority. Approximately 55,998 tests have been conducted for AI surveillance in the LBMS for the first full quarter and partial second quarter. 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 prevention and control program was initiated in 2004, the number of LBMS H5 and H7 avian influenza positive premises has decreased steadily. In FY 2014, only one detection of H5 viral RNA occurred, but no virus was isolated. In addition, only three detections of LPAI were found in backyard poultry auctions (one H5 viral RNA, one H7N2 LPAI virus and one H7N7 LPAI virus).

Reovirus Infection, Diagnostics and Prevention in Turkeys
Ben Wileman, Ag Forte

About 60 years ago this year the first isolation of Reovirus was made by Fahey and Crawley (1) and was later linked to tenosynovitis by Walker et al. in 1972 (2). The arthritis and tenosynovitis syndrome in turkeys specifically was first described by Levisohn et al. in 1980 (3) and again by Page et al in 1982. Although the chicken industry has dealt with the various manifestations of Reovirus infection for many years, until about 2011 the turkey industry had not dealt with Reovirus infection to any measurable degree. In 2011 the Minnesota Veterinary Diagnostic Laboratory isolated and characterized Reovirus from submissions of turkey legs with clinical tenosynovitis and arthritis (5). Since that time several groups have been able to replicate and study the disease process of Reovirus induced tenosynovitis in turkeys (6 & 7) and have found that the severity of infection and the ability to isolate the virus from various tissues is strain dependent. And since most avian species have Reovirus in their enteric systems that are non-pathogenic and do not cause tenosynovitis there is a need to differentiate ubiquitous Reovirus strains or even Reovirus strains from other avians such as chickens from those that cause tenosynovitis in turkeys. Currently there is a dearth of useful diagnostic tools available to the practitioner for use in diagnosing and managing Reovirus in turkeys. The three categories of tools that we have currently available are ELISA, virus neutralization and molecular techniques. The purpose of this report is to share with the Committee our experiences with managing Reovirus in our turkey operation specifically relating to diagnostic tools and their uses.

We have had a lot of experience using the commercial Reovirus ELISA kits (Synbiotics and IDEXX) that were developed for chickens in our turkey
breeding operation in Minnesota. Recently we have focused an even
greater amount of attention on these kits to see if we can figure out how to
use them in practice. The first step for us was to determine the correlation of
reported titers by each of the ELISA testing kits with each other, and we
found that they correlated well (ex: 1,000 titer in one was basically a 1,000
titer in the other). Part of our management strategy is autogenous
vaccination and we wanted to see what the difference in titer was between
vaccinates and controls relative to ELISA titer. We found that we were
unable to tell the difference between vaccinate and control birds when using
the commercial ELISA kits. This study was repeated and again found that
birds housed at our research facility showed no difference between
vaccinates and controls. We have developed an in-house ELISA that is
specific to both of the strains of field Reovirus isolates used in the vaccine
and it is able to demonstrate a difference between vaccinated and control
animals. Thus far we are unsure how to use these commercial ELISA’s in
our operation as there is little correlation to titer and vaccination and titer and
clinical Reovirus infection. We are currently comparing our in-house ELISA
to the commercial ELISA in the field.

The second tool we have available is the use of virus neutralization
assays through Dr. Jack Rosenberger’s laboratory. Dr. Rosenberger has
developed a virus neutralization assay array containing several different
Reovirus strains. With this assay you attempt to neutralize a virus you have
isolated from a clinical case by using a bank of antisera that has been
generated against several different specific Reovirus strains. The limitations
of this assay are related to the requirement of having a virus and the amount
of cross reaction between sera groups and turnaround time. The delay from
the time of having a flock that has clinical Reovirus, then determining if it is
bad enough to warrant virus isolation attempts, then determining if you think
it is different enough from the Reovirus infections currently going on that you
are not confident the vaccination program will work (meaning has there been
a genetic shift in the virus), then to get it to Dr. Rosenberger for the assay
and then the results back and interpreted is extensive. Once you do get the
results back it is not uncommon to have some cross reaction in the assay
and there doesn’t appear to be a strong correlation with ELISA assay titers
and the virus neutralization assay titers.

The third class of tools, molecular based tools, is relatively new and are
really still being developed by various groups (8-11). This class of tools may
hold the most promise as there appears to be some degree of ability to
delineate enteric and chicken Reovirus strains from those causing
tenosynovitis in turkeys. And the ability to run these tests on different sample
types may yield a quicker turnaround time. The majority of the work with
these tests have been on known viruses and in the research setting and over
the next year we will hopefully see how they perform in the field when
performed on unknown samples and different sample types.

In summary, we have a dearth of diagnostic Reovirus tools in turkeys
that correlate with vaccination and virus neutralization and clinical disease.
The promise of newer techniques that decrease turnaround time and don’t require virus isolation and extensive reagent costs is encouraging but need to be field tested. A tool that can determine if a bird is carrying or shedding a Reovirus that is pathogenic and will cause tenosynovitis in her or her offspring through vertical transmission would be invaluable.

**A Simulation Based Evaluation of Active Surveillance Protocol Options for the Movement of Broilers to Slaughter**

Sasidhar Malladi\(^a\), J Todd Weaver\(^b\), Dave Halvorson\(^a\)

\(^a\)University of Minnesota, Center for Animal Health and Food Safety

\(^b\)USDA-APHIS-VS, Science Technology and Analysis Services, Center for Epidemiology and Animal Health

In the event of an outbreak of Highly Pathogenic Avian Influenza (HPAI), emergency response would involve stamping out of infected premises as well as restrictions on moving poultry and poultry products from within a Control Area. Movement restrictions aimed at controlling the outbreak may also result in unintended consequences such as disruptions to business continuity. On the other hand, the unrecognized or unintentional movement of infectious birds may result in further disease spread. Pre-movement active surveillance is a key mitigation measure to differentiate between infected and uninfected flocks and to enable the managed movement of uninfected broilers to slaughter.

Active surveillance protocol options considered by the Secure Broiler Supply workgroup all involve testing two pooled samples of swabs taken from dead birds via the influenza matrix gene real-time reverse transcriptase polymerase chain reaction test (rRT-PCR) at National Animal Health Laboratory Network (NAHLN) laboratories. However, protocol options differ with respect to specific aspects such as the number of swabs per pooled sample, the timing of the tests in relation to the scheduled movement, or inclusion of supplementary Antigen Capture (AC) testing near the time of load-out. The different protocol options have their advantages and disadvantages for application in specific outbreak scenarios. For example, in scenarios where the turnaround time needed to obtain results from NAHLN laboratories is anticipated to be more than 12-hours, protocols with earlier sample collection times for rRT-PCR tests would be more appropriate. The addition of flock-side testing very close to load-out using AC test kits offers logistical benefits without requiring additional laboratory facilities. The objective of evaluating multiple active surveillance protocol options is to incorporate flexibility in emergency response plans and support risk managers in their choice of an active surveillance protocol option given their relative pros and cons.

A key strategy to increase confidence that HPAI infected broilers are not moved is implementation of a pre-movement isolation period (PMIP) ahead of the scheduled movement date. In essence, PMIP requires implementing very high biosecurity for a few days before scheduled movement to slaughter. The PMIP involves restricting most farm visits for the specified
duration prior to movement except for critical visits such as feed delivery or emergency repairmen. Critical visits are performed with strict biosecurity protocols including personal protective equipment (PPE) and vehicle cleaning and disinfection (C&D). In general, exposure close to the time of movement is relatively less likely to be detected via active surveillance due to the reduced time for HPAI to spread and disease mortality to occur. PMIP is aimed at minimizing chances of exposure close to movement. In addition to comparing the performance of various active surveillance protocols, we evaluated the impact of PMIP in conjunction with active surveillance on the likelihood of moving infectious broilers to processing.

Methods

The following active surveillance protocol options were compared with respect to the probability of HPAI detection on various days post exposure of a broiler house relative to the time that the flock is scheduled to be moved to slaughter.

Comparison 1: The use of 11 vs. 5 swabs in each pooled sample for rRT-PCR testing in the baseline active surveillance protocol compared in terms of HPAI detection likelihood. In this comparison, the active surveillance protocol involved testing one pooled sample for every 50 dead birds from each house on the premises on two consecutive days before movement where the second (later) rRT-PCR sample is collected within 24 hours of movement.

Comparison 2: The impact of collecting rRT-PCR samples one day earlier due to logistical constraints was evaluated. This option provides for a longer turnaround time to receive test results. In this analysis, the detection likelihood when rRT-PCR samples are collected at 18 and 42 hours prior to movement (e.g., the baseline active surveillance protocol) was compared with detection when samples for rRT-PCR testing are collected earlier at 42 and 66 hours prior to movement.

Comparison 3: This comparison was performed in two parts to evaluate the impact of supplementary AC testing by industry veterinarians close to the time of movement in addition to the rRT-PCR testing performed at NAHLN laboratories. In the first part (Comparison 3a), the baseline RT-PCR protocol was compared to rRT-PCR testing with the addition of flock-side AC testing. In the second part (Comparison 3b), the detection likelihood when rRT-PCT samples are collected earlier due to logistical constraints (42 and 66 hours prior to movement) was compared to the case when AC testing is performed close to movement in addition to rRT-PCR.

A recent study at the USDA’s, Agricultural Research Service, Southeast Poultry Research Laboratory, was undertaken to provide data on AC test performance in dead birds infected with HPAI viruses. Data from 46 dead birds for the HPAI H5N2 Pennsylvania strain and 14 dead birds for the HPAI H7N3 Jalisco strain were used in the current analysis. Using a Bayesian approach, we estimated a mean diagnostic sensitivity of 97.9% (95% credibility intervals 92 to 99.9%) for HPAI H5N2 and 57% (33 to 80%) for HPAI H7N3 in dead birds. The wider interval for the case of HPAI H7N3 is
due to the smaller sample size and correspondingly greater uncertainty. For HPAI H5N1 (multiple clades), we estimated a diagnostic sensitivity of 86% (33 to 80%) in dead birds using available data from published scientific literature.

A stochastic chain binomial disease transmission model was utilized for simulating HPAI disease spread and disease mortality on various days post infection of the house. Simulation models of active surveillance were then used to predict disease detection considering factors such as the HPAI transmission model results, normal daily mortality, and sensitivity of the diagnostic tests. For the purposes of this analysis, we assumed that diagnostic test sensitivities for AC tests could range from 60 to 80%, and the diagnostic sensitivity for rRT-PCR was 86.5%. In addition to diagnostic testing, a daily mortality above 0.3 percent of the house was considered as a trigger for HPAI detection (i.e., unexplained high mortality was detected through enhanced passive surveillance).

Results and Discussion:

Comparison 1: Simulation results indicate that using a rRT-PCR pooled sample with 11 swabs per pool resulted in a moderate gain in detection probability compared with pools containing five swabs each (i.e., approximately 12% of simulation iterations where the house become exposed three days prior to movement).

Comparison 2: The results also indicate that collecting rRT-PCR samples earlier to accommodate logistical constraints (i.e., a longer turnaround time to receive results from the NAHLN laboratory) could result in an as much as a 30% decrease in HPAI detection probability in simulation iterations where the house became exposed three to four days prior to the time of movement. These results indicate that it is critical to test as close as logistically feasible to the time of movement.

Comparison 3: Our results indicate that supplemental flock-side testing conducted by industry veterinarians has the potential to enhance HPAI detection probability, particularly in situations where there are logistical constraints as in the previous comparison. In Comparison 3a, where the second rRT-PCR test sample is collected within 24 hours of movement, supplementary AC testing (with an assumed diagnostic sensitivity of 60%) provided nearly a 20% gain in detection probability in cases where the house became exposed 2 or 3 days prior to the time of movement. In Comparison 3b with earlier rRT-PCR sample collection in anticipation of a more than a 12-hour turnaround time to obtain test results, supplementary AC testing provided more than a 30% gain in detection probability in cases where the house became exposed two or three days prior to the time of movement. However, we note that even though the diagnostic sensitivity of the AC tests has been found to be high (mean greater than 80%) for dead birds infected with HPAI H5N1 or HPAI H5N2 strains, there is some uncertainty on the estimate for other HPAI strains. In addition, it was assumed that pooling of up to five swabs in an AC test sample would not adversely impact diagnostic
sensitivity. Further studies on these aspects would increase confidence in the application of AC tests in specific outbreak scenarios.

Simulation model results indicate that an effective PMIP of 5 days or more, in conjunction with the RRT-PCR active surveillance close to the time of movement, would result in high likelihood of detecting HPAI exposures by the time of movement (Table 1). Because movement of people and equipment are considered to be the main mechanism of secondary spread between poultry, very strict biosecurity during a few days before movement would be effective in reducing exposure to HPAI.

Table 1. Simulation model results showing the predicted probability of HPAI detection if the flock (house) could only become exposed to HPAI virus prior to implementation of PMIP biosecurity measures.

<table>
<thead>
<tr>
<th>Active surveillance option (dead bird testing)</th>
<th>4 Days</th>
<th>5 days</th>
<th>6 days</th>
</tr>
</thead>
<tbody>
<tr>
<td>rRT-PCR testing of a pooled sample of 5 swabs each on 2 consecutive days</td>
<td>96%</td>
<td>98%</td>
<td>99%</td>
</tr>
<tr>
<td>rRT-PCR testing of a pooled sample of 11 swabs each on 2 consecutive days</td>
<td>98%</td>
<td>99%</td>
<td>99%</td>
</tr>
</tbody>
</table>

The Chicken Gut Microbiome and *Salmonella*

Hosni M. Hassan, Prestage Department of Poultry Science, North Carolina State University

Food-borne infections following the consumption of poultry meat and egg products contaminated with *Salmonella enterica* is a major public health concern. In the U.S, *Salmonella* affects more than 1.4 million individual annually that results in ~15,000 hospitalizations and ~400 deaths. While there are thousands of *Salmonella* serotypes, *S. Typhimurium* (ST) and *S. Enteriditis* (SE) are the two most important with respect to pathogen associated food-borne illness in poultry foods. ST and SE, account for approximately 40-60% of all reported *Salmonella* infections. The gut microbiota plays an important role in the digestion of complex plant fibers and polysaccharides. It also provides protection against colonization by invasive pathogenic organisms (colonization resistance). Furthermore, it has been shown in humans that the gut microbiota is essential for the proper development of the host’s immune system. Clearly, there is plethora of...
information about the human’s gut microbiome and how it can control pathogen colonization, but little information is available about the chicken’s intestinal microbiota and its role in resistance to diseases (i.e., *Salmonella*). The use of probiotics and prebiotics to modulate the gut microbiota is becoming more common for enhancing human health. The use of probiotics in chickens has been suggested as a replacement to antibiotics as growth promoters. In addition, there are no published reports on the influence of vaccination against *Salmonella* on the diversity of the bacterial species in the intestinal tract (or the oviduct). In this presentation, I will provide an overview of the chicken gut microbiome, and present data from our current research program that aims to define the role of the chicken microbiota in *Salmonella* transmission and persistence in poultry flocks. We employed pyrosequencing of the 16S rRNA bacterial tag-encoded FLX amplicon to determine the effects of age of the birds, vaccination, and supplementation of the diet with the prebiotic GOS on the diversity of the microbial species in the intestinal tract of chickens. The deep sequencing data were “denoised” and grouped into OTUs (Operational Taxonomic Units) at a 97% level to approximate phylotypes/species-level. The counts of each OTU in each sample were used to perform alpha and beta diversity calculations, and the measurements were used with sample metadata to create graphic visualizations. A combination of Unifrac significance, principal coordinate analysis (PCoA) using Fast Unifrac, and network analysis were used to evaluate the similarities between bacterial communities, and compare samples based on treatment. We also examined the correlation between the microbiome diversity and resistance to *Salmonella* challenges. The data show that both vaccination and supplementation of the diet with the prebiotic GOS were beneficial in reducing the persistence of *Salmonella* in the challenged birds. [USDA-NIFA-AFRI 2012-68003-19621].

**USAHA Committee on Salmonella Report**

Doug Waltman, Georgia Poultry Laboratory Network

The USAHA Committee on Salmonella met on October 21, 2014 and received presentations from:

Dr. Stacey Bosch from the Center for Disease Control (CDC) discussed the Multistrain Salmonella Outbreaks in 2013-2014. She described how the CDC can identify outbreaks of Salmonella that are due to multiple serotypes or multiple PFGE clusters. She reviewed the *Salmonella* Heidelberg outbreak in chicken (2013-2014) where CDC has identified isolates comprising 7 PFGE clusters. A second example was the outbreak from Live Poultry caused by *Salmonella* Infantis, Newport and Hadar. A third example was the outbreak from organic sprouted chia powder caused by *Salmonella* Newport, Hartford, and Oranienburg.

Brenda Morningstar-Shaw presented the annual NVSL *Salmonella* update.

Dr. Heather Harbottle from the Food and Drug Administration (FDA) gave a presentation on *Salmonella* enteric serotypes and antimicrobial
resistance trends as reported from the National Antimicrobial Resistance Monitoring System (NARMS). NARMS is a national public health surveillance program that monitors the susceptibility of enteric bacteria to antimicrobial agents of medical importance in order to help assess the impact of veterinary antimicrobial use on human health. The program is comprised of three Arms; 1.) Human Arm at CDC, 2.) Animal Arm at USDA, 3.) Retail Arm at the FDA. All three Arms report resistance trends in non-Typhoidal *Salmonella*, *Campylobacter*, E. coli, and Enterococcus species. CDC collects clinical isolates from all 50 states. FDA works with FoodNet and State Public Health Laboratories to collect retail meat samples from grocery stores in 14 states.

All 14 states culture for *Salmonella* and *Campylobacter*, four states (GA, OR, TN, MD) culture for E. coli and Enterococcus. The Animal Arm has historically been comprised of HACCP samples collected by USDA-Food Safety Inspection Service (FSIS) from animals at slaughter. Beginning in 2013, the Animal Arm of NARMS is adding an "in-plant" sampling program whereby cecal sampling will be conducted. Cecal samples better reflect animal status and are less confounded by plant events. A randomized, nationally representative testing of slaughterhouses was designed. An "on-farm" pilot sampling program has been initiated by NARMS and is led by USDA-Agricultural Research Service (ARS) in partnership with universities and industry. The goals of this program include evaluating the logistical challenges and the potential value in adding a pre-harvest component to NARMS, examining the differences in resistance on farm and at slaughter, and exploring this data collection program as point for obtaining antimicrobial drug use information.

Dr. John Linville of USDA-FSIS reported on the FSIS Initiatives to Reduce Human Exposure to *Salmonella*. He shared about the baseline studies that FSIS has conducted in preparation for the new Performance Standards which are currently in rule making. The new standards will be for comminuted chicken and turkey and for chicken parts.

Dr. Dan McChesney presented a CVM *Salmonella* Surveillance Update. Studies have shown that the prevalence of *Salmonella* in pet food (1.7%), pet treats (3.5%), animal feed (6.3%) and plant based ingredients (8.8%) are relatively low. Animal feed ingredients (48.3%) had the highest percentage of *Salmonella*. An evaluation of serotypes isolated in feed were compared to the most common isolates from humans. There were very few common serotypes.
REPORT OF THE COMMITTEE ON TRANSMISSIBLE DISEASES OF SWINE
Chair: Harry Snelson, NC
Vice Chair: Lisa Becton, IA

Bobby Acord, NC; Paul Anderson, MN; Gary Anderson, KS; Karen Beck, NC; Lisa Becton, IA; C. Black, GA; Robert Blomme, IA; Philip Bradshaw, IL; Becky Brewer-Walker, AR; Corrie Brown, GA; Nancy Brown, KS; Tom Burkgren, IA; Jim Collins, MN; Joseph Corn, GA; Fred Cunningham, MS; Thomas DeLiberto, CO; Dee Ellis, TX; Effingham Embree, Jr., IL; Mark Engle, TN; Tony Forshey, OH; Jim Fraley, IL; Nancy Frank, MI; Donna Gatewood, IA; Cyril Gay, MD; Michael Gilsdorf, MD; Timothy Goldsmith, MN; Larry Granger, CO; Thomas Hagerty, MN; Rod Hall, OK; James Mark Hammer, NC; William Hartmann, MN; Greg Hawkins, TX; Michael Herrin, OK; Richard Hesse, KS; Sam Hines, MI; James Kober, MI; Jennifer Koeman, BC; Charlotte Krugler, SC; Elizabeth Lautner, IA; James Leafstedt, SD; Donald Lein, NY; Tsang Long Lin, IN; Mary Luedeker, TX; Bret Marsh, IN; David Marshall, NC; Chuck Massengill, MO; Paul McGraw, WI; Gay Miller, IL; Richard Mock, NC; Jerome Nietfeld, KS; Sandra Norman, IN; Gary Osweiler, IA; Kris Petrini, MN; Maryn Ptaschinski, IA; David Pyburn, IA; Tom Ray, NC; James Roth, IA; Mo Salman, CO; Joni Scheftel, MN; David Schmitt, IA; Richard Sibbel, IA; Harry Snelson, NC; Mike Starkey, MN; Paul Sundberg, IA; Brad Thacker, MD; Lee Ann Thomas, MD; Beth Thompson, MN; Susan Trock, GA; Paul Ugstad, NC; Liz Wagstrom, DC; Patrick Webb, IA; Margaret Wild, CO; Larry Williams, NE; Ellen Mary Wilson, NM; Nora Wineland, MO; Paul Yeske, MN.

The Committee met on October 20, 2014 at the Sheraton Hotel in Kansas City, Missouri, from 1 to 6 p.m. There were 29 members and 48 guests present.

Presentations and Reports

The Feral Swine PRV/BR Subcommittee Report was provided by Dr. Joe Corn, University of Georgia. Motion was made to accept the report and seconded, motion passed unanimously. A summary is included at the end of this Committee report.

USDA Swine Health Programs Update
Barbara Porter-Spalding and Ellen Kasari, USDA-APHIS-VS

A comprehensive review was given on current surveillance activities for this year. There are multiple diseases that are currently under surveillance and this includes a wide variety of sample streams for this surveillance. Surveillance is from diagnostic laboratories, Food Safety and Inspection Service (FSIS) samples and other sources. For pseudorabies virus (PRV), there were no cases for FY2014. The largest streams are cull sow-boars at
slaughter and then diagnostic laboratory samples. Swine brucellosis (SB) will have a quarterly report for this surveillance. For FY2014, there were no herds identified with SB infections. There is focus for the upcoming year to look at how to maximize samples for testing for multiple diseases. For the current year, there is a review of the amount of samples that are submitted for the SB/PRV to make the process more efficient. There are continuing to be some positive transition herds (PRV/SB) that are in direct contact with feral swine. Changes in surveillance will be coming and geared towards more efficient and risk-based sampling.

Surveillance for foreign animal diseases (FADs) is ongoing and now includes classical swine fever (CSF), African swine fever (ASF), and foot and mouth disease (FMD). All of these diseases are working towards being utilized in NAHLN laboratories for initial surveillance. ASF is still on hold due to a lack of reagents currently. Once availability changes, then ASF will be added to the list for continuous surveillance. CSF is being surveyed from multiple streams both postmortem and ante-mortem streams. USDA has submitted a request to World Animal Health Organization (OIE) for recognition for historical freedom of disease for CSF. There is a pilot for ASF and FMD which will look at what is needed for surveillance and response to potential positive results. This is ongoing and will strengthen the National Animal Health Laboratory Network (NAHLN) laboratories ability to be prepared in the event of an emergency. Pilot will take place for 12 months. The eight laboratories in participation will work on messages for Laboratory Information Management Systems (LIMS) and additional reporting. Tests are polymerase chain reaction (PCR) and validated samples include ASF as whole blood; FMD as oral swabs.

Influenza A virus in swine (IAV-S) surveillance is looking at the continued implementation of the new terminology versus swine influenza. Case submissions for the anonymous submissions are ongoing. We are still targeting commingling events and cases that are linked to human infection. There were only two cases associated with human infection for 2014 as compared to 19 for 2013 and 300+ for 2012. There have been adjustments to the testing algorithm for efficiency in collecting valued information. In order to get a larger percentage of isolates that can have virus isolated, the cT values have changed. These changes have been in place since July of 2013. There is continued collaboration with Ohio State University for IAV-S at fairs. There is also a working relationship with Iowa State University on the impact of vaccine and tracking this data associated with IAV-S isolates. USDA-ARS will continue to have molecular analysis of isolates. A report of results from the surveillance is underway instead of the NAHLN Quarterly and will be further developed with industry on needs for reporting of results. For results, there is a 1-2 month time lag for reporting of final results but they are still being reported when finalized. See the presentation for breakdown of the percentage of isolates being identified. H1N1 appears to be more predominant with H3N2 a strong second predominant strain.
Enhance Passive Surveillance (EPS) overview will be looking at non-disease specific surveillance stream. VS has partnered with Department of Homeland Security and Institute of Infectious Animal Diseases (IIAD) for this project. Dr. Korslund with VS has been detailed as liaison with Department of Homeland Security (DHS). Enhanced passive surveillance (EPS) will be combined with Active surveillance to show a more comprehensive surveillance picture for the U.S. There is information sharing of condemnation data as a signal of abnormality is noted.

Surveillance of garbage feeders is ongoing. Most are located in Puerto Rico; 28 states permit it, 22 do not.

APHIS continued to work on feral swine control. VS is looking at disease and population monitoring for diseases. Monitoring is for PRV, SB, IAV-S and PRRS. Samples are shown as percentage positive but not for prevalence.

An update was provided for swine enteric coronavirus disease (SECD). The goal is to count the current number of infected premises, develop herd management practices and support of biosecurity management practices. See information online for specific details of the program and results.

Reimbursement is ongoing for testing and confirmation of SECD. Emergency Management Response Services (EMRS) receives the data from the NAHLN laboratories as well as other key information such as the herd management plans and biosecurity procedures. There is also a weekly map that is shown from the SECD testing only as compared to the NAHLN accession map. The maps and information are updated on a weekly basis and provides data on the status of infections and breakdown of types of farms that are infected. In addition to the program activities, there are cooperative agreements for many different activities. The program has provided a platform to provide PIN's for animal health and will lead to future preparedness activities and plans.

A question came up about the use of premise identifiers for future testing. This would be appropriate for cull sow/boar PRV testing. The identification will be very valuable for these disease streams.

Laboratories and Laboratory Messaging System (LMS) compatibility for SECD: University of Minnesota and Kansas are testing data for LMS. Other states are in development for the messaging. There are plans to continue to get swine laboratories online and tentatively getting Iowa State University (ISU) online within the next month. There is a difficulty for state animal health laboratories to report through LMS and Access to EMRS is limited in some states so both issues need to be addressed. The identification for each state is different and needs to be accounted for (i.e. location identification (LID) vs. personal identification number (PIN)).

**Emerging Diseases Response Plan**

Liz Wagstrom, National Pork Producers Council

Dr. Wagstrom discussed the 2014 National Pork Producers Council (NPPC) Resolution that deals with emerging diseases. The focus is on the response plan. The Resolution was to outline an emerging disease plan and work with all partners (state, federal and industry) to designate
responsibilities for each party. This request is to look at containment, response and management strategies. The goal is to have a report back by the 2015 Forum in March.

What was learned? Communications channels were not previously identified; authority was not well understood; resources weren’t previously inventoried; there was no one central coordination entity. There were a lot of groups doing many things, but there was still not one entity for coordination.

The goal of the Emerging Diseases Response group was tasked to look at how we can respond better in the future. Makeup of the group is staff from respective organizations (American Association of Swine Veterinarians (AASV), National Pork Board (NPB), and NPPC), producers, state veterinarians, federal veterinarians and other individual producers. One concept was to re-evaluate the U.S. Swine Health Board (USSHB). This idea is based off of the concept of the past PRV Control Board. There is no primary authority but would be used to help coordinate industry comments and recommendations that would be provided to USDA. The Board is more of an advisory Board to USDA, but the state or federal government would have ultimate authority for final decision making.

Role of the USSHB:
1. Suggest actions to response to known pathogens in other countries
2. Suggest actions to respond to identification of emerging diseases in the U.S.

Membership would represent all parties that are involved within any disease response within the U.S.; state, federal and industry partners as well as experts in particular situations.

Included in the plan is a potential list of options for response to an event. There is also a need for a defined “leader” for diseases and specific situations. The end-goal is to define actions and responsibilities and then have the outlined leaders determined to hasten the response. Dr. Wagstrom outlined a brief flow chart of proposed activities for the Board interaction with other parties for different events such as an FAD outbreak or potentially emerging disease or unknown etiology with high morbidity/mortality event.

One activity that has aided in the investigation of an emerging disease is the use of the Rapid Response Teams for epidemiologically unique situations. This concept has been valuable for the early investigation and also for standardized investigation early in the course of a disease outbreak. Funding sources for ongoing use of this Team concept needs to be better defined.

There is an additional project that looks at strengthening the borders. USDA is also looking at pathways assessment. There is a current project with University of Minnesota to do the following: assess the inventory of products imported to the U.S.; current safeguards and authorities; impact of potential changes within the Food Safety Modernization Act (FSMA) and what are the current mitigations for potential contamination.
PED and the Swine Disease Matrix
Harry Snelson, American Association of Swine Veterinarians

Dr. Snelson reviewed the timeline of events for porcine epidemic diarrhea (PED) from 2013 from the initial sow farm outbreaks. The question comes up about stopping movement during an outbreak like this? Stop movement is a very serious issue for the industry and it can heavily impact the business and flow of animals if a response is not quickly reached. There are also significant concerns with trading partners and impact from lost trade. A stop movement order would have not made impact after the virus was identified and announced as PEDV. Retrospective testing from April 2013 showed many more cases than would have been previously identified in May. By May 20, 2013, there were 74 premises with PEDV identified. The virus was already spreading very quickly. The industry has never responded to an exotic production disease. There was a review of the National Animal Health Laboratory Network (NAHLN) laboratory data for current case data.

PEDV was actually not a surprise. There were anecdotal reports from Asia and other practitioners who visited these countries. Subsequently, there was no formal response. This led then to needing to understand what we know of and what we do not know of that could negatively impact the industry. With assistance from USDA, a list of 40+ viruses that are known to exist somewhere in the world was given to American Association of Swine Veterinarians (AASV). The AASV Swine Health Committee reviewed the list and prioritized the list for potential issues. A separate expert panel reviewed the list to the identify viruses of concern. The exert panel agreed with the AASV Swine Health Committee prioritized list. One of the viruses that is of concern was a “hot” strain of pseudorabies virus (PRV) from China. There were questions regarding potential information, current research and potential mitigations for that virus in the event that it might get into the U.S. Discussion led to conversations with USDA-APHIS for next steps of evaluation of research.

The next step is to go through the list of diseases and understand what data is needed at the initial onset of a disease outbreak. Items included diagnostic capability, pathogenesis, epidemiology of the disease, transmission, survivability, development of immunity etc. The goal is to have a person to assist in filling out the categories for each disease and help identify what the current needs are for those items.

Next steps include development of a mechanism to focus on this process and how to respond appropriately and timely to those needs. A potential literature search of key diseases, monitoring of diseases, development of one-pagers, and work with USDA/SAHO’s to determine roles and outcomes.

Swine Health and Information Center
Paul Sundberg, National Pork Board

Dr. Sundberg reviewed the concept and potential implementation of a Swine Health and Information Center. A review of lessons learned covered items such as identification of pathway introduction is difficult; USDA alone
cannot be expected to protect U.S. herds; better state-federal-industry response coordination is essential. The likelihood of another event is high and we have to be prepared and need a better response. The attention is on non-regulatory diseases and not for FAD’s or program diseases. If this concept passes, the funds for this project would be funded with industry monies but it would not be a Pork Board specific entity.

For the industry, National Pork Producers Council (NPPC) is focusing on a response plan; National Pork Board (NPB) is concentrating on swine disease information sharing and American Association of Swine Veterinarians (AASV) is directing the development of the swine disease matrix. Filling in the matrix gaps will help us be better prepared for emerging diseases. Emphasis on having timely diagnostics is critical for early and effective disease management. Producer request in response to the porcine epidemic diarrhea virus (PEDV) outbreak was for a group to solely concentrate on emerging diseases and to communicate with already established groups. There would be close discussion and collaboration with the international community to make this an international effort and gain a better understanding of diseases worldwide that would potentially be risks to the U.S.

The proposal is under consideration with the NPB but not finalized. The mission implemented is to protect and enhance the health of the U.S. swine herd. It would be an add-on to the capabilities for AASV, NPB and NPPC. The Center would cover capabilities that are not being done within the three entities currently. It would be a “virtual” center. The Center would have separate oversight and have a finite lifespan to be assessed at the end of five years. Data streams to be evaluated include voluntary information from disease projects that are ongoing. This could include the Swine Health Monitoring Project, Production Animal Disease Risk Assessment Program (PADRAP) and Secure Pork Supply. The Center would be housed outside of the three organizations; would have different data confidentiality options; and potentially afford increased data security. The efforts could be complementary to current USDA, Veterinary Services (VS) work. The Center will need to continue coordination efforts between state-federal-industry partners.

Emerging Disease Discussion
The Committee discussed issues with the Center and also other concerns in general with emerging diseases response and management.

Will data be shared? This will depend on voluntary delivery of information through targeted projects and objectives.

There needs to be focus to NOT stumble over the definition between trans-boundary diseases versus FAD’s. This needs to be lined out ahead of time and not allow it to hinder response efforts. Is there middle ground for movement options versus just the “black and white” of no restrictions or stop movement? This needs to be answered before the next event.
The challenge is how to access, analyze and utilize the data that exists in the industry today and not to re-invent the wheel for other analysis and database development. Additional focus needs to be on providing funds and infrastructure that can work through cases that are not FAD’s but are as yet undiagnosed.

It will be important to incorporate the National List of Reportable Animal Diseases (NLRAD) and Emerging Disease Framework into how the Center integrates and cooperates with other data sources.

SECD International Meeting
Randall Levings, USDA-APHIS-VS

Dr. Levings provided a review of the September 24-25, 2014 Swine Enteric Coronavirus Diseases (SECD) meeting that was held in Chicago, Illinois. The objectives were to have an international meeting to learn more about SECD and to review global situations and risk pathways. The meeting had representation from 27 countries and 150 participants. There were concurrent and general sessions to cover a variety of topics. There were smaller group meetings to discuss pre-determined topics related to their area of discussion and then presented back to the general session at the end of the meeting. Information was openly shared for the status of countries with what is going on and current and future focus. The countries that have experienced SECD difference in presentation: Europe versus Asian countries, and the U.S. All countries emphasized collaboration and cooperation with all entities involved. Focus on continued research needs, diagnostics and assays, and investigation into recombination events. A lot of future needs and activities were identified. There is a continued sharing of international information and see that continuing throughout the year = risk assessment, diagnostics, disease findings and virus sequences. Sharing of sequences was highlighted and looking into ways to get that completed in a timely manner. The meeting coordinated was a collaborative effort with USDA and industry partners. Contact Dr. Randall for the link to the website. Randall.L.Levings@aphis.usda.org

SECD Root Cause Investigation in the U.S.
Aaron Scott, USDA-APHIS-VS

Dr. Scott provided updated information on the root cause analysis that is currently underway. The actual cause of entry to the U.S. remains unknown. A review of the initial events post-diagnosis of porcine epidemic diarrhea (PED) was given as well as an overview of the resources available for the disease. But for 2014, there are still no hard answers for the mechanism of how PEDV entered into the U.S. The USDA Federal Order for reporting provided additional funding for needed activities to assess the root cause and risk assessment pathways for entry to the U.S.

The root cause investigation overviewed information that was already available and started with the evaluation of the epidemiology of the virus and then formulated the scenarios of what could have happened with the virus.
Additional collaborations were established to assess the virus and potential pathways. The SECD viruses (3-4) are new viruses to the U.S. There could have been more than one outbreak from April to December 2013. First cases were in growing finishing hogs and then sow farms later. All were identified in commercial herds with higher biosecurity and not found in smaller, less biosecure farms. The physical properties of the virus make it adept at infecting farms and having rapid spread which equals survival in wide range of temperatures and substrates, low amount of virus to infect the host and relatively hardy in the environment. No obvious link between the farms that broke out was identified.

The virus had to fit a certain criteria to be considered; must fit the basic epidemiology information; survive 3-6 weeks on a ship or a few days for plane travel; pH around 6.5, low temperature survivability; and moisture to prevent desiccation. Why did it not break in Canada or the European Union? What was different in April – December 2013 to cause the outbreak?

A review of the supporting diagnostic tests to identify the herds during the outbreak was given. The evaluation included assessment of PED and PDCoV. The viruses got to the U.S, however not apparently through the “usual” methods that viruses can travel. Situations that were ruled out included intentional introductions, feral swine circulation of the virus, human visitors to the U.S., nasal passage carriage in humans (study not yet complete), escape from diagnostic laboratory submissions, contamination biologicals, antibiotic filler/rice hulls etc., semen imports or live animals, birds or bats, and illegal product entry. Other products of interest but not considered a primary source include organic soybeans or corn (fertilized with manure). The question of transport on trucks came up but unlikely from international source.

Other scenarios of interest include imported pet treats. A Food and Drug Administration (FDA) report looks at general risk for these products. There have been many issues with pet treats for other species. Some treats are irradiated but its cold pasteurization and the amount of viral reduction is limited. There is also use as salvage ingredients in swine rations but hard to fully associate or not.

Complete feed rations have been gauged and some research shows that it can happen. No one common branding that showed up as a risk but it is important to assess as the ingredients do have some association with positive cases.

Work is ongoing with this project and many different areas are under review. There is testing of archived samples from feral swine, human nasal swabs and pet treats. Feed rations and ingredients of index farms are being traced. There are no archived samples to test of straight vitamin or mineral premixes.
SECD Next Generation
Brian McCluskey, USDA-APHIS-VS

Dr. McCluskey provided an overview of the current swine enteric coronavirus diseases (SECD) reporting and looking at what is needed for the future of the program. The next step is to have the conversation of the future of the mandatory reporting for SECD. A small group of people was put together to look at the next generation of the plan and what are some key questions for the next steps?

Other Business

Dr. Sundberg let the group know that the PEDV Strategic Task Force will be submitting comments to Dr. McCluskey after this Friday for SECD Next Steps.

What’s working in the SECD response?
- Availability of cooperative agreement funds for states helped to target individual state producer needs.
- Use of PIN’s is working to get that into the system.
- The payment of PEDV samples was useful.

What’s not adding value in the SECD response?
- Added regulatory burden for activities that were already being done
- Many states already had data collection ongoing and the extra entry of data into EMRS did not add value to the industry.
- Reporting into EMRS is an issue as there is not reporting back to the producers/veterinarians to see the summary data; it takes a lot of time to enter it but there is not info coming back out.
- There is no information for the support of epidemiology on-farm.

What tools do we need for options?
- There is some additional time needed to assess what is happening over winter 2014 and into spring of 2015.
- Tracking the disease and count of premises infected does add value from support of trade – helps to see what the impact is for the disease as it progresses in time.
- Continued timely information on genomic sequencing of strains (whole genome).

Are there other responses that can be looked at as models? Is there anything that is similar?
- PRV Control Board is a good model.
- Need to establish the communication points to continue to work on a plan for the future to do a better job on disease response.
- Potential to look at the current Johne’s program or NPIP program.
- The government programs need to be set up to be able to respond to the needs of industry.

Would you make a recommendation for next steps and what would be the next steps in this process?
The funding timeline and mechanisms need to be discussed in the context of continuation of the program.

What do you want to do next?

- Keep the reporting part as it does have value from the trade aspect.
- Potential to remove the federal order?
- See options in the presentation for SECD.

Committee Business

One resolution was discussed, “Need for APHIS Risk Assessment and Rulemaking prior to Allowing Imports from Countries with African Swine Fever”. Dr. Wagstrom provided the background for the need for this resolution. The introduction of ASF would be devastating to the industry so the resolution so steps to prevent entry into the U.S. are needed. See the resolution for actual verbiage.

A motion was made to adopt the resolution and seconded. A call for the question was made. The motion passed unanimously.

A recommendation was put forth to the Committee as follows. The background for the recommendation was made by Dr. Wagstrom.

“Development of a U.S. Swine Health Board to Address Emerging Swine Production Disease”

BACKGROUND INFORMATION:

Trade and commerce of live swine, pork, pork products and variety meats represent the cornerstone of the business model for U.S. pork producers. A healthy national swine herd and the regulatory and veterinary activities to protect that health status are important to maintaining and expanding trade and commerce. Traditionally USDA regulations and response plans have been centered on preventing and responding to the introduction of highly contagious foreign animal diseases listed by the World Animal Health Association (OIE) that affect commerce and trade. The pork industry, and U.S. animal agriculture, will benefit from a standardized process to identify and report incidences of emerging swine production diseases (trans-boundary diseases not on the former OIE List A or non-program domestic diseases) for collaborative federal, state and industry analysis and decision making. In order to facilitate this process a U.S. Swine Health Board (Board) should be developed and processes implemented by the Board to provide a mechanism for shared analysis of emerging swine production diseases and development of recommendations for actions. The U.S. Swine Health Board will be a non-regulatory entity based on the Pseudorabies Control Board model. The Board will have no regulatory authority but rather serve as a facilitator of federal, state, industry analysis and recommendation development for an adaptive response. Recommendations developed by the Board will be non-binding, but will have been arrived at through a collaborative process between regulators and
industry that is expected to provide the best mix of regulatory and voluntary responses. This standardized approach will improve the speed in which state and federal regulators and the pork industry work together to address emerging swine production diseases in the U.S.

**RECOMMENDATION:**

The United States Animal Health Association Transmissible Diseases of Swine Committee support industry development of a U.S. Swine Health Board to facilitate federal, state, industry analysis and recommendation development for an adaptive response to emerging swine production diseases. Such a Board will have no regulatory authority and recommendations made by the Board will be non-binding.

A motion was to accept the recommendation and seconded. The recommendation passes by voice vote with one dissenting vote.

Motion made to adjourn and the meeting was adjourned.
The Subcommittee met on October 19, 2014. Dr. Dale Nolte reported on the feral swine damage management program. USDA, Wildlife Services (VS) will be the lead on this project. The goal is to reduce the negative impact from feral swine. APHIS will implement strategies to reduce the impact of feral swine. USDA, Animal and Plant Health Inspections Services (APHIS) will seek other support for feral swine management.

Dr. Corn provided an update on the feral swine distribution maps. Information is collected from state and territory information. Data is submitted on a daily basis and updated on a monthly basis. This has been in action since 2008. There are currently 36 states with established populations of feral swine which equals evidence of breeding and/or been identified in a state for at least two years.

An update was provided on surveillance activities for feral swine and diseases of concern. These diseases can pose both an animal health threat as well as zoonotic potential. Monitoring will have a role in the continuing CISS surveillance system. An update was provided for all surveillance activities and the role of wildlife in that surveillance activities.
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; 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 Broadaus, VA; Charles Brown II, WI; William Brown, KS; Mike Chaddock, DC; John Clifford, DC; Robert Cobb; 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 Engeland, NM; Donald Evans, KS; John Fischer, GA; W. Kent Fowler, CA; Nancy Frank, MI; Mallory Gaines, DC; Tam Garland, TX; Robert Gerlach, AK; Collin Gillin; Michael Gilsdorf, MD; Linda Glaser, MN; Chelsea Good, MO; Velmar Green, MI; Michael Greenlee; 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; Russell Iselt; Billy Johnson, AR; Shylo Johnson, CO; Jamie Jonker, VA; Karen Jordan, NC; Susan Keller, ND; Bruce King, UT; Diane Kitchen, FL; Paul Kohrs, WA; Maria Koller-Jones, ONT; Todd Landt; John Lawrence, ME; Maxwell Lea, Jr., LA; Tsang Long Lin; Rick Linscott, ME; Jason Lombard, CO; Travis Lowe, KS; 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 Petrin, MN; Alex Raeb, CHE; John Ragsdale, NM; Jeanne Rankin, MT; Tom Ray, NC; M. Gatz Riddell, Jr., AL; Sueliee 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 Throld, ND; Tracy Tomascik; Darren Turley, TX; Paul Ugstad, NC; Arnaldo Vaquer, VA; Victor Velez; 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; Glen Zebarth, MN.
The Committee met on October 21, 2014 at the Sheraton, Kansas City, Missouri from 1:00 to 6:00 p.m. There were 70 members and 30 guests present. Dr. Oedekoven introduced himself, welcomed members and guests, and introduced the Vice chair, Dr. Thompson.

The first presenter was Dr. Mitch Palmer, 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 then presented the report of the Bi-National TB Committee (BNC). Dr. Massengill, U.S. Coordinator for the USA/Mexico Bi-National Committee for the Eradication of Bovine Tuberculosis and Brucellosis began his report with a history of the BNC, and concluded with an update on the committee’s work.

Dr. Burke Healy, Director of Cattle Health Services, presented the National Tuberculosis Program Update. Dr. Healy reported on individual state updates, for Michigan and California, and also updates on total affected herds. The full text of the update is included in this report.

Dr. T.J. Myers, Associate District Administrator, APHIS, Veterinary Services, reported on the cooperation between the United States and Mexico on regionalization, including the goals of the five year regionalization plan.

Dr. José Alfredo Gutiérrez Reyes, Director, Animal Health Programs, Secretary of Agriculture, Ranching, Rural Development, Fisheries and Food Supply (Mexico) (SAGARPA) National Service of Health, Safety and Quality of Food (SENASICA) presented the Committee with the Mexico National Tuberculosis Report.

Individual presentations were given on the role of M. bovis in zoonotic transmission, including:

- Zoonotic potential of M. bovis, presented by Dr. Brian McCluskey;
- Phylogenetic analysis of M. bovis, presented by Dr. Sue Lee Robbe-Austerman;
- North Dakota TB update, presented by Dr. Susan Keller; and
- California TB update, presented by Dr. Anita Edmondson.

The panel discussed and answered questions on M. bovis in humans and related issues.

Committee Business

At the conclusion of formal presentations, Dr. Oedekoven determined there was a quorum.

Dr. Oedekoven reported on the status of the 2013 resolutions.
REPORT OF THE COMMITTEE

One resolution was approved and forwarded to the Committee on Nominations and Resolutions. The topic of that resolution was to urge USDA-APHIS to license the Bovigam® assay so that Lelystad tuberculin may be used in the stimulation phase of the assay, as part of the official TB program procedure.

A motion to adjourn was made, and seconded. The meeting adjourned at 5:30 p.m.
Integration of Models and Dense Phylogenetic Sampling to Understand BTB epidemiology in Cattle and Wildlife
Professor Rowland Kao, Institute of Biodiversity Animal Health and Comparative Medicine, University of Glasgow, Glasgow, U.K.

The epidemic of bovine tuberculosis (bTB) in British cattle is the most important livestock disease problem in Great Britain today, where the control of the epidemic is complicated by the presence of an important wildlife reservoir, the Eurasian badger. This system is an important exemplar of a disease with a wildlife reservoir, a problem that can be more generally framed in the context of multi-host pathogen system. Now, whole genome sequencing applied on the mass scale is being used to study the transmission dynamics of the pathogen at a hitherto unimaginable level of detail. In this presentation, I shall discuss the relative merits of evolutionary and epidemiological modeling approaches to interpreting high density phylogenetic data, and how both these approaches present new challenges and new opportunities in our efforts to control bTB.

Effect of Skin Test on Serum Antibody Responses to Mycobacterium bovis Infection in Cattle
Ray Waters, Tyler Thacker, Mayara Maggioli and Mitch Palmer, National Animal Disease Center (NADC), Agricultural Research Service (ARS), USDA Jeff Nelson, National Veterinary Services Laboratories (NVSL), USDA-APHIS-VS Molly Stafne, Iowa State University, College of Veterinary Medicine Kristin Bass, Bethyl Laboratories Rick Linscott and John Lawrence, IDEXX Laboratories

Recently, several serologic tests designed to detect immunodominant antibodies to *M. bovis* antigens (e.g., MPB83, MPB70, ESAT-6, and CFP10) have emerged for potential use with samples from cattle. Of these, a commercial ELISA to MPB83/MPB70 (*M. bovis* antibody ELISA) has gained approval for use in cattle for bovine tuberculosis control programs by the Office International des Epizooties and United States Department of Agriculture. In the present study, the effect of injection of purified protein derivatives (PPD) for caudal fold (CFT) and comparative cervical (CCT) skin tests on serum antibody responses were evaluated with samples from cattle experimentally-infected with *M. bovis* (*n* = 8, aerosol challenge). Injection of *M. bovis* PPD for CFT (89 days after aerosol challenge) elicited serum antibody responses detectable within one week by the IDEXX *M. bovis* antibody ELISA. Positive responses were detectable in all animals up to 74
days after PPD administration. Injection of *M. avium* and *M. bovis* PPDs for CCT (105 days after CFT) resulted in a dramatic increase in antibody responses in all animals. Antibody avidity, as measured by an ammonium thiocyanate assay, also increased upon injection of PPDs for CCT. These findings demonstrate that the anamnestic response elicited by injection of PPD(s) for skin test results in both qualitative and quantitative increases in serum antibody responses in *M. bovis*-infected cattle, of diagnostic relevance.

**Comparison of CSL and Lelystad Tuberculin PPD in the Bovigam Under Field Trial Conditions in the U.S.**

Dr. Bjoern Schroeder, Thermo Fisher Scientific, Prionics AG, Schlieren-Zurich, Switzerland

**Distribution of *Mycobacterium Bovis* Genotypes in Infected Deer and the Implication for Whole Genome Sequencing Epidemiology**

Tyler Thacker, Mitchell Palmer, W. Ray Waters, National Animal Disease Center, USDA-ARS

Suelee Robbe-Austerman, Tod Stuber, National Veterinary Services Laboratories, USDA-APHIS-VS

*Mycobacterium bovis* (*M. bovis*) was cultured from 30 tissues originating from 14 infected deer. Whole-genome sequencing (WGS) was performed on the original inoculum, single colonies subcultured from the original inoculum as well as isolates from each culture positive tissue. Results indicate that population bottlenecks appear to be the primary driver of WGS genotype changes observed in both deer tissues and subclutured inoculum, as the majority of homogeneous SNPs identified in peripheral deer tissues and subcultures were identified in the original inoculum as heterogeneous SNPs. Furthermore, individual tissues had different WGS genotypes. These data suggest that dissemination of *M. bovis* beyond the initial site of infection may demonstrate that transmission events within the animal require few mycobacteria, creating additional bottlenecks. These results imply that specimen sampling, tissue pooling, and culture practices can impact WGS results. Consequently interpreting results with these potential biases in mind is critical.
Update on the NVSL bTB Serum Bank and Use of Chembio DPP in Captive Cervids
Dr. Jeff Nelson, USDA-APHIS, National Veterinary Services Laboratories, Ames, Iowa

The National Veterinary Services Laboratories (NVSL) continues to accept serum from animals for the Tuberculosis Serum Bank. Currently the bank contains 3,732 samples from cattle and 3,505 from cervid species. Of the cattle samples, 524 are from *Mycobacterium bovis* infected animals. For cervid samples, 71 come from *M. bovis* infected animals. Since the inception of the TB serum bank in 2007, 3,667 serum samples have been provided to 31 different requestors.

Technology advances have allowed the development of serological tests to detect antibodies specific to *Mycobacterium bovis*. In 2011, a project was completed by the United States Department of Agriculture, Veterinary Services (VS) to determine if serological tests could be an alternative to tuberculosis (TB) skin testing in cervids. The single cervical test and the comparative cervical test were compared with serological tests elk, white-tailed deer, and reindeer. Two serological tests were evaluated: the CervidTB Stat-Pak™ and the Dual Path Platform VetTB Assay™ (DPP). The specificity of both serologic tests used in series was 97.0%. Stat-Pak and DPP were designated as official tests in the U.S. bovine TB eradication program for select species in February 2013 because of the VS project. Analysis of data from samples submitted during the Spring of 2013 determined that the specificity of Stat-Pak and DPP was 97.7%. However, false positive results remained a concern. Of the 43 cervids sent to necropsy, none were infected with *M. bovis*. Using this additional data, on September 1, 2013 VS established cutoff values for the DPP test using an optical reader. Values ≥200 for reindeer and fallow deer and ≥500 for white-tailed deer, red deer, and elk are positive. The cutoff values have improved specificity to 99.8% percent. Since March 2014, DPP is used exclusively for serological testing in cervids. Samples submitted to NVSL rose from 6,532 to 16,310 in fiscal years 2013 and 2014, respectively. Using serological testing in the U.S. bovine TB eradication program may allow for increased TB testing participation rates and reduce injuries or deaths during testing events.

Other business:

Use of the Chembio Dual Path Platform (DPP) VetTB Assay® as a primary test
On Dec 20, 2013, the Scientific Advisory Subcommittee (SAS) of the USAHA Committee on Tuberculosis received a request from USDA-APHIS-VS-TB Program Staff (Staff) to evaluate a proposed change in the Cervid TB Program. Specifically, Staff requested that SAS comment on the use of the Dual Path Platform (DPP) VetTB Assay® as a stand-alone primary and secondary test for *Mycobacterium bovis* (bTB) in cervids. Previously the CervidTB Stat-Pak® was used as a primary test and the DPP as a secondary test.
test. The proposed change would use DPP test readings from a calibrated optical density (OD) reader as both the primary and secondary tests (30 days apart) in approved cervid species.

The specific question posed by Staff to the TB SAS: “Is it scientifically valid to change the Cervid TB serological testing protocol at NVSL by eliminating the CervidTB Stat-Pak® as the primary test and instituting the use of the DPP VetTB Assay® as the primary serological test and also using the DPP VetTB Assay® as the confirmatory test 30 days after the initial positive serological test?”

TB SAS Comments:
1. As Chembio will discontinue the manufacture of the CervidTB Stat-Pak®, a change in protocol is requisite. Replacing a subjective, visually interpreted assay with an objective assay that uses electronically determined, numeric values for status classification is considered a positive change.
2. From a regulatory perspective, terminology may be important; therefore, categorizing the second DPP as a “repeat test” is more accurate than using terminology such as “confirmatory test”.
3. It appears from the testing of 150 samples each of white-tailed deer and elk, that the DPP does not categorize as positive, samples categorized as negative by the Stat-Pak. This conclusion is based on a sample size determined to be statistically valid by a CVB statistician (i.e. 150 samples each of the two most commonly tested species). The validity of this evaluation is important, as it is the basis of the critical assumption that 8285 Stat-Pak negative samples would have also been DPP negative if tested, thus yielding the specificities of 99.76% for the first DPP and 99.89% for the second DPP. Presuming this assumption is valid; it appears scientifically acceptable to make the proposed change in the Cervid TB testing protocol.
USAHA Tuberculosis (TB) Scientific Advisory Subcommittee (SAS) Report on: Correlation of *Mycobacterium bovis* gamma interferon test kit, for cattle (Bovigam®), Product Code 5A64.00 (permitted), utilizing CSL Purified Protein Derivative (PPD), and *Mycobacterium bovis* gamma interferon test kit (Bovigam®), Product Code 5A64.01 (not permitted), utilizing Lelystad PPD for the detection of tuberculosis in cattle.

On September 19, 2014, Prionics USA provided to the chairman of the USAHA Committee on Tuberculosis and the Scientific Advisory Subcommittee (SAS), documentation on field trial comparisons of CSL tuberculin and Lelystad tuberculin in the Bovigam® assay. Bovigam® is licensed and approved for use in the USDA bovine tuberculosis eradication program for the identification of *Mycobacterium bovis* infected cattle.

In 2012, the TB SAS reviewed similar data that demonstrated increased sensitivity of the Bovigam® when Lelystad tuberculin was used compared to CSL tuberculin. It was the opinion of the TB SAS that Lelystad tuberculin be approved for use in the stimulation phase of the Bovigam® assay.

The objective of the current submission was to compare tuberculins from two different sources (CSL and Lelystad) in order to demonstrate equivalence of product performance. This was done to fulfill requirements for approval of the Bovigam® kit containing Lelystad tuberculin in place of CSL tuberculin.

For purposes of this report the terms tuberculin and purified protein derivative (PPD) are synonymous.

Tuberculosis Scientific Advisory Subcommittee (TB SAS) Comments

The 2014 submission describes side-by-side comparisons of Lelystad and CSL tuberculins using samples from confirmed *M. bovis* infected cattle (confirmation by culture or polymerase chain reaction (PCR) from herds in Michigan and Colorado, and presumed non-infected herds in Texas, Idaho, Minnesota and Pennsylvania. Data from a total of 84 confirmed *M. bovis* infected animals and 711 non-infected animals are presented.

Using the Bovigam® assay as directed by the manufacturer, assay sensitivity in confirmed *M. bovis* infected cattle was 73.8% and 45.2% for Lelystad and CSL tuberculins, respectively. This difference was statistically significant. Assay specificity in presumed *M. bovis* negative cattle was 96.9% and 95.1%, respectively for Lelystad and CSL tuberculins. This difference was not statistically significant.

This new data, combined with that reviewed in 2012, demonstrates that Lelystad tuberculin performs with superior sensitivity and equivalent specificity to CSL tuberculin in the Bovigam® assay. Therefore, it is the opinion of the TB SAS that approval of Lelystad tuberculin for use in the Bovigam® assay would be appropriate. It is important to note that a positive...
recommendation from the TB SAS in no way implies approval by the USDA Center for Veterinary Biologics or USDA-APHIS TB Program staff.
Development of Proposed Brucellosis/TB Regulations

APHIS completed new regulations and supporting standards for the brucellosis and TB programs in FY2012. Under the proposed approach, the Code of Federal Regulations will provide the regulatory 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 FY2014. APHIS is hopeful that Proposed Rule and Program Standards will be published in early 2015. Upon publication, APHIS plans to provide an extended comment period of 90 days.

Bovine State Status

As of September 30, 2014, 48 States, two Territories (Puerto Rico and the U.S. Virgin Islands), and one zone (Michigan) were TB accredited-free. California has modified accredited advanced (MAA) status. The MAA zone of Michigan was advanced to accredited-free status on September 10, 2014. With this advancement, Michigan has an accredited-free and a modified accredited (MA) zone.

TB-Affected Herds Identified in FY2014

Two TB-affected cattle herds, one dairy in North Dakota and a small bison herd in the modified accredited (MA) zone of Michigan, were detected during FY2014. The dairy is under a test-and-remove management plan, and the bison herd was depopulated with Federal indemnity. This is the fewest number of new herds since 1998; however, infected herds have not yet been identified for three culled adult cattle detected through slaughter surveillance. Two captive cervid herds in the Michigan MA zone remain under quarantine.

National TB Surveillance

Granuloma Submissions:

From October 1, 2013, through June 30, 2014, 6,096 granulomas from 123 federally inspected establishments were identified during postmortem slaughter inspection and submitted for diagnostic testing. In addition, 106 granulomas were submitted from three state inspected establishments for a total of 6,202 granuloma submissions. Overall, 2.6 granulomas were submitted per 2,000 adult cattle (culled dairy and beef cows and bulls) slaughtered. This is the lowest submission rate since 2006. During FY2006-2013, the submission rate ranged from 2.9-3.5 per 2,000 culled adult cattle slaughtered. The minimum standard for slaughter surveillance is one granuloma submitted per 2,000 adult cattle slaughtered annually. Thirty-six of the 40 highest volume adult cattle slaughter establishments met or exceeded
the submission standard through the third quarter of FY2014. These 40 highest volume establishments slaughter approximately 95 percent of adult cattle processed with federal inspection in the United States.

**Slaughter Cases:**

During FY2014, a total of 16 granuloma submissions had histology consistent with mycobacteriosis. Of these, TB was confirmed in 11 (68.8 percent) cases. TB is confirmed by polymerase chain reaction (PCR) testing of formalin-fixed tissue and culture of fresh tissue. Of the remaining five cases, other *Mycobacterium* species were identified for three cases and no organism was isolated for two cases.

Three of the 11 confirmed cases occurred in adult cattle over two years of age, and eight cases occurred in feeder cattle. Of the three adult cases, the herd of origin was located for two cases, but infection was not confirmed in the source herds. Of these two, one case occurred in a beef cow from a recently dispersed Nebraska herd. The second case occurred in a beef cow that originated from Texas; herd testing found no additional infected animals. The third case occurred in an adult dairy cow slaughtered in California and is currently under investigation.

The eight fed cattle cases were detected at slaughter establishments in Michigan (three cases), Texas (three cases) and Wisconsin (two cases). Three cases were in Mexican-origin cattle and five were in domestic origin Holstein steers. Whole genome sequencing of isolates from the Holstein steers were a close match to isolates from the 2013 affected dairy in Saginaw County, Michigan.

**Mexican-Origin Slaughter Cases:**

A total of three 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 Coahuila (one case), Sinaloa (one case), and Veracruz (one case). This is the fewest number of new cases since FY2010, when three cases were detected.

**Animal Identification Collection for Slaughter Cases:**

As a result of USAHA Resolution 29, the National Veterinary Services Laboratories (NVSL) developed a process to record information on the presence or absence of official animal ID on animals sampled for TB slaughter surveillance. Database modification and personnel training were completed early in 2014. Data entry began in late April for the third quarter of 2014. During this time period, 520/935 (56 percent) submissions had official animal identification collected at the time of slaughter, 224 (24 percent) had unofficial identification and 191 (20 percent) had no identification collected.

A complete analysis of the data will be available in FY2015 and information on animal identification for slaughter cases will be included in future annual reports.
Live Animal Testing, Cattle:
Tuberculin skin testing in live animals is another component of national TB surveillance in cattle and bison. During October 1, 2013 through August 31, 2014, 474,574 caudal fold tuberculin (CFT) skin tests of cattle and bison were reported, with 6,174 responders (1.3 percent, 41 states and one Territory reporting). During FY2013, 944,678 CFT tests of cattle and bison were reported, with 12,757 responders (1.4 percent, 50 States and 1 Territory reporting).

The gamma interferon test has been approved for use in cattle only as an official supplemental test in the TB program since 2005. Laboratories in six States (California, Colorado, Michigan, Nevada, Texas, and Washington) and the NVSL in Iowa are approved to conduct gamma interferon testing. These laboratories completed 5,208 tests for cattle residing in 22 states during the time period October 1, 2013 through July 31, 2014.

Live Animal Testing, Cervids:
Information for tuberculin skin testing in captive cervids for FY2014 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. During FY2014, through September 27, 2014, a total of 16,300 cervid serological TB tests were completed. These samples were submitted from 13,142 white-tailed deer (80.5 percent), 2,604 elk (16.0 percent), 375 fallow deer (2.3 percent), 156 red deer (1.0 percent), and 23 reindeer (0.1 percent).

The production of the CervidTB Stat-Pak was discontinued by the manufacturer in early 2014 and NVSL exhausted its supply in March 2014. VS provided statistical evidence to the USAHA TB SAS in support of replacing the Stat-Pak as the primary serological TB test for cervids with the DPP test. The TB SAS approved of this change in testing protocol and subsequently VS revised the cervid TB serological test guidance document and amended the CFR to make the DPP the primary test and also the secondary post 30 day test. NVSL started testing of serum samples with the DPP as both the primary test and secondary test in March 2014.

Thirteen animals were positive of 7,239 tested (0.2 percent) by the DPP during FY2014, through September 27, 2014. Of these, 8 of 8,424 (0.1 percent) white-tailed deer were positive, 4 of 1503 (0.3 percent) of elk tested, 1 of 256 (0.4 percent) fallow deer, and no positives of 87 red deer and 20 reindeer tested.

As of September 27, 2014, a total of eight animals have been submitted for necropsy in FY2014. Representative lymph nodes and grossly lesioned tissues were evaluated by histopathology and culture. All samples were negative for TB by histopathology. Six cultures have been completed and M. bovis has not been identified; the remaining cultures are pending.

Collaborations with Mexico:
In FY2014, APHIS and Secretaría Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación (SAGARPA) finalized a joint strategic plan.
designed to minimize the risk of TB while providing a framework to facilitate trade in the future. APHIS teams conducted reviews in Sonora and Chihuahua and assisted SAGARPA with pre-certification reviews in Baja California Sur, Chihuahua, Coahuila, Durango, Sonora, Tabasco, and Yucatan.

As a result of the APHIS, Veterinary Services (VS) review of the State of Chihuahua, APHIS has granted provisional modified accredited (MA) status there for one year beginning on July 1, 2014. APHIS provided a series of essential recommendations to Chihuahua to be completed by June 30, 2015 in order to maintain the MA status. These recommendations include that Chihuahua must complete the area testing of all cattle herds, including dairies, in MA zone no later than June 30, 2015. In addition, VS recognized four non-accredited zones within Chihuahua's MA zone for a period of 12 months beginning July 1, 2014. After July 1, 2015 VS will recognize only three non-accredited zones.

While under provisional MA status VS will accept whole herd tests conducted on or after January 1, 2013 for cattle being exported to the U.S. These whole herd tests will expire in 24 months, at which time an additional whole herd test would be required to export to the United States. Whole herd test charts and applicable individual animal test charts are required in order for animals to be presented at the border. TB testing for exporting to the United States must be completed by veterinarians meeting the requirement for caudal fold testing as submitted on the approved veterinarian list provided by SAGARPA to APHIS.

Regular progress on these items will be monitored by quarterly reports submitted by Chihuahua animal health officials. Each quarterly report will include a list of all veterinarians conducting caudal fold testing in the quarter and a list of all herds tested during the quarter. Failure to comply with these will result in an immediate revocation of provisional MA status. APHIS will conduct a follow-up review in Chihuahua, in approximately July 2015.

APHIS participated in two courses organized by Mexico on bovine TB epidemiology, infected herd management, and TB surveillance in Zacatecas and Hidalgo.

**TB Serum Bank:**

APHIS continues to obtain well-characterized serum samples for both uninfected and infected animals. 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 from confirmed TB-infected animals. 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 FY2015.

**IDEXX ® *M. bovis* Antibody Test Kit:**

The IDEXX ® *M. bovis* Antibody Test Kit was approved for official TB program use in TB-affected cattle herds in FY2013. 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 serology test is being used in addition to traditional skin testing to reduce the risk of not detecting truly infected animals that are skin test negative. The test was used in one TB affected herd in FY2014, as part of the test and remove herd management plan. Four of 172 serology positive (2.3 percent) animals were euthanized; in addition to 4/562 caudal fold responders (0.7 percent) (one animal was positive on both tests). No evidence of TB infection was found by histology and culture in the seven positive animals.

Selected State Updates

California and Utah:
Three dairies were tested in Utah by regulatory veterinarians without finding evidence of tuberculosis, as a result of finding TB in a culled adult dairy cow slaughtered in California in November 2013. Herd testing is underway of potential source herds in California and Arizona. The quarantine was released in FY2014 for a TB-affected California dairy herd that was identified in FY2013.

Michigan:
One new affected herd occurred in a small bison herd located in the Modified-Accredited (MA) zone. The herd was detected through inspection of an animal harvested for consumption. Quarantines have been released for two dairies and one beef herd that had 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 FY2009 remain under quarantine in the MA zone.

Nebraska:
TB was confirmed in a culled adult Nebraska beef cow that originated from a recently dispersed herd. The herd had been tested in 2009 as part of an affected captive cervid herd investigation in that state; however, this cow had not received a test at that time. Whole genome sequencing results indicate the recent isolate was a close match to 2009 isolates from the cervid herd.

North Dakota:
A dairy was confirmed infected after herd testing subsequent to a dairy worker being diagnosed with *Mycobacterium bovis* infection. The herd is being managed by test-and-remove. An affected beef herd detected in FY2013 was released from quarantine in 2014.
The Committee met on October 19, 2014 at the Sheraton Hotel in Kansas City, Missouri, from 12:30 to 5:00 p.m. There were 36 members and 31 guests present. The Chair briefly reviewed house-keeping items and the use of Robert’s Rules of order to conduct the meeting. There were no resolutions or recommendations submitted by this Committee in 2013.

Committee members discussed and voted unanimously to strike the word “accidental” from the current mission statement. The motion was made by John Fischer and seconded by Dick Winters.

The purpose of the Committee on Wildlife Diseases is to promote an understanding of the importance of diseases to free-ranging wildlife,
commercial captive wildlife and domestic animals and the interactions these
groups of animals and diseases have; to protect the integrity of native free-
ranging wildlife populations while simultaneously protecting native free-
ranging wildlife, commercial captive wildlife, and domestic animals of the
United States from diseases they may share or which may be transmitted
among them; to protect free-ranging wildlife of the United States from
accidental introduction of diseases; to assist in the identification and
management of disease problems of free-ranging and commercial captive
wildlife; and to promote sound wildlife disease management practices among
responsible agencies and industries.

Presentations and Reports

USAHA Wildlife Student Scholarship Presentation
Betsy Elsmo, University of Georgia
Dr. Elsmo discussed her background and several research projects she
has authored including Acute, necrotizing, hemorrhagic, interstitial
pneumonia and suppurative myocarditis associated with Bartonella henselae
in a Florida panther (Puma concolor coryi) and gave a review of dermatologic
diseases in wild turkeys (Meleagris gallopavo) in the eastern U.S. from 1975-
2013.

Mountain Goats (Oreamnos americanum) at the Livestock – Wildlife
interface: A Susceptible Species
Peregrine Wolff, Nevada Department of Wildlife
Thomas Besser, Danielle Nelson, Washington State University, Veterinary
Diagnostic Laboratory
Julia Ridpath, Kathryn McMullen, Ruminant Diseases and Immunology
Research Unit, National Animal Disease Center, USDA Agricultural
Research Service
Mike Cox, Chris Morris, Caleb McAdoo, Nevada Department of Wildlife
Mountain goats (Oreamnos americanum) were first introduced into the
East Humboldt and Ruby Mountains of Elko County, Nevada in the 1960’s.
These contiguous mountain ranges are also home to other ruminant species
(native mule deer and introduced Rocky Mountain bighorn sheep) and are
surrounded by both public and private rangelands utilized for domestic cattle,
sheep, and goats. Permitted as well as stray domesticos have been
documented between 9,000 and 10,000 feet which are well within utilized
habitat of the mountain goats. Since 2010, we have documented infection by
Mycoplasma ovipneumoniae in adult (n=13) and kid (n=1) mountain goats.
Nasal (i.e., all animals) and lung (i.e., kid) swabs from these animals were
used to identify M ovipneumoniae by reverse transcription polymerase chain
reaction (RT-PCR) following broth enrichment. In addition to
bronchointerstitial pneumonia, the kid had suppurative and hemorrhagic
enteritis with lymphoid necrosis. Type 1a BVD virus was isolated from the
kid’s spleen. A female adult goat was presented with ulcerative cheilitis and
pseudocowpox virus was identified in this lesion by PCR and sequencing. These disease surveillance data suggest that interactions resulting in disease transmission occur between mountain goats and domestic ruminants and should be discouraged as part of a comprehensive management program for this species.

**Results of the Mycoplasma Ovipneumoniae Ring Test (Testing the Laboratories)**
Mark Drew, Tricia Hebdon, Idaho Department of Fish and Game, Wildlife Health Laboratory
Daniel Walsh, National Wildlife Health Center, United States Geological Survey
Thomas Besser, Veterinary Microbiology and Pathology, College of Veterinary Medicine, Washington State University
Frances Cassirer, Idaho Department of Fish and Game

A ring test was conducted to compare the consistency of results for detection of *Mycoplasma ovipneumoniae* using reverse transcription polymerase chain reaction (PCR) in a standardized sample set. Five laboratories that routinely test samples for Mycoplasma spp. participated. Four of these laboratories provided four source samples consisting of both *M. ovipneumoniae*-positive and -negative samples isolated from bighorn sheep (*Ovis canadensis*). A total of 21 test samples were prepared as 250 μl aliquots of selected source samples, and distributed as replicate, blinded samples to each laboratory. Using either standard or real time PCR test, high agreement was found within and between laboratories for most samples including the replicated source samples. Results of only two of 85 (17 samples run by five laboratories) differed between laboratories. However for two source samples (four test samples/laboratory) containing very low levels of specific DNA template there was some variation in results within and between laboratories. All participating laboratories felt the ring test was successful, and based on the results of the ring test some laboratories made changes to improve their PCR protocols. The ring test provided a review of current methods for PCR detection of *Mycoplasma ovipneumoniae* and showed consistency of results between the participating laboratories, both of which will benefit bighorn sheep disease diagnostic efforts.

**Update on Pneumonia Complex in Bighorn Sheep**
Peregrine Wolff, Nevada Department of Wildlife

In September of 2013, a bighorn sheep disease sampling/health assessment workshop was conducted at the request of the Western Association of Fish and Wildlife Agencies, Wildlife Health Committee (WAFWA WHC) to prioritize and standardize testing protocols for respiratory pathogens of bighorn sheep. Specific concerns included that numerous tests for a variety of pathogens are available but interpretation of results is challenging, laboratories do not have standard methodology and the 2009 WAFWA WHC Sheep Sampling Guidelines required updating.
WILDLIFE DISEASES

The workshop included wildlife health professionals from nine Western state wildlife agencies and two Canadian provinces. WAFWA Wild Sheep Working Group members were surveyed prior to the workshop. Funding was secured from the Wild Sheep Foundation to support attendees with travel restrictions.

The group produced documents: 1) outlining sampling protocols for various herd management goals, 2) listing important terms and their concise definitions, 3) standardizing necropsy protocols, 4) providing a concise article on herd health monitoring recommendations. Also identified were several tests/protocols requiring future research as well as topics/techniques for agency staff training to support consistent approaches to sample collection and handling. These products will support recommendations across agencies for different management practices and provide a valuable resource and reference for all wildlife health and management professionals.

Dr. Subramaniam Srikumarin, Washington State University, has been working on developing two approaches to prevent infection of bighorn sheep with *Mannheimia hemolytica*. The first approach involves utilizing leukotoxin negative *Bibersteinia trehalosi* to potentially inhibit the growth of leukotoxin (Lkt) positive *M. hemolytica* in the oropharynx of domestic sheep, thus eliminating the transfer of Lkt positive *M. hemolytica* to bighorn sheep. The second approach involves the use of a mutant form of a virus which would contain fragments of leukotoxin positive *M. haemolytica*. The properties of the mutant virus are such that it reactivates under stress which would in essence provide a booster effect thus allowing animals to develop adequate lifelong immunity with a single dose of the vaccine.

The Role of “Super Shedders” in the Persistence of Disease in Bighorn Sheep

Idaho department of Fish and Game, Washington State University and South Dakota State University are collaborating to investigate whether respiratory disease persists within bighorn sheep populations through the infection of a relatively small number of chronic or “super shedders” of *Mycoplasma ovipneumoniae* that are responsible for driving disease transmission. Captive pen studies of ewe/lamb groups will test whether ewes that are identified as persistent shedders will have different rates of lamb survival vs. ewes that are classified as non-shedders of *M. ovipneumoniae*.

Respiratory Disease Surveillance in Bighorn Sheep: Linking Pathogens and Herd Health

Wyoming, Colorado and Montana are conducting a joint research project to better understand the distribution and pathogenicity of the respiratory pathogens that are recovered during pneumonia die-off events in bighorn sheep, specifically investigating if there is a link between pathogen presence and herd health. The group is two years into a three year study, and has sampled 187 bighorn sheep from ten herds in Wyoming. Blood, feces, and
swabs (tonsil, nasal and ears) were collected. Future research will include similar analysis from bighorn sheep herds in Colorado and Montana.

**Bighorn Sheep Sinus Tumors are Associated with Co-Infections by Potentially-Pathogenic Bacteria in the Upper Respiratory Tract**

A collaborative project between Colorado and Wyoming to study whether or not the presence of sinus tumor features (tumor score) affected the likelihood of detecting potentially-pathogenic bacteria from upper respiratory sinus lining tissues in bighorn sheep. A polymerase chain reaction (PCR) assay for the detection of leukotoxigenic *Pasteurellaceae* bacteria as well as a PCR for the detection of *Mycoplasma ovipneumoniae* were used to screen sinus lining tissues from bighorn sheep for the presence of these potentially-pathogenic bacteria. The presence of sinus tumors may present a possible mechanism for maintenance and shedding of bacterial agents from the upper respiratory tracts of bighorn sheep.

A number of publications have been published that address bighorn sheep pneumonia. These publications are available on the University of California (Davis), Wildlife Health Center website dedicated to Wild and Domestic Sheep Disease.

Reference: [http://www.mwvcrc.org/content/view/122/102](http://www.mwvcrc.org/content/view/122/102)

**Meningeal Worm – The Interface between the Swamp and the Fence**

Mark Drew, Idaho Department of Fish and Game, Wildlife Health Laboratory

The meningeal worm, *Parelaostrongylus tenuis*, is a nematode parasite of the meninges of white-tailed deer (*Odocoileus virginianus*). The parasite causes mortality in most other species of cervid and bovid that it infects, largely with the exception of cattle and sheep. The parasite is transmitted by a variety of terrestrial snails and slugs and in the natural host (white-tailed deer) the larvae migrate within the dorsal horns of the spinal cord cranially to the meninges without producing clinical signs. In other species of ungulates, *P. tenuis* larvae migrate through the spinal cord and can end up in various locations within the brain. The aberrant migration pattern leads to the severe clinical signs prior to death which can include muscle weakness, circling, incoordination, head tilt, inability to rise and thrashing.

Many surveys for meningeal worm have been done in the past both to outline the distribution of the parasite and to develop risk assessments for the possible introduction of the parasite in locations where it is not known to exist. In general, the distribution of the parasite, based on fecal surveys for dorsal-spined larvae in fecal samples or dissection of heads to find adult parasites in white-tailed deer, is the eastern portion of North America, with the western boundary at or near the 100th meridian. Many locations west of the boundary have appropriate species of snails or slugs and white-tailed deer for the parasite to exist, but the parasite is not present presumably due to environmental conditions. However, most areas west of the present distribution of the parasite also have numerous species of wild ungulates that
would likely experience negative population level consequences if the parasite was introduced.

The widespread captive cervid industry, currently enumerates white-tail deer, elk, fallow, etc. The natural host of the parasite, the white-tailed deer, is one of the most common species of domestic cervids in North America and numbers of captive white-tailed deer are increasing in many states. It is also known that some elk (*Cervus elaphus*) that are infected with *P. tenuis* can tolerate the infection and even produce larval worms which can transmit the infection to other animals.

Many states in the west, including Idaho, prohibit the importation of domestic or captive cervids from east of the 100th meridian. The primary basis for the prohibition is the presence of susceptible cervid and bovid hosts and the appropriate intermediate hosts. If the parasite was introduced, control of it would be very problematic as the intermediate hosts are difficult to control in the environment and there is no good treatment for affected individuals.

**Introduction**

*Parelaphostrongylus tenuis* is a metastrongylid parasite of white-tailed deer (*Odocoileus virginianus*) (Anderson, 2000; Lankester, 2001). The intermediate hosts are terrestrial slugs and snails. Numerous cervids including moose (*Alces alces*) and elk (*Cervus canadensis*) as well as domestic ungulates including sheep, horses, cattle, llamas and alpacas can all be affected by *P. tenuis* (Lankester 2001; Gerhold et al., 2010; Tanabe et al., 2010; Mitchell et al., 2011). Currently, *P. tenuis* infection is diagnosed using by post-mortem examination of brain or spinal cord sections. This technique has variable to low sensitivity and often animals are diagnosed as *P. tenuis* suspects. The construction of a live animal test would be a significant and sensitive diagnostic, research, and surveillance tool. In addition it would allow for detection of subclinically infected animals which would assist with understanding the epidemiology of the disease. Additionally the test would be useful to determine the western extent of *P. tenuis* distribution. Although the historic distribution of *P. tenuis* extended to the 100th meridian (Lankester, 2001), recent anecdotal evidence suggests that *P. tenuis* has extended beyond its historical range.

Deer farming is one of the fastest growing industries in rural America, and it is a great alternative agricultural pursuit for families. Compared to traditional livestock, the deer industry is booming. It generates $3 billion for the U.S. economy and supports tens of thousands of jobs in communities across the country. In fact, a Texas A&M study reports deer farming as one of the fastest growing industries in rural America (North American Deer Farmers Association (NADFA) 2014). Approximately 250,000 animals, including white tailed deer, fallow deer, sika deer, reindeer are farmed in the U.S. Numbers of elk farms and farmed elk in Canada total 800 with 35,000 elk. In the U.S., there are 1,200 farms and 70,000 elk, with totals of 150,000-160,000 farmed elk in North America.
Association between *Treponema* spp. and Severe Hoof Disease in Elk from Washington State, USA

Kristin Mansfield, Washington Department of Fish and Wildlife

Nicholas Evans, Department of Infection Biology, Institute of Infection and Global Health, University of Liverpool, U.K.

Sushan Han, Diagnostic Medicine Center, College of Veterinary Medicine and Biomedical Sciences, Colorado State University

Reports of elk (*Cervus elaphus*) with lameness and severely deformed or missing hooves increased dramatically in southwest Washington State during the late winter and early spring of 2008. The geographic distribution of reports of the disease has continued to expand since then, and at this time is estimated to encompass a core area of approximately 10,500 km$^2$ (4,000 mi$^2$). A diagnostic investigation to determine the cause was initiated in 2009. Radiography, bacteriology, virology, serology, and trace mineral analysis failed to reveal a cause of the disease. Histopathology and silver staining of lesions from affected hooves demonstrated the presence of deeply invasive spirochetes accompanied by significant inflammation. Furthermore, *Treponema phagedenis*-like and *Treponema medium*-like spirochetes were isolated from diseased elk hooves. These isolated *Treponema* represent two of the three phylotypes known to be highly associated with hoof diseases in domestic animals: bovine digital dermatitis in cattle and contagious ovine digital dermatitis in sheep. Based on findings to date, it appears that *Treponema* spp. may have a causal role in the emergence of a significant disease of free-ranging elk in the Pacific Northwest of North America.

Research Update on VOC Sampling in Wildlife & Livestock for Bovine Tuberculosis TB and Brucella

Jack Rhyan, Pauline Nol, Wildlife/Livestock Disease Investigations Team, Animal and Plant Health Inspection Service, Veterinary Services

Analysis of volatile organic compounds (VOC) from breath of animals is being tested as a screening tool for brucellosis and bovine tuberculosis. In two studies of *Mycobacterium bovis* naturally- and experimentally-infected animals, analyses of breath VOCs by gas chromatography/mass spectrophotometry and by an electronic nose showed different patterns of VOCs in breath of infected and non-infected cattle. In two studies of Brucella seropositive and seronegative Yellowstone bison, different patterns of VOCs were detected between seropositive and negative animals by GC/MS and the electronic nose. Results of these studies suggests the need for continued evaluation of this emerging technology.

SCWDS Hemorrhagic Disease and Culicoides Survey Updates: 2014

Daniel Mead, Joseph Corn, David Stallknecht, Stacey Vigil, Southeastern Cooperative Wildlife Disease Study

Dr. Daniel Mead presented the Southeastern Cooperative Wildlife Disease Study (SCWDS) hemorrhagic disease report as well as an update on the SCWDS *Culicoides* survey. SCWDS has received samples (mostly...
white tailed deer (WTD) from 13 states for HD testing. EHDV-2 has been detected in samples submitted from Georgia, Louisiana, and Oregon. EHDV-6 has been detected in samples submitted from Florida and North Carolina. BTV-17 was detected in New Jersey. SCWDS has been conducting surveys to determine what Culicoides spp. are present in the Southeast since 2007. Since 2007 they have collected at 307 sites and have collected over 227,196 biting midges. Dr. Mead provided a list of species that were found outside of their previously recorded ranges.

Brucellosis Surveillance and Management in Montana Elk Populations
Neil Anderson, Kelly Proffitt, Jennifer Ramsey, Keri Carson, Jenny Jones, Montana Fish, Wildlife & Parks
Quentin Kujala, Justin Gude, Montana Fish, Wildlife and Parks
Julee Shamhart, Montana Fish, Wildlife and Parks

Montana Fish, Wildlife and Parks (MFWP) initiated a targeted surveillance project for brucellosis in elk in the winter of 2010/2011. Targeted surveillance focused on wintering elk herds in areas adjacent to the known distribution of brucellosis in Montana’s elk populations. Surveillance efforts detected brucellosis in three areas where brucellosis had not been known to exist, resulting in the expansion of the geographical distribution of the disease in elk populations. Where detected, seroprevalence in elk ranged from approximately 5% - 23%. These findings also led to the expansion of the Designated Surveillance Areas (DSA) for brucellosis in livestock. The cause of the expansion may likely be due to several factors including: increased surveillance efforts, changing elk distributions and expansion of the disease into new population segments. Surveillance in two areas, the Pioneer Mountains and the Tobacco Root Mountains, failed to detect brucellosis, increasing confidence that these elk populations pose little risk for transmitting brucellosis to livestock.

MFWP, through a citizens working group, developed guidelines for managing elk populations within the DSA. The fundamental objectives of the guidelines consist of: 1.) minimize transmission of brucellosis from elk to livestock, 2.) maximize acceptance of management actions by major stakeholders, and 3.) maximize cost effectiveness. Management efforts focus on elk distributions within the DSA and maintaining separation between elk and livestock during the brucellosis risk period from January thru June. The tools available for managing elk distributions include hazing elk, limited hunting seasons, limited fencing of small areas (hay stacks and feed lines), and continued research and education. The guidelines also call for the establishment of local working groups to address elk/cattle distribution issues. All management plans are subject to the public process and MFWP Commission approval. A lawsuit has been filed seeking an injunction for actions proposed by one local working group and tentatively approved by the MFWP Commission.
Chronic Wasting Disease (CWD) in Pennsylvania Captive Cervids - Current Status
Craig Scultz, State Veterinarian, Pennsylvania Department of Agriculture

Cervid Farming In Pennsylvania
Captive cervid operations became regulated by the Pennsylvania Department of Agriculture (PDA) in 2005. They were previously regulated by the Pennsylvania Game Commission. The cervid industry exhibited expansion under PDA and peaked in 2009 at nearly 1,500 herds – over half certified herds.

Cervid Regulation in Pennsylvania
Orders of general quarantine - Provide for a nimble regulatory response to animal disease threats – classified as dangerous transmissible diseases (DTD) under Pennsylvania’s Domestic Animal Law. Chronic wasting disease (CWD) was designated as DTD in 2006. The First Order of General Quarantine is to address new disease control procedures. A Revised Quarantine Order was put in place in 2014 to meet Federal herd certification program (HCP) Standards and address CWD positives in a five year fully certified herd in 2012.

History of Pennsylvania CWD Positives
October 2012 – A small (ten head) certified herd in New Oxford, Pennsylvania (Adams County) submitted routine mortality reports. A “thin” lactating white tailed doe with no other clinical signs was observed and tested positive for CWD. Depopulation yielded second positive – a young male. The facility proved to have some compliance-challenges in their HCP operation with marginal recordkeeping. A positive trace-back exposed a herd in Lycoming County (North Central Pennsylvania) was the birth herd of the infected animal according to records. The positive doe left this herd as a fawn and was considered a relatively low risk situation. Following discovery, there were subsequent numerous trace forward exposed herds. Subsequent DNA testing demonstrated no link between the positive Adams County doe and the purported Lycoming County birth herd. All additional test results of cervids in trace back/forward exposed herds were “not detected”.

Pennsylvania CWD Response Plan
A CWD Interagency Task Force was convened and included key members of the Pennsylvania Department of Agriculture, Pennsylvania Game Commission, Pennsylvania Department of Environmental Protection, Pennsylvania Department of Health, USDA-APHIS, and additional members from academia and Agricultural Extension.

Disease Management Areas
The number of captive cervids tested at Pennsylvania Veterinary Laboratory included:
- 2008 - 2,448
- 2009 - 2,347
- 2010 - 2,518
- 2011 - 3,133
- 2012 - 2,307
2013 - 2,197
Since 2002 – 21,335

Free-ranging cervids tested by the Pennsylvania Game Commission during the 2012-2013 hunting season included 2,088 from Adams/York Disease Management Area (DMA) 2 with an additional 2,945 tested statewide. Also, three south-central positives were discovered in Blair and Bedford Counties from Hunter Harvest surveillance. Two additional road kill surveillance positives were found in DMA 2 confirmed in 2013.

During the 2013-2014 Hunting Season, 738 from Adams/York Disease Management Area were tested, 1,060 from Blair Bedford Disease Management Area, 3,322 from elsewhere in the state, with one additional road kill surveillance positive from DMA 2 confirmed in 2014. Since 1998 – over 48,000 free-ranging deer have been tested.

CWD Program Participants in Pennsylvania
- Approximately 1200 Farms
- HCP /HMP – 602/367 May 2014
- HCP/HMP – 466/650 October 2014
  Ratio is changing with enrollment in new programs.

CWD in PA Captive Certified Herds
A total of nine white-tailed deer in two, five-year fully certified herds have tested CWD positive. Recently a tenth positive deer was found in a new herd in DMA 3. Disease transmission was confirmed in two herds. Recordkeeping gaps in the index Adams County herd prevented successful trace of the index positive animal to the premises of origin. DNA did not confirm herd of origin as indicated in the participant’s records. The Jefferson County herd was a small herd assembled through purchase of fully certified deer. There was excellent recordkeeping and program compliance in all implicated herds including positive and trace-back exposed herds. Trace-back exposed herds however, showed high animal movement/turnover.

CWD in Pennsylvania Certified Herds
Jefferson County herd – small herd (15-20 total inventory) assembled in 2012-2013 through purchase of fully certified WTD from five year fully certified source herds. CWD positive animal identified through routine surveillance sample that tested positive in April 2014.
Second surveillance sample subsequently tested positive. The herd was depopulated in July 2014 yielding five additional CWD positives totaling seven positives out of 17 adult animals.

Benefits to Disease Research
Through efforts of the captive cervid industry live animal samples were collected from the quarantined positive herd prior to depopulation. Collected tissues included whole blood, rectal tissue, and nasal brushings. Post mortem samples (eyes, blood, and rectal tissue) were collected at Pennsylvania Veterinary Laboratory after depopulation at time of CWD sample collection.
Trace-back-Exposed Herds - Risk Considerations

1. Herd Disease Surveillance through Mortality Testing. Risk considerations include missed/poor quality/untestable samples and animals sold to herds with unknown previous testing status where results are not obtainable.

2. Animal Movements into the Herd. Risk considerations include animals associated with CWD positive herd in the past; CWD in free-ranging cervid population; and proximity to CWD infected herd.

Other high risk activities associated with captive operation include taxidermy, handling of high risk materials from hunts, rehabilitation, and fawn rearing

Exposed Deer - Risk Considerations in Determining Testing Priority:

- Length of Time in a CWD Positive Herd
- Length of Time in CWD Exposed Herd
- Length of Time on Contaminated Soil
- Length of Time since Exposure (Positive Animal or Soil) Occurred

Specific requirements in the Pennsylvania program include 1) Tamper-resistant tags for both forms of identification (ID), 2) Pre-approval of recipients of captive cervids – must be enrolled and approved before receiving animals, 3) Regulatory verification of decomposed cervids considered untestable, 4) Documentation of all transactions/movements: “Set forth the type of transaction, which included sold, lent, leased, consigned, exchanged, bartered, gifted, boarded, moved including for breeding purposes, given, harvested or otherwise transferred and whether such transaction transferred ownership or mere possession of the cervid(s).”

5) Inventory verification by accredited Category II Accredited Veterinarian only, 6) Regulatory verifications separate and at the discretion of USDA or PDA, 7) Annual Program inspections may include ID/inventory sample but do not serve as hands-on or distance-visual ID verification, and 8) Participant responsibility to maintain certified cervids in a continuous certified environment – supported by all movement documents.

Additional Specific Requirements in the Pennsylvania Program

Mortality testing requirement

Herd certification program (HCP) Herds
1) 100% of all mortalities of CWD susceptible cervids (>12 months) from all causes to include all suspects.
2) HCP cervids sold to herd monitored plan (HMP) herds (including hunting preserves) are subject to HMP testing requirement.
3) HCP cervids that remain under the ownership of the HCP at time of harvest in an HMP preserve are subject to HCP testing requirement.

HMP Herds
50% of all mortalities of susceptible cervids (> 12 months) from all causes to include all suspects.

Recent Event - October 7, 2014 – A DMA 3 captive cervid testing positive for
WILDLIFE DISEASES

CWD was identified through trace activity in another small herd. This herd was placed in quarantine and the investigation is ongoing.

**Iowa CWD Herd Depopulation 2014**
David Schmitt, State Veterinarian, Iowa Department of Agriculture and Land Stewardship (IDALS)

Iowa’s recent chronic wasting disease (CWD) positive deer herd was appraised and indemnified by USDA in 2014. A CWD Herd Plan and Fence Maintenance Agreement were put in place and a joint depopulation was undertaken August 25–27, 2014 with USDA, Veterinary Services (VS); USDA, Wildlife Services (WS); IDALS, Kansas State University (KSU), and USDA Security. A total of 356 white-tailed deer (WTD) were depopulated including 173 does and 183 bucks.

The CWD herd depopulation involved extensive planning and was conducted under an Incident Command System structure. The event period included Sunday, August 24 operations staff meeting; Monday, August 25 – 109 deer depopulated and samples collected; Tuesday, August 26 – 146 deer depopulated and sampled; Wednesday, August 27 – 101 deer depopulated and sampled, followed by clean-up.

During the CWD team meeting the sampling area was reviewed and animals in the herd identified as Iowa CWD Positive Herd with Official identification (ID) tags were applied to all deer in the herd. Tag identification results included:

- **Does** – 173 (48.6%)
  - 139 with ID tags – 80.3%
  - 34 no ID tags – 19.7%
- **Bucks** – 183 (51.4%)
  - 139 with ID tags – 76%
  - 44 no ID tags – 24%
- **WTD in herd tagged**
  - 78% with ID tags
  - 22% with no ID tags

CWD results from the infected herd included high prevalence with 284 positive animals (79.8%) and 72 deer where CWD was not-detected in the samples taken (20.2%). CWD was identified at different rates in the tissues tested:

- **Obex**
  - 6 Location – 1.7%
  - 146 Not-detected – 41%
  - 204 Positive – 57.3%
- **MRP Lymph Nodes**
  - 72 Not-detected – 20.2%
  - 284 Positive – 79.8%

Cleaning and Decontamination Inspection occurred on September 9, 2014 with the Order of Quarantine issued August 12, 2014. The Quarantine
REPORT OF THE COMMITTEE

Release was signed and sent September 12, 2014.
Research related to this CWD event:
Dr. Nicholas Haley, Kansas State University - rectal samples, nasal brushings, and blood
Tracy Nichols, National Wildlife Research Council – blood and feces
Iowa State University, Veterinary Diagnostic Laboratory - blood and rectal samples

Rectal biopsies were split three ways for IHC (Immunohistochemistry), RT-QuIC (Realtime- Quality Induced Conversion) [an amplification assay for detecting low levels of prions, and] to Iowa State University (ISU), Veterinary Diagnostic Laboratory (VDL) for other research. A total of 355 samples were included in the project.
Rectal Biopsy results
IHC
- Had 129 positives out of 283 positives at National Veterinary Services Laboratories (NVSL) = 44.2% Sensitivity - similar to RAMALT in sheep and goats
- 1 false positive = 98.6% Specificity
- Obex positive deer had higher rates of positive on IHC
RT-QuIC
- Tissue homogenized
- Had 201 positives out of 283 positives at NVSL= 67.7% Sensitivity - 50% better than IHC
- 6 false positives = 92.6% Specificity
- Obex positives had higher rate of positive on RT-QuIC

2014 Cervid Health Program Updates
Patrice Klein, Cervid Health Program Team Leader, USDA-APHIS-VS
Dallas Meeks, Randy Pritchard, Owen Henderson, Alecia Naugle, USDA-APHIS-VS

Chronic Wasting Disease Herd Certification Program (CWD HCP)

The national CWD HCP and requirements for interstate movement were established when APHIS published the CWD interim final rule (9 CFR Parts 55 and 81) in June 2012. The rule became effective in August 2012. APHIS accepted public comments on preemption of State regulations, as that aspect of the rule had changed significantly since the rule was proposed. APHIS considered the preemption comments and revised the rule by amending the definition of herd plan to replace ‘eradication’ with ‘control’ of CWD and adding the definition of ‘established slaughter facility’. A final rule was published in April, 2014. Comments received on other topics are held for future rulemaking. A total of 29 Approved States are participating in the national CWD HCP.

The CWD program standards accompany the rule to provide clarification and guidance on how to meet CWD herd certification program and interstate
movement requirements. The standards were first published in July 2012. In response to stakeholder requests, APHIS set up a discussion group in November 2012 to provide input on revisions to these program standards. The group included representatives from the cervid industry, State animal health officials, State wildlife officials, diagnostic laboratories, and Veterinary Services. APHIS published the revised Program Standards in the Federal Register in December 2013 and accepted comments until March 31, 2014. APHIS received 328 comments reflecting the diverse stakeholder positions noted in the discussion group and made four changes as a result of these comments. The revised standards became effective on May 9, 2014. A provision exists for the annual review of the Program Standards by representatives of the cervid industry and appropriate State and Federal agencies, and further revision as necessary.

In August 2014, APHIS met with representatives from the Association of Fish and Wildlife Agencies (AFWA) to discuss their concerns with the CWD rule and program standards. Two specific topics included limitations to interstate movement and the need for retrospective epidemiologic assessments of CWD positive animals from herds monitored for many years to better assess risk of disease transmission.

As of October 2014, CWD has been confirmed in wild deer and elk in 19 U.S. States, and in farmed cervids in 13 States. In total, 22 States have identified CWD in wild and/or farmed cervids. Confirmation of the disease in a free-ranging, wild white tailed deer in northeastern Iowa in April 2014 marked the first report in the wild cervid population in this State.

To date, CWD has been reported in 65 farmed cervid herds in the United States. In the last 2 years, CWD has been identified in a red deer herd in Minnesota (May 2012), and a white tailed deer (WTD) herd each in Iowa (July 2012), Wisconsin (November 2013), and Pennsylvania (April 2014). The herds in Minnesota, Iowa, and Pennsylvania were depopulated in 2014 and provided federal indemnity. All animals from these depopulated herds are tested for CWD. No additional CWD positives were reported in the red deer; a total of 7 of 15 WTD in the Pennsylvania herd were reported CWD positive; and approximately 80% of the deer in the Iowa herd tested CWD positive. The Wisconsin herd and the owner’s hunt facility, as well as the five herds in Colorado and three herds in Nebraska remain under State’s quarantine. All mortalities from these quarantined herds are tested for CWD.

In September 2014, two new CWD positive WTD herds were reported, one in Wisconsin and the other in Pennsylvania (same county as previous herd). APHIS is in discussion with the state officials to consider indemnity for these herds.

Cervid Tuberculosis

In February 2013, APHIS implemented official program testing at the National Veterinary Services Laboratories (NVSL) for cervids with the CervidTB Stat-Pak and Dual Path Platform (DPP) serologic tests in captive and free-ranging North American elk, white-tailed deer, red deer, fallow deer, and reindeer. However, the CervidTB Stat-Pak was discontinued by its
manufacturer in early 2014.APHIS amended and published the cervid TB serology interim final rule in July 2014 making the DPP test both a primary and secondary serology test for bovine TB in cervids. No public comments were received. VS Guidance (6701.2) on the Primary and Secondary Serological Test for Diagnosing Bovine Tuberculosis (TB) in Farmed and Captive Cervids also was amended in March 2014.

A manufacturer’s shortage of the DPP test kits occurred in April 2014 resulting in an interruption of testing at NVSL for three weeks. NVSL banked submitted samples to test when the DPP test kits became available and reported all test results in less than two weeks after the remaining test kits arrived. Another manufacturer’s shortage of DPP test kits is expected by the end of October due to increased submissions for serological testing at NVSL. The manufacturer is unable to resupply test kits for at least six weeks. NVSL will again freeze all samples received and resume testing as soon as kits are available.

In FY2014, to date, 16,300 Cervids have been tested serologically for bovine TB. Eight necropsies have been performed on serologic suspect and reactor cervids. Mycobacterial cultures for *M. bovis* were negative on six of those animals; two cultures are pending.

National Animal Health Monitoring System Cervid Industry Study

Beginning in September 2014, VS, in cooperation with the National Agricultural Statistics Service (NASS), initiated the first national study of the U.S. farmed-cervid industry. The study includes a survey of 3,000 producers from all States that have farmed cervids and will provide baseline industry statistics, a description of current production practices and challenges, producer-reported disease occurrences, and an overview of health management and biosecurity practices. Reports from the study should be available in spring 2015.

Cervid Health Program Budget

The Cervid Health Program includes the CWD herd certification program and the cervid TB program within the Equine, Cervid, and Small Ruminant Health Center. In FY2014, the Cervid Health Program was appropriated $3.0 million by Congress for cervid health activities.

Funding was allocated to provide $1.1 million for indemnity, $200,000 in CWD research towards development of live animal diagnostic test methods, and $1.2 million for general program support. APHIS anticipates the FY2015 Cervid Health Program budget to remain at FY2014 levels and will propose similar funding allocations.

Committee Business

No recommendations or resolutions were brought forward during the 2014 meeting of the Committee on Wildlife Diseases. The meeting was then adjourned.
II. F. Other Reports

Sponsored by the American Association of Extension Veterinarians

Efficacy of a vaccine and a direct-fed microbial against fecal shedding of *Escherichia coli* O157:H7 and corresponding impacts on cattle performance in a commercial feedlot - C.A. Cull, D.G. Renter, N.M. Bello, A.H. Babcock, and T.G. Nagaraja

Using Serology to Investigate Reproductive Failure Due to Neospora in Beef Herds – R. Daly

Evaluation of an Interactive workshop designed to teach practical welfare techniques to beef cattle caretakers and decision makers - R. Dewell, C. Hanthorn, J. Danielson, R. Burzette, J. Coetzee, A. Ramirez, G. Dewell

Impact of Foot and Mouth Disease Indirect Transmission Probability and Vaccination on Outbreak Duration, Herds Depopulated and Economic Costs - S.W. McReynolds, M.W. Sanderson, T. Schroeder, D. Pendell

New Method for Extension Needs Assessment and Use in STEC Extension Programming - D.A. Moore and D.R. Smith

Influenza A virus (IAV) surveillance using pre-weaning oral fluid samples - Y Panyasing, C Goodell, A Kittawornrat, C Wang, I Levis, L Defresne, R Rauh, P Gauger, J Zhang, K Lin, S Nezami, S Azeem, K-J Yoon, J Zimmerman

Occupational Safety Survey of Corporate Cattle Feeding Operations in the Western United States – J. Sarchet,

Live Bird Markets, Disease Surveillance and e-Learning - S.C. Trock and J. A. Zingeser

Dairy Farm Management Practices and Characteristics of Herds Positive for Johne’s Disease and/or Bovine Viral Diarrhea in the Intermountain West - D.J. Wilson, K.A. Rood, G.M. Goodell, T.M. Byrem
II. F. OTHER REPORTS

Efficacy of a Vaccine and a Direct-Fed Microbial Against Fecal Shedding of *Escherichia coli* O157:H7 and Corresponding Impacts on Cattle Performance in a Commercial Feedlot

C.A. Cull\(^1\), D.G. Renter\(^1\), N.M. Bello\(^2\), A.H. Babcock\(^3\), and T.G. Nagaraja\(^1\)

\(^1\)Department of Diagnostic Medicine/Pathobiology, Kansas State University, \(^2\)Department of Statistics, College of Arts and Sciences, Kansas State University; \(^3\)Adam's Land and Cattle Company

Our primary objective was to determine the efficacy of a siderophore receptor and porin proteins-based vaccine (VAC) and a *Lactobacillus acidophilus*-based direct-fed microbial (DFM) against fecal shedding of *Escherichia coli* O157:H7 in commercial feedlot cattle. Our secondary objective was to quantify performance and carcass characteristics associated with these treatments. Cattle (n=17,148) fed a finishing diet during the summer were randomly allocated into 40 pens grouped by processing dates into ten complete blocks; pens within block were randomly allocated to control, VAC, DFM, or VAC+DFM treatment groups. The DFM groups were fed a product with \(10^6\) CFU/animal/day of *Lactobacillus acidophilus* and \(10^9\) CFU/animal/day of *Propionibacterium freudenreichii*. The VAC cattle were vaccinated on days zero and 21 whereas unvaccinated cattle were not given a placebo and were not re-handled on day 21. Pen floor fecal samples (30/pen) were collected weekly for four total weeks with a total of 4,800 samples. Two concurrent culture procedures were used to estimate the *E. coli* O157:H7 prevalence for shedding and for high shedders; the cumulative prevalence for these were 31.7% and 3.5%, respectively. Data were analyzed using linear mixed models that accounted for the study design. For analyses of *E. coli* O157:H7 shedding and high shedding, there were no significant treatment and time of sampling interactions. However, vaccinated pens had significantly lower prevalence estimates for *E. coli* O157:H7 shedding \((P < 0.01)\) and for high shedding \((P < 0.01)\) compared to unvaccinated pens. There was no evidence of a DFM effect on either measure of *E. coli* O157:H7 prevalence. For performance and carcass characteristics, the main effects of DFM and VAC during the intervention period are reported as there were no significant interactions among treatments. Vaccinated cattle had significantly \((P < 0.05)\) lower total weight gain, average daily gain (ADG) and cumulative dry matter intake (DMI) while the DFM increased total weight gain and the ratio of cattle weight gain to weight of feed delivered (G:F). Daily DMI was significantly lower for vaccinated pens as compared to unvaccinated pens for five days following revaccination. After the intervention period, cattle were followed until harvest where days on feed, yield dressing percentage, hot carcass weight and ADG differed among treatment groups. We conclude that the application of these two treatments differentially impacted both fecal shedding of *E. coli* O157:H7 and cattle performance outcomes. Thus, our results demonstrate the need to
consider potential food safety impacts as well as cattle and carcass performance, when evaluating potential costs and benefits of interventions.
II. F. OTHER REPORTS

USING SEROLOGY TO INVESTIGATE REPRODUCTIVE FAILURE DUE TO NEOSPORA IN BEEF HERDS

Russ Daly
South Dakota State University

In late November, 2013, a diagnosis of abortion due to *Neospora caninum* was made in a fetus aborted from a coming second-calf cow in a north central South Dakota beef herd. The cow was one of 81 bred cows purchased at a sale earlier that month. Following the abortion, the purchased group was re-examined for pregnancy and 21/81 cows previously confirmed pregnant were found open.

Nine other South Dakota ranchers were identified to have purchased bred cows from the same sale. All nine herds then had their purchased bred cows re-examined for pregnancy during December 2013 or January 2014. The size of the purchased groups ranged from 12-376 (average = 87). All nine herds found cows that were now open. The open rates in the ten groups of previously-confirmed-pregnant cows ranged from eight to 31 percent (average = 22%). In all, 205 out of 866 cows (24%) were diagnosed “not pregnant” by their herd veterinarians.

The cows were purchased at auction on November 19, 2013, at a north central South Dakota auction market from a single North Dakota ranch. The heifers were bred to calve in May 2014 and were ultrasounded to confirm pregnancy by a veterinarian on October 17, 2013.

Because of the diagnosis of *Neospora caninum* in one of the affected groups, the ten herds tested cows for the presence of *N. caninum* antibody. All herds were sampled from January 14-31, 2014. Eight herds tested all purchased animals, while two herds tested some of the purchased animals. All serology was performed at the SDSU ADRDL, utilizing the ELISA test. A percent inhibition of 30 or above was considered positive for *N. caninum* antibodies. Information regarding cow pregnancy status was provided with the submissions.

The overall seropositive rate for purchased animals was 17.6%. However, there were marked differences in seropositive rates between open and bred animals. Open cows sampled had an overall seropositivity rate of 78% (group range = 50-100%), while cows still pregnant had an overall rate of 7% (group range = 3-18%). In these animals, the odds of an open cow being *N. caninum*-positive were 46.7 times that of pregnant cows being seropositive (95% confidence interval = 26.8-81.6).

Pathologic diagnosis of *N. caninum* was not obtained in eight subsequent abortion submissions to South Dakota State University (SDSU) from these groups, nor was a point source of infection identified for these animals. Evidence pointing to *N. caninum* as a cause of reproductive loss in these animals includes: extremely high levels of association between seropositivity and non-pregnancy, a higher overall seropositivity rate in these groups compared to expected background levels in the Northern Plains, and
the lack of other infectious agents consistently identified in serology or pathology submissions. Evidence supporting a cause of reproductive loss in these animals prior to sale includes the consistent open rates found across the ten groups.
EVALUATION OF AN INTERACTIVE WORKSHOP DESIGNED TO TEACH PRACTICAL WELFARE TECHNIQUES TO BEEF CATTLE CARETAKERS AND DECISION MAKERS

R. Dewell\textsuperscript{1,2}, C. Hanthorn\textsuperscript{1}, J. Danielson\textsuperscript{3}, R. Burzette\textsuperscript{4}, J. Coetzee\textsuperscript{1}, A. Ramirez\textsuperscript{1}, G. Dewell\textsuperscript{1}

\textsuperscript{1}Veterinary Diagnostic and Production Animal Medicine, College of Veterinary Medicine, Iowa State University;
\textsuperscript{2}Center for Food Security and Public Health, College of Veterinary Medicine, Iowa State University;
\textsuperscript{3}Veterinary Pathology, College of Veterinary Medicine, Iowa State University;
\textsuperscript{4}Administration, College of Veterinary Medicine, Iowa State University

An interactive workshop was organized in July 2014 to teach techniques to enhance beef cattle welfare. Participants received instruction on topics related to: 1) local anesthesia techniques for dehorning and castration; 2) the use of non-steroidal anti-inflammatory drugs for pain management; 3) low stress cattle handling techniques; 4) decision making for compromised cattle and 5) lameness evaluation and treatment. Instructional objectives were completed using a combination of didactic classroom-based instruction and hands-on instruction using cadavers, live animals, and demonstrations using a mobile video camera. Participants were asked to complete a pre and post-workshop questionnaire to 1) measure attitude changes towards welfare techniques as a result of participation and 2) compare perceived ability to perform or incorporate certain procedures as a result of workshop participation. Participants used a five point scale to rate the likelihood that they would use or recommend the use of certain techniques/ procedures both prior to and following the workshop. Paired t-tests were used to compare pre and post-questionnaire data with significance set at p<0.05. Following training, respondents were more likely to use or recommend use of local anesthesia for dehorning, and castration. Participants were more inclined to utilize meloxicam for pain management. Respondents also reported being “somewhat better” to “much better” at performing all skills taught in the workshop after completing the workshop than before. These results suggest instructional techniques used to teach practical concepts/ techniques relevant to beef cattle welfare led to improvements in both perceived competency and estimated likelihood that the material will be utilized.
II. F. 1. APPLIED ANIMAL AND PUBLIC HEALTH RESEARCH AND EXTENSION VETERINARIANS SYMPOSIUM

IMPACT OF FOOT AND MOUTH DISEASE INDIRECT TRANSMISSION PROBABILITY AND VACCINATION ON OUTBREAK DURATION, HERDS DEPOPULATED AND ECONOMIC COSTS

S.W. McReynolds¹, M.W. Sanderson¹ T. Schroeder², D. Pendell³
¹Department of Diagnostic Medicine and Pathobiology and ²Agricultural Economics, Kansas State University, USA, ³Department of Agricultural Economics, Colorado State University

Introduction:
The central United States (U.S.) has a large livestock population including cattle, swine, sheep and goats that are susceptible to foot and mouth disease (FMD). Because FMD is a highly infective foreign animal disease, the only method to assess the impact of an introduction and effectiveness of control is through modeling. We developed simulation scenarios to assess the impact of an FMD introduction in the central U.S. and the effect of vaccination strategies and variation in biosecurity on FMD outbreaks using the North American Animal Disease Spread Model (NAADSM), a spatially explicit, stochastic infectious disease model.

Materials and Methods:
Based on data from the U.S. Department of Agriculture National Agricultural Statistic Service (NASS), a simulated population of livestock operations was generated. The population included 151,620 herds defined by latitude and longitude, production type, and herd size. For the simulations, a single 17,000 head feedlot in Northeast Colorado was selected as the initial latently infected herd in an otherwise susceptible population.

Direct and indirect contact rates between herds were based on survey data of livestock producers in Kansas and Colorado or estimated from expert opinion. Scenarios were simulated for different vaccination protocols compared to depopulation only. Ring vaccination of herds was triggered around infected herds. Large feedlots (>3,000 head) had the highest vaccination priority. Simulated vaccination protocols included low and high vaccine capacity based on results from a livestock producer survey and expert opinion, vaccination zones of 10 km vs. 50 km, and vaccination trigger of ten or 100 infected herds. The effect of biosecurity methods was modeled by varying the probability of indirect transmission following an indirect contact between an infected as susceptible herd as 15%, 20% and 25%.

The economic model was a multi-market, multi-commodity quarterly partial equilibrium model of the United States agricultural sector. The model incorporates horizontal and vertical linkages from livestock production to the final consumer, including international trade. Grain markets are also incorporated in the model as a major input into livestock production.

Results:
Increasing probability of transmission following an indirect contact between an infected and susceptible herd increased the number of herds
II. F. OTHER REPORTS

depopulated and the outbreak duration. In scenarios with a probability of transmission following indirect contact between an infected and susceptible herd of 15% no vaccination strategy altered the median number of herds depopulated or outbreak duration compared to the no vaccination baseline, but the 90th percentile for each was decreased particularly when the vaccination zone was set at 50 km. When the probability of transmission following indirect contact was set at 20%, all vaccination scenarios decreased the median and 90th percentile number of herds depopulated compared to baseline but outbreak duration was only decreased when the vaccination zone was 50 km. When the probability of transmission following indirect contact was set at 25%, only the vaccination scenario with high capacity and a 50 km zone was effective at decreasing the number of herds depopulated compared to baseline.

The no vaccination baseline scenario had the largest total median loss of any scenario ($187 billion), and the longest median disease duration. Scenarios with a vaccination zone size of 50 km were most effective at decreasing outbreak duration as well as median producer and consumer loss ($56-75 billion).

Significance:

The probability of transmission following indirect contact between an infected and susceptible herd is a measure of the biosecurity practices applied to traffic and people on and off the farm. Important aspects include truck washing, boot washing and control of visitor contact with animals. The level of biosecurity required to achieve a given probability of transmission is not known. The results of these scenarios were compared to assess the impact of the probability of transmission following an indirect contact, an indicator of biosecurity controls, on the number of herds depopulated and the duration of the FMD outbreak. Outbreak size and number of herds depopulated was sensitive to transmission probability/biosecurity. Increased size of the vaccination zone during an outbreak may lead to decreased length of the outbreak and number of herds destroyed even in an outbreak with high probability of indirect transmission. A better understanding of the biosecurity practices necessary to control transmission probability would allow more focused planning of optimal control efforts. Economic outcomes indicate that large vaccination zones are most effective at controlling producer and consumer loss in the face of an outbreak.
NEW METHOD FOR EXTENSION NEEDS ASSESSMENT AND USE IN STEC EXTENSION PROGRAMMING

D.A. Moore¹ and D.R. Smith²
¹Washington State University and ²Mississippi State University

Background:

Extension program planning includes several basic steps: (1) Assessing the problem, (2) Analyzing the audience, (3) Reaching the audience, (4) Delivering the program, and (5) Evaluation. Assessment of the problem and discovering audience learning needs has traditionally been done in several ways: (1) mail and online surveys; (2) focus groups; (3) key informants; or (4) the community forum approach. Another method, environmental scanning, appears intuitive and it seems as if Extension specialists are doing it every day when talking with clients, reading journals, or perusing the lay literature. An environmental scan is a ‘process of studying and analyzing the current and emerging forces’ that could impact an organization or your clientele (Guion, 2010). It is a way of looking at outside factors. The technique of environmental scanning is not new and has been adapted to public health needs assessment (Rowel et al., 2005). With the expansion of the Internet, information, whether accurate or not, can be spread widely, and misinformation can permeate public knowledge and affect policy-making, particularly when it comes to food safety.

Objectives:

The purpose of this project was to evaluate the national “conversation” on pre-harvest Shiga toxin-producing Escherichia-coli (STEC) control in cattle in an effort to identify educational needs.

Material and Methods:

An environmental scan using “Google Alerts” (http://www.google.com/alerts) was conducted using the search term: E. coli cattle. The system is a search query one that continuously monitors internet traffic on a topic and forwards traffic summaries as a daily email update and included press-releases, news items, blog entries, etc. with the search term from February, 2010, to November, 2010. The items were categorized by theme and evaluated for accuracy based on the current literature and science about pre-harvest control and production practices for cattle.

Results:

There were 144 “Google Alerts” that focused on pre-harvest Shiga toxin-producing Escherichia coli (STEC) and cattle over the scanning period. Four major news stories were revealed by the scan that occurred during this time: (1) A press release about efficacy of cattle vaccination from a vaccine manufacturer, (2) A large European outbreak of a non-O157 STEC, (3) An outbreak of STEC O157 at the North Carolina State Fair, and (4) A press release on studies linking feeding of wet distillers grains to cattle resulting in higher STEC O157 shedding. The internet news stories and blogs that
surfaced primarily focused on these news stories and included stories on the "other" STECs (N=27) and the subsequent labeling of them by the USDA as adulterants requiring additional testing (N=6), on cattle vaccination as a way to reduce STEC O157 shedding (N=18), and animals in public settings as sources of STEC O157 (N=10). Water contamination by cattle and wildlife (N=14) was also discussed. The pre-harvest control themes included cattle diet influences on STEC O157 (N=11), cattle production practices’ influence on shedding (N=16), and antibiotic use influence on shedding (N=7). Misinformation or ‘myths’ were identified with the most significant and common ones being: “grass-fed beef is safer”, “industrial farming results in more STEC O157”, “antibiotic use in cattle leads to STEC O157 shedding”, and “local or organic food is safer with regards to STEC O157”.

**Conclusions:**

Without having to read every email alert, lay publication, or newspaper, a daily, targeted internet environmental scan can provide data on the national conversation on a specific topic. Knowing what people are talking about and what information might be inaccurate or not supported by evidence can help identify learning needs for Extension programming.

**References:**


INFLUENZA A VIRUS (IAV) SURVEILLANCE USING PRE-WEANING ORAL FLUID SAMPLES

Y Panyasing¹, C Goodell¹, A Kittawornrat¹, C Wang¹, I Levis², L Defresne², R Rauh³, P Gauger¹, J Zhang¹, K Lin¹, S Nezami¹, S Azeem¹, K-J Yoon¹, J Zimmerman¹

¹Department of Veterinary Diagnostic and Production Animal Medicine, Iowa State University
²Seaboard Farms, Inc.
³Tetracore®, Inc.

Influenza A Virus (IAV) is a major respiratory pathogen in contemporary production systems. IAV circulates endemically in all age groups, including suckling pigs. That is, IAV transmission and infection occurs in piglets despite the presence of maternally-derived antibodies. The feasibility of conducting IAV surveillance using pre-weaning oral fluid samples from litters of piglets was evaluated in four ~12,500 sow, IAV-vaccinated, breeding herds. Oral fluid samples were collected from 600 litters 24 hours prior to weaning. Serum samples from their dams were included for comparison. Litter oral fluid samples were tested for IAV by virus isolation, quantitative reverse-transcriptase polymerase chain reaction (qRT-PCR), RT-PCR subtyping, and sequencing. Commercial nucleoprotein (NP) enzyme-linked immunosorbent assay (ELISA) kits and NP isotype specific assays (IgM, IgA, and IgG) were used to characterize NP antibody in litter oral fluid and sow serum. All litter oral fluid specimens (n = 600) were negative by virus isolation. Twenty-five oral fluid samples were positive by qRT-PCR, based on screening (Laboratory 1) and confirmatory testing (Laboratory 2). No hemagglutinin (HA) and neuraminidase (NA) gene sequences were obtained, but matrix (M) gene sequences were obtained for all qRT-PCR-positive samples submitted for sequencing (n = 18). Genetic analysis revealed that all M genes sequences were identical (GenBank accession no. KF487544) and belonged to the triple reassortant influenza A virus M gene (TRIG M) previously identified in swine. The proportion of IgM- and IgA-positive samples was significantly higher in sow serum and litter oral fluid samples, respectively (p < 0.01). Consistent with the extensive use of IAV vaccine, no difference was detected in the proportion of IgG- and blocking ELISA-positive sow serum and litter oral fluids. The circulation of IAV in vaccinated sow herds was detected in oral fluid samples collected from litters of pigs prior to weaning. This study supported the use of oral fluid sampling as a means to conduct IAV surveillance in pig populations and demonstrated the inapparent circulation of IAV in piglets. Future work on IAV oral fluid diagnostics should focus on improved procedures for virus isolation, subtyping, and sequencing of HA and NA genes. The role of antibody in IAV surveillance remains to be elucidated, but longitudinal assessment of specific antibody has the potential to provide information regarding patterns of infection, vaccination status, and herd immunity.
II. F. OTHER REPORTS

OCCUPATIONAL SAFETY SURVEY OF CORPORATE CATTLE FEEDING OPERATIONS IN THE WESTERN UNITED STATES

Jeff Sarchet
Decatur, Texas

Information from data obtained from a survey on occupational safety of eleven corporate cattle feeding operations in the western United States measuring the type of safety culture in these feedlots was obtained. Data is categorized by feed mill workers, cattle handling workers, maintenance workers, pen riders, and management or office workers as well as general information and demographics. The survey was voluntary, anonymous, written in English and Spanish and the data was analyzed by each feedlot and as a whole. Differences in perceived safety culture and survey data were measured but must be interpreted with caution because of inherent biases in the design and implementation of the survey however the data adds to the limited information on occupational safety in the beef industry.
In 2013 low pathogenic avian influenza H7N9 emerged in China as a pathogen for humans while causing little to no illness/mortality among infected poultry. Based upon epidemiologic data linking human cases with exposure to poultry in live birds markets, several jurisdictions in China summarily closed live bird markets and witnessed a drop in human cases. Subsequent to these closures, markets have been allowed to re-open and continue to operate.

The live bird markets provide a unique setting, often in urban environments, where the public interfaces directly and indirectly with live birds from a variety of sources. Depending upon the country or local setting, the markets themselves present a variety of hygienic standards. Because birds are often carried over from day to day and new birds are mixed with the carry over birds, these settings are sometimes viewed as points in the marketing chain where avian influenza virus can continue to circulate and provide a unique opportunities for bird to human transmission.

Because these markets provide a culturally, socially and traditionally accepted marketing system for customers, there is continued demand for them and the products they provide. Therefore it is necessary to create recommendations and protocols for avian disease surveillance – using avian influenza as the model – in live bird market systems. In March 2014 the Food and Agricultural Organization of the United Nations (U.N.) (FAO) held an ad hoc external consultation of subject matter experts on developing such systems in various settings. The 14 external subject matter experts represented ten countries and five continents. The challenge to the group was to provide practical guidelines for surveillance in live bird market settings, particularly ones that could be used in resource poor settings.

Discussions included sampling protocols, swab types, sample type, transport media, laboratory quality assurance/quality control and reporting. General consensus agreed that pooling samples of similar type was most cost effective and would enhance surveillance efforts. It was agreed that sampling frequency and number of sample sites was dependent upon resource availability and the goal of surveillance. It was also agreed that surveillance design must take into consideration the market chain associated with live bird markets.

Proposed surveillance programs in live bird markets were qualified based upon status of the country. Three situations were considered and guidance was drafted for each situation. In the first situation, a country was categorized as ‘endemic’ for avian influenza (AI) (ex: Indonesia, Egypt). In the second scenario, a country was conducting surveillance for AI in their live bird markets to detect early incursion of AI (ex: Viet Nam, Hong Kong SAR).
II. F. OTHER REPORTS

The final scenario developed was for countries considered ‘free’ of AI, where surveillance in live bird markets would be necessary to establish such freedom from infection (ex: U.S., Australia).

One of the proposed meeting products is the creation of web-based/compact disc, read-only-memory (CD-ROM) training materials that could also be used in person-to-person outreach and education. This would be in addition to the meeting resultant surveillance document that could be used by countries or locales to conduct surveillance for avian influenza in live bird market systems.
II. F. 1. APPLIED ANIMAL AND PUBLIC HEALTH RESEARCH AND EXTENSION VETERINARIANS SYMPOSIUM

DAIRY FARM MANAGEMENT PRACTICES AND CHARACTERISTICS OF HERDS POSITIVE FOR JOHNE’S DISEASE AND/OR BOVINE VIRAL DIARRHEA IN THE INTERMOUNTAIN WEST

D.J. Wilson¹, K.A. Rood¹, G.M. Goodell², T.M. Byrem³
¹Department of Animal, Dairy and Veterinary Sciences, School of Veterinary Medicine, Utah State University, Logan, UT
²The Dairy Authority, Greeley, CO
³Antel BioSystems, Lansing, MI

The objective of the study was to record herd characteristics and management practices on dairy farms positive for either Johne’s disease (JD) and/or bovine viral diarrhea (BVD) virus in bulk tank milk. Positive status for JD or BVD was defined by finding at least one positive test result (JD by PCR or ELISA, BVD by PCR) from five milk samples collected at 3-4 day intervals from all bulk tanks on 151 participating dairy farms. The farms were located in Utah and southern Idaho. There were 67 herds detected with JD and/or BVD in bulk milk, and 22 farms participated in a follow up visit project. The 22 farms were visited and evaluated using a questionnaire and standardized observations. An owner and usually other key personnel were interviewed and farms were observed.

Twenty herds were JD positive only, one was BVD positive only, one was positive for JD and BVD. For all 22 herds, means and medians respectively were: number milking cows, 778, 420; 305d milk production, 20,052 lbs (9240 kg), 20,311 lbs (9221 kg); SCC in bulk milk, 175,545/ml, 178,000/ml. Holsteins were the main breed on 21 farms (95%), Jerseys the main breed on one farm (5%), but 15/22 farms (68%) had a mixture of Holsteins, Jerseys or other breeds. Fifteen farms (68%) milked in herringbone parlors, six (27%) milked in parallel parlors, and one (5%) milked in a rotary parlor. Number of milking units ranged from 6 to 160, with a mean of 28 units.

Main type of lactating cow housing was: 16 farms (73%) outdoor freestalls with small roofs, four (18%) freestalls in covered barns, two (9%) dry lot. Main type of dry cow housing was: 12 farms (55%) dry lot, seven (32%) freestalls, with some loose housing or pasture. Visibly soiled percentage of stalls: mean 37%, median 32%, range 5% to 90%. Freestall bedding used was: 16 (80%) straw, three (15%) sand, one (5%) sawdust.

Thirteen farms (59%) including the farm positive only for BVD, had been closed for >1 year to purchased animals, for a median of five years. Within the previous year, nine farms (41%) had purchased: six farms (27%) springing heifers, four farms (18%) bulls, three farms (14%) cows, two farms (9%) calves. Whenever they had most recently purchased herd additions, 14 farms (64%) used no biosecurity practices. Eight farms (36%) had used the following biosecurity practices: six farms (27%) administered Infectious bovine rhinotracheitis (IBR) BVD parainfluenza-3-Bovine Respiratory
Syncytial Virus (PI3-BRSV) and leptospirosis vaccine to replacements on arrival, three farms (14%) segregated replacements, two farms (9%) provided plastic boots for visitors, two farms (9%) tested replacements using BVD enzyme-linked immunosorbent assay (ELISA), one farm (5%) cleaned their livestock trailers after unloading replacements, one farm (5%) tested replacements using tuberculosis caudal fold tests, and one farm (5%) tested replacements using mycoplasma culture. Eleven farms (50%) (five closed, six open) had previously tested for JD, primarily testing cows with clinical signs of the disease; 9/11 had had a previous animal test JD positive, but none had tested the whole herd for JD. Eleven farms (50%) (eight closed, three open) had performed no previous testing for JD. No farms had tested regularly for BVD; some had tested periodically for persistently infected BVD animals. The two farms with BVD had never tested previously for either BVD or JD.

Twelve out of twenty one (57%) of JD positive farms stated that they would allow known JD positive cows to calve again, three (14%) were not sure; in addition, none of the 15 farms allowing JD positive cows to calve again would require a separate calving area for those cows. Both farms detected with BVD would allow BVD positive cows to calve again. All farms administered BVD vaccine at least once per year. Fourteen farms (64%) fed pooled colostrum; 12 of those also fed unpasteurized discard milk to calves. Six farms (29%) fed only individual-cow colostrum and pasteurized milk to calves. Nineteen farms (86%) did not wash machinery if it contacted manure and then handled feed. Seventeen (81%) JD positive farms had observed cows losing weight but continuing to eat; 11 (52%) had seen cows with diarrhea that died. Both BVD positive farms had observed abortions. One farm with BVD had sheep of all ages mixed with dairy animals. The results demonstrate that most recommended control measures for JD or BVD were not widely adopted on farms positive for one or both diseases.
II. F. 2. 2014 USDA- ARS Research Reviews


Antimicrobial Resistance Profiles in Pathogens Isolated from Chickens - R.J. Meinersmann

Bacteria Resistant to Antimicrobials Critically Important to Human Medicine in Beef Cattle Production and Processing Environments - J. W. Schmidt

Overview of U.S. Government Plans for Antimicrobial Resistance - E.L. Thacker

Surveying Antimicrobial Resistance in Dairy Animals on Farm and at Slaughter in Pennsylvania - J. S. Van Kessel, D. R. Wolfgang, E. Hoving, and J. S. Karns
In order to reduce both the need for antibiotic use and the prevalence of antibiotic resistant bacteria in animals, research in the Food Safety Enteric Pathogens (FSEP) Unit focuses on the discovery and development of alternatives to antibiotics for improving animal health and preserving food safety. The intestinal tracts of humans and animals are populated by roughly 100 trillion total bacteria \((10^{11-12} \text{ cfu/gm contents})\). The intestinal tract is also a diverse ecosystem with 500->1000 microbial species many of which are uncharacterized and some not yet cultured. Mutualistic intestinal bacteria contribute to the host animal nutrition and digestion, immunity, organ physiology, disease resistance, and, based on growing evidence, even behavior. By and large and for the most part we do not understand the key microbial species, the combinations of species, or the colonization sequences of species -- that in the end contribute to host health. Fourteen different antibiotics are approved for use in swine production in the United States. Several of these, e.g., tetracycline antibiotics, macrolide antibiotics, and the quinoxaline antibiotic carbadox, have been fed in large quantities, especially to early life swine. What impacts do antibiotics, especially performance enhancing antibiotics, have on intestinal microbial communities? We believe the answer to this question will allow us to make informed decisions for selecting and developing alternatives to antibiotics used in animal production. In separate studies, we fed post weaning pigs (21-day old) diets containing performance enhancing levels of ASP250 (PNAS 109:1691; mBio 2:e00260-11; Gut Microbes 32:463) or carbadox (Front. Microbiol. 2014 doi: 10.3389/fmicb.2014.00276). Metagenomics, phylotype, Q-PCR, digital polymerase chain reaction (PCR), and culture-based analyses were used to evaluate changes in microbial composition of fecal samples of animals fed diets with or without (control) antibiotics. Significant increases (100-fold) in non-pathogenic *E. coli* shedding were observed two weeks after feeding ASP250 but not carbadox. Fecal antibiotic resistance genes increased in the ASP250 fed swine and included AR genes both for the fed antibiotics and AR genes for antibiotics (aminoglycosides) not fed, likely due to the co-association of the genes. Fecal populations of bacteriophage, some carrying AR genes, increased in animals fed ASP250. For both ASP250 and carbadox-fed animals, there were increases in relative abundance of fecal populations of bacterial taxa that contribute to energy metabolism of the animal. These include *Prevotella*, *Ruminococcus*, and *Succinivibrio* species, many known for their ability to catabolize plant polysaccharides. These bacterial taxa will be targeted as biomarkers in assessing the impacts of antibiotic alternatives on swine intestinal microbiotas and on animal health/food safety.
Antimicrobial resistance profiles are frequently studied from the perspective of epidemiology and not so often from the perspective of population genetics. The population geneticist assumes that gene flow, vertically (generation to generation), horizontally (individual to individual) or migratory (habitat to new habitat) is driven by Darwinian selection. Thus we analyze changes in trait prevalence to see how they correlate with possible selective factors. Antimicrobial usage is certainly a strong selective pressure, but the selective cost of maintaining resistance genes without the presence of the antimicrobials is less clear. With this in mind, we analyzed data from the National Antimicrobial Resistance Monitoring System (NARMS) for isolates collected from chickens at slaughter from 1997 to 2013. In this period we have collected 3,283 isolates of *Campylobacter coli*, 6,597 isolates of *C. jejuni*, 16,943 isolates of *Escherichia coli* and 16,608 isolates of *Salmonella enterica*. Since all these isolates came from commercially raised chickens throughout the U.S., the antimicrobial pressures should have been the same for all the bacterial species. Of the several antimicrobial resistance traits that were monitored it was noted that tetracycline resistance has gradually decreased in *Campylobacter* and *E. coli* and streptomycin resistance has decreased in *E. coli* (not monitored in *Campylobacter*), but in *Salmonella* the prevalence of tetracycline and streptomycin resistance dramatically increased in that period. A closer look at *Salmonella* shows that in the observation period the prevalence of serovar Kentucky increased from 25.2% up to 45.7%. The prevalence of serovar Heidelberg decreased from 23.8% down to 5.6% and serovar Enteritidis rose from less than 1% to a peak of 27.3% in 2011 and since has fallen to 15.2%. Such changes were not seen for other serovars. Fascinatingly, when considering the percent of all chicken *Salmonella* isolates in that time period, streptomycin or tetracycline resistant serovar Enteritidis remained less than 1%, resistant serovar Heidelberg fell from less than 10% to less than 1% for those antimicrobials, but resistant serovar Kentucky rose from 4.2% up to 32.1% for tetracycline and from 2.8% up to 36.9% for streptomycin. Analysis of *Salmonella enterica* serovar Kentucky by cluster analysis of pulsed-field gel electrophoresis (PFGE) suggests development of two lineages with new antimicrobial resistance; one lineage gaining just streptomycin resistance and another lineage that is simultaneously gaining tetracycline and streptomycin resistance. Thus, the prevalence of *Salmonella enterica* serovar Kentucky has been dramatically increasing in chickens at slaughter carrying increased resistance to streptomycin and tetracycline but the expansion is probably for reasons other than antimicrobial resistance.
Concerns have been raised that therapeutic use of ceftiofur in cattle at feedlots may increase the prevalence of third generation cephalosporin-resistant (3GC\textsuperscript{r}) \textit{Escherichia coli}. However, fecal and hide 3GC\textsuperscript{r} \textit{E. coli} prevalences throughout a longitudinal study of cattle at a feedlot, including during the period of greatest ceftiofur use at the feedlot, were either not significantly different or significantly less than the respective prevalences at arrival. In the United States the \textit{bla}\textsubscript{CMY} gene is frequently identified in 3GC\textsuperscript{r} \textit{E. coli} and 3GC\textsuperscript{r} \textit{Salmonella} from both human and cattle sources. Molecular characterization of 3GC\textsuperscript{r} \textit{E. coli} isolates indicated that clonal expansion of feedlot-adapted \textit{bla}\textsubscript{CMY} \textit{E. coli} strains contributed more to the persistence of \textit{bla}\textsubscript{CMY} than horizontal transfer of \textit{bla}\textsubscript{CMY} between \textit{E. coli} strains at this feedlot. These results demonstrate that therapeutic use of ceftiofur at this cattle feedlot did not significantly increase the herd prevalence of 3GC\textsuperscript{r} \textit{E. coli}.

Specific concerns have also been raised that 3GC\textsuperscript{r} \textit{E. coli}, trimethoprim-sulfamethoxazole-resistant (COT\textsuperscript{r}) \textit{E. coli}, 3GC\textsuperscript{r} \textit{Salmonella}, and nalidixic acid-resistant (NAL\textsuperscript{r}) \textit{S. enterica} that may be present in cattle production environments, persist through beef processing, and contaminate final products. The prevalences and concentrations of these organisms were determined in feces and hides (at feedlot and processing plant), pre-evisceration carcasses, and final carcasses from three lots of fed cattle. Prevalences and concentrations were further determined for strip loins from two of these lots. 3GC\textsuperscript{r} \textit{Salmonella} were detected on 7.6\% of hides during processing and were not detected on final carcasses or strip loins. NAL\textsuperscript{r} \textit{S. enterica} was detected on only one hide. 3GC\textsuperscript{r} \textit{E. coli} and COT\textsuperscript{r} \textit{E. coli} were detected on 100.0\% of hides during processing. 3GC\textsuperscript{r} \textit{E. coli} and COT\textsuperscript{r} \textit{E. coli} were each detected on only 0.5\% of final carcasses and were not detected on strip loins. The very low prevalences of these organisms on final carcasses, and their absence on strip loins demonstrate that current sanitary dressing procedures and processing interventions are effective against antimicrobial-resistant bacteria.
Antimicrobial resistance (AMR) bacteria are becoming an increasing serious concern both nationally and internationally. In order to address the issue, it requires an integrated, One Health Approach taking into account that human and animal health, as well as the environment all plays important roles. Shortly after penicillin was discovered as an antibiotic, resistance began to occur at measurable levels. While AMR also occurs naturally in bacteria, the levels of resistance to medically important antibiotics have significantly increased in the last few years. In addition, there has been an increased emphasis in the public domain with increased media attention. As a result, while the importance of AMR has been increased, a great deal of misinformation that is not scientifically grounded has also surfaced. The U.S. government has a long history of acting on AMR including a number of Task Forces and surveillance programs such as the National Antimicrobial Resistance Monitoring System (NARMS) and the National Animal Health Monitoring System (NAHMS). NARMS is one of the most complete surveillance systems used and is a partnership between the Centers for Disease Control (CDC), Food and Drug Administration (FDA), United States Department of Agriculture (USDA) and state and local public health departments. NARMS monitors humans (CDC), animals (USDA) and retail meats (FDA) for a number of enteric foodborne pathogens including; Salmonella, Campylobacter, E. coli, and others. NARMS looks for emerging trends of resistance and linkages of bacteria to specific foodborne outbreaks. While the CDC has a number of surveillance systems for humans, NAHMS conducts on-farm interviews to better identify production practices and their relationship with diseases, including AMR. The NAHMS monitors one major agricultural species a year and as a result there is a 5 to 7 year interval between species, making close evaluation of AMR trends in production animals challenging. A recent study piloted by ARS and funded by FDA collected AMR bacteria data from animals on farm and compared it to the bacterial profiles at slaughter. While not yet complete, it has provided important information on the different populations of AMR foodborne pathogens in cattle, swine and poultry on farm and at slaughter. A recent program lead by the White House, Combating Antibiotic Resistant Bacteria (CARB) has developed a multi-departmental program aimed at developing a strategy to slow the emergence of AMR bacteria, strengthen surveillance and stewardship and encourage the development of improved diagnostic assays and new antibiotics. Concurrently, a strategy was also put forth by the President’s Council of Advisors on Science and Technology on combating AMR. The challenges of maintaining and increasing these programs are dependent on funding and coordinating the various Action Plans and Federal
II. F. OTHER REPORTS

Agencies. However, there is recognition by all levels of the Federal Government about the serious problems associated with uncontrolled AMR bacteria and efforts are being made to work quickly before we lose the ability to successfully treat bacterial infections.
Antimicrobial resistance in bacteria associated with food production animals and their environment has received a lot of attention because of the potential risk to human health. Antibiotics used in various stages of animal production to treat and prevent disease may influence the population of resistant bacteria and impact humans by exposure via milk, meat, or through environmental exposure. Studies were conducted to evaluate the prevalence of resistant Salmonella and E. coli in dairy animals on farms and at slaughter. All sampling was conducted in Pennsylvania (PA). In an initial survey of 440 fecal and composite manure samples from dairy animals at a slaughter facility, Salmonella was isolated from 49% of the samples and all were determined to be pan-susceptible to the NARMS panel of antibiotics. Of the 438 E. coli isolates that were tested, 21.5% were resistant to at least one antibiotic and 4% of the isolates were resistant to four or more antibiotics. The most common resistance was to tetracycline (86), streptomycin (44), sulfisoxazole (41), and ampicillin (18). One isolate was resistant to nine antimicrobials and another isolate was resistant to ten antimicrobials. The second study compared antimicrobial resistance in bacteria from culled cows or their cohorts at the farm with that in those obtained from the cows when they arrived at the slaughterhouse. Tracking cull dairy cattle from farm to slaughter is challenging as they may pass through a buying station and/or an auction house before arrival at any of a number of slaughterhouses. These cows may be exposed to animals from many other herds en route to slaughter. Fecal samples were collected from soon-to-be culled cows or their cohorts on two dairy farms over a seven month period and culled animals from these farms were sampled at slaughter. Salmonella was isolated from fecal samples at one farm but not the other; however, Salmonella was isolated from animals from both farms when they reached the slaughterhouse. Again, very limited resistance was observed in these isolates. Approximately 12% of all samples yielded E. coli with resistance to three or more antimicrobials. When E. coli from fecal samples collected at the farm were compared with E. coli collected from cohort animals at the slaughterhouse more isolates were resistant at slaughter (resistance to three or more antimicrobials: 4.6% vs. 9.1% and 4.3% vs. 16.7%). For example, 4% of E. coli isolates from one farm were resistant to Sulfsisoxazole while 19% of isolates from cohort animals at slaughter were resistant. Similar trends were observed with isolates from both farms and with most of the tested antimicrobials. These data support previous observations of the
transfer and mixing of bacteria as the cows are moved from the farm to slaughter. In a third study four animal groups on PA dairy herds (pre-weaned calves, post-weaned calves, dry cows, and lactating cows) were sampled. *Salmonella* was isolated from 50 of 71 herds and all were pan-susceptible except for a few tetracycline resistant isolates from one herd. Resistance in non-type-specific *E. coli* was more prevalent in pre- and post-weaned calves than in adult cows (dry and lactating) for all antimicrobials tested. Tetracycline, streptomycin, kanamycin, and ampicillin resistance were the most prevalent in all age groups. Much more work is needed to further understand the dynamics of antimicrobial resistance in enteric bacteria associated with dairy animals and the potential for impact on human health.
III. Organizational Matters

A. Bylaws of USAHA
B. USAHA Administrative Policies
C. Previous Meetings
D. USAHA Medal of Distinction Award
III. A. USAHA BYLAWS

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 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.
III. ORGANIZATIONAL MATTERS

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
III. A. USAHA BYLAWS

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 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 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
III. ORGANIZATIONAL MATTERS

the second business session at a time certain specified in the program for “Report of Action of the Committee on Nominations and Resolutions.” If a paper is being presented at the specified time, the presentation will be completed and, immediately after, the report shall be read. If the program is ahead of schedule, a recess will be taken until the time specified in the program for the amendments to the slate presented by the Committee.

6) The report or amendments approved by a majority vote of the membership is forwarded to the Board of Directors. The acceptance of the report by a majority vote of the Board of Directors shall constitute election of the nominees to office.

h. Term. The officers shall serve for one year or until their successors are elected and qualify.

5.2. Executive Director. The Executive Director shall be employed by and serve at the pleasure of the Executive Committee, manage the Association’s day-to-day affairs and perform such other duties as customarily belong to that office or as the Board of Directors or Executive Committee may assign. The Executive Committee shall prepare and negotiate a contract with the Executive Director for a period of not more than five (5) years which shall be subject to approval by a majority of the Board of Directors. If the Association does not have an Executive Director, the Board of Directors shall elect a Secretary.

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 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.

ARTICLE X – MISCELLANEOUS
III. ORGANIZATIONAL MATTERS

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.
10.6. **Annual Audit.** The Association shall cause an independent certified public accountant, selected by the Executive Committee, to make an annual examination of its financial accounts and shall submit the report of examination to Audit Committee.

10.7. **Compensation/Reimbursement.** No member of the Board of Directors, committee member or elected officer of the Association shall receive any compensation for his or her services as such. The Association shall develop policies providing for reimbursement of expenses reasonably incurred in attending meetings and performing special assignments of the Association by the elected officers.

10.8. **Dissolution.** In the event of dissolution, the Association shall distribute its assets as required by the laws and statutes of the State of Delaware; and distribute its remaining net assets in a manner permitted an entity to maintain its status as exempt from taxation under Section 501 (c) (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. ORGANIZATIONAL MATTERS

- 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.

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.
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.
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
2008
USAHA prohibits third-party video and audio recording of committee meetings at the Annual Meeting.

THIRD PARTY MEETINGS
2008
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.

AAVLDD PARTNERSHIP
2008
USAHA will maintain a Memorandum of Understanding (MOU) 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
2010
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.

DIRECTOR, OFFICER AND STAFF RELATED POLICIES
III. ORGANIZATIONAL MATTERS

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.
III. B. USAHA ADMINISTRATIVE POLICIES

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
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
III. ORGANIZATIONAL MATTERS

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, Fort Worth, TX</td>
</tr>
<tr>
<td>2</td>
<td>Oct. 11-12, 1899 ††</td>
<td>Omaha, NE</td>
<td>*Mr. C.P. Johnston, Springfield, IL</td>
<td>*Mr. Taylor Riddle, KS</td>
</tr>
<tr>
<td>3</td>
<td>Oct. 2-3, 1900</td>
<td>Louisville, KY</td>
<td>*Mr. C.P. Johnston, Springfield, IL</td>
<td>*Mr. E. T. Eisenman, Louisville, KY</td>
</tr>
<tr>
<td>4</td>
<td>Oct. 8-9, 1901</td>
<td>Buffalo, NY</td>
<td>*Mr. W.H. Dunn, TN</td>
<td>*Mr. Wm. P. Smith, Monticello, IL</td>
</tr>
<tr>
<td>5</td>
<td>Aug. 23-24, 1903</td>
<td>Denver, CO</td>
<td>*Mr. E. Bolton, Woodward, OK</td>
<td>*Mr. Wm. P. Smith, Monticello, IL</td>
</tr>
<tr>
<td>6</td>
<td>Aug. 15-16, 1905</td>
<td>Richmond, VA</td>
<td>*Dr. W. H. Dalrymple, Baton Rouge, LA</td>
<td>*Dr. S. H. Ward, St. Paul, MN</td>
</tr>
<tr>
<td>7</td>
<td>Aug. 15-16, 1906</td>
<td>Springfield, IL</td>
<td>*Mr. M. M. Hanks, Oshkosh, WI</td>
<td>*Dr. C. E. Cotton, St. Paul, MN</td>
</tr>
<tr>
<td>8</td>
<td>Sept. 13-15, 1909 ‡</td>
<td>Richmond, VA</td>
<td>*Dr. W. H. Dalrymple, Baton Rouge, LA</td>
<td>*Dr. S. H. Ward, St. Paul, MN</td>
</tr>
<tr>
<td>9</td>
<td>Sept. 16, 1907</td>
<td>Washington, DC</td>
<td>*Dr. H. W. Lamb, CO</td>
<td>*Dr. S. H. Ward, St. Paul, MN</td>
</tr>
<tr>
<td>10</td>
<td>Sept. 14-16, 1908</td>
<td>Chicago, IL</td>
<td>*Dr. W. H. Dalrymple, Baton Rouge, LA</td>
<td>*Dr. S. H. Ward, St. Paul, MN</td>
</tr>
<tr>
<td>11</td>
<td>Dec. 5-7, 1910</td>
<td>Chicago, IL</td>
<td>*Dr. C. E. Cotton, St. Paul, MN</td>
<td>*Dr. J. J. Ferguson, Chicago, IL</td>
</tr>
<tr>
<td>12</td>
<td>Dec. 2-4, 1913</td>
<td>Chicago, IL</td>
<td>*Dr. F. W. Babcock, Atlanta, GA</td>
<td>*Dr. J. J. Ferguson, Chicago, IL</td>
</tr>
<tr>
<td>13</td>
<td>Dec. 3-5, 1915</td>
<td>Chicago, IL</td>
<td>*Dr. J. J. Ferguson, Chicago, IL</td>
<td>*Dr. J. J. Ferguson, Chicago, IL</td>
</tr>
<tr>
<td>14</td>
<td>Dec. 2-4, 1913</td>
<td>Chicago, IL</td>
<td>*Dr. F. W. Babcock, Atlanta, GA</td>
<td>*Dr. J. J. Ferguson, Chicago, IL</td>
</tr>
<tr>
<td>15</td>
<td>Dec. 5-7, 1916</td>
<td>Chicago, IL</td>
<td>*Dr. J. L. Gibson, Springfield, IL</td>
<td>*Dr. J. J. Ferguson, Chicago, IL</td>
</tr>
<tr>
<td>16</td>
<td>Feb. 16-18, 1914</td>
<td>Chicago, IL</td>
<td>*Dr. J. L. Gibson, Springfield, IL</td>
<td>*Dr. J. J. Ferguson, Chicago, IL</td>
</tr>
<tr>
<td>17</td>
<td>Feb. 2-3, 1915</td>
<td>Chicago, IL</td>
<td>*Dr. E. G. Wills, Albany, NY</td>
<td>*Dr. S. H. Ward, St. Paul, MN</td>
</tr>
<tr>
<td>18</td>
<td>Dec. 3-5, 1917</td>
<td>Chicago, IL</td>
<td>*Dr. S. H. Ward, St. Paul, MN</td>
<td>*Dr. S. H. Ward, St. Paul, MN</td>
</tr>
<tr>
<td>19</td>
<td>Dec. 2-4, 1918</td>
<td>Chicago, IL</td>
<td>*Dr. M. Jacob, Knoxville, TX</td>
<td>*Dr. D. M. Campbell, Chicago, IL</td>
</tr>
<tr>
<td>20</td>
<td>Dec. 3-5, 1919</td>
<td>Chicago, IL</td>
<td>*Dr. G. W. Dunphy, Lansing, MI</td>
<td>*Dr. D. M. Campbell, Chicago, IL</td>
</tr>
</tbody>
</table>
### III. C. PREVIOUS MEETINGS

<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>24</td>
<td>Nov. 29-Dec. 1, 1920</td>
<td>Chicago, IL</td>
<td>*Dr. S. F. Musselman, Frankfort, KY</td>
<td>*Dr. D. M. Campbell, Chicago, IL</td>
</tr>
<tr>
<td>25</td>
<td>Dec. 28-30, 1921</td>
<td>Chicago, IL</td>
<td>*Dr. W. F. Crewe, Bismarck, ND</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. E. E. Munce, Harrsiburg, 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, Helena, 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. McNel, Trenton, NJ</td>
<td>*Dr. O. E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>30</td>
<td>Dec. 1-3, 1926</td>
<td>Chicago, IL</td>
<td>*Dr. John R. Mohler, Washington, DC</td>
<td>*Dr. O. E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>31</td>
<td>Dec. 4-6, 1927</td>
<td>Chicago, IL</td>
<td>*Dr. C. A. Curry, Auburn, AL</td>
<td>*Dr. O. E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>32</td>
<td>Dec. 5-7, 1928</td>
<td>Chicago, IL</td>
<td>*Dr. W. J. Comnaway, Columbus, MD</td>
<td>*Dr. O. E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>33</td>
<td>Dec. 2-4, 1929</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>34</td>
<td>Dec. 3-5, 1930</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>35</td>
<td>Dec. 2-4, 1931</td>
<td>Chicago, IL</td>
<td>*Dr. E. T. Faulder, Altanta, GA</td>
<td>*Dr. O. E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>36</td>
<td>Dec. 5-7, 1932</td>
<td>Chicago, IL</td>
<td>*Dr. T. E. Robinson, Providence, RI</td>
<td>*Dr. O. E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>37</td>
<td>Dec. 4-6, 1933</td>
<td>Chicago, IL</td>
<td>*Dr. Peter Malcom, Des Moines, IA</td>
<td>*Dr. O. E. Dyson, Kansas City, MO</td>
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<tr>
<td>38</td>
<td>Dec. 2-4, 1934</td>
<td>Chicago, IL</td>
<td>*Dr. E. A. Crossman, Dorchester, MA</td>
<td>*Dr. Mark Welsh, College Park, MD</td>
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<tr>
<td>39</td>
<td>Nov. 30-Dec. 2, 1935</td>
<td>Chicago, IL</td>
<td>*Dr. I. S. McAdory, Frankfort, KY</td>
<td>*Dr. Mark Welsh, College Park, MD</td>
</tr>
<tr>
<td>40</td>
<td>Dec. 1-3, 1937</td>
<td>Chicago, IL</td>
<td>*Dr. R. W. Smith, Concord, NH</td>
<td>*Dr. Mark Welsh, College Park, MD</td>
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<tr>
<td>41</td>
<td>Dec. 4-6, 1938</td>
<td>Chicago, IL</td>
<td>*Dr. J. L. Arby, Indianapolis, IN</td>
<td>*Dr. Mark Welsh, College Park, MD</td>
</tr>
<tr>
<td>42</td>
<td>Dec. 5-7, 1939</td>
<td>Chicago, IL</td>
<td>*Dr. H. D. Port, Cheyenne, WY</td>
<td>*Dr. Mark Welsh, College Park, MD</td>
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<td>43</td>
<td>Dec. 6-8, 1940</td>
<td>Chicago, IL</td>
<td>*Dr. E. A. Crossman, Boston, MA</td>
<td>*Dr. W. H. Hendricks, Salt Lake City, UT</td>
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<tr>
<td>44</td>
<td>Dec. 2-4, 1942</td>
<td>Chicago, IL</td>
<td>*Dr. J. S. Hendershot, Trenton, NJ</td>
<td>*Dr. W. H. Hendricks, Salt Lake City, UT</td>
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<tr>
<td>45</td>
<td>Dec. 3-5, 1943</td>
<td>Chicago, IL</td>
<td>*Dr. W. H. Hendricks, Salt Lake City, UT</td>
<td>*Dr. W. H. Hendricks, Salt Lake City, UT</td>
</tr>
</tbody>
</table>

* indicates President

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### III. C. PREVIOUS MEETINGS

<table>
<thead>
<tr>
<th>Meeting</th>
<th>Date</th>
<th>Place of Meeting</th>
<th>President</th>
<th>Secretary/Executive</th>
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<tr>
<td>48</td>
<td>Dec. 6-8, 1944</td>
<td>Chicago, IL</td>
<td><em>Dr. J. M. Sutton, Atlanta, GA</em></td>
<td><em>Dr. R. A. Hendershott, Trenton, NJ</em></td>
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<td>49</td>
<td>Dec. 5-7, 1945</td>
<td>Chicago, IL</td>
<td><em>Dr. C. U. Duckwork, Sacramento, CA</em></td>
<td><em>Dr. R. A. Hendershott, Trenton, NJ</em></td>
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<td>50</td>
<td>Dec. 4-6, 1946</td>
<td>Chicago, IL</td>
<td><em>C. U. Moore, Raleigh, NC</em></td>
<td><em>Dr. R. A. Hendershott, Trenton, NJ</em></td>
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<td>51</td>
<td>Dec. 3-5, 1947</td>
<td>Chicago, IL</td>
<td><em>Will J. Miller, Topeka, KS</em></td>
<td><em>Dr. R. A. Hendershott, Trenton, NJ</em></td>
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<tr>
<td>52</td>
<td>Oct. 12-14, 1949</td>
<td>Columbus, OH</td>
<td><em>Jean V. Knapp, Tallahassee, FL</em></td>
<td><em>Dr. R. A. Hendershott, Trenton, NJ</em></td>
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<td>53</td>
<td>Oct. 10-12, 1949</td>
<td>Denver, CO</td>
<td><em>Dr. T. O. Brandenburg, Bismarck, ND</em></td>
<td><em>Dr. R. A. Hendershott, Trenton, NJ</em></td>
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<td>54</td>
<td>Nov. 1-3, 1950</td>
<td>Phoenix, AZ</td>
<td><em>C. P. Bishop, Harrisburg, PA</em></td>
<td><em>Dr. R. A. Hendershott, Trenton, NJ</em></td>
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<tr>
<td>55</td>
<td>Nov. 14-16, 1951</td>
<td>Kansas City, KS</td>
<td><em>Ralph L. West, St. Paul, MN</em></td>
<td><em>Dr. R. A. Hendershott, Trenton, NJ</em></td>
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<td>56</td>
<td>Oct. 29-31, 1952</td>
<td>Louisville, KY</td>
<td><em>T. C. Childs, Ottawa, Canada</em></td>
<td><em>Dr. R. A. Hendershott, Trenton, NJ</em></td>
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<td>57</td>
<td>Sept. 23-25, 1953</td>
<td>Atlantic City, NJ</td>
<td><em>T. C. Green, Charleston, WV</em></td>
<td><em>Dr. R. A. Hendershott, Trenton, NJ</em></td>
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<td>58</td>
<td>Nov. 10-12, 1954</td>
<td>Omaha, NE</td>
<td><em>A. L. Bracken, Baltimore, MD</em></td>
<td><em>Dr. R. A. Hendershott, Trenton, NJ</em></td>
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<td>59</td>
<td>Nov. 16-18, 1955</td>
<td>New Orleans, LA</td>
<td><em>H. E. Wilkins, Helena, MT</em></td>
<td><em>Dr. R. A. Hendershott, Trenton, NJ</em></td>
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<td>60</td>
<td>Nov. 28-30, 1956</td>
<td>Chicago, IL</td>
<td><em>C. G. Good, Cheyenne, WY</em></td>
<td><em>Dr. R. A. Hendershott, Trenton, NJ</em></td>
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<td>61</td>
<td>Nov. 13-15, 1957</td>
<td>San Francisco, CA</td>
<td><em>John G. Milligan, Montgomery, AL</em></td>
<td><em>Dr. R. A. Hendershott, Trenton, NJ</em></td>
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<td>62</td>
<td>Nov. 15-18, 1959</td>
<td>Miami Beach, FL</td>
<td><em>F. F. Bazell, Augusta, ME</em></td>
<td><em>Dr. R. A. Hendershott, Trenton, NJ</em></td>
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<tr>
<td>63</td>
<td>Oct. 17-21, 1960</td>
<td>Charleston, WV</td>
<td><em>W. F. A. Hendershott, Trenton, NJ</em></td>
<td><em>Dr. R. A. Hendershott, Trenton, NJ</em></td>
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<td>64</td>
<td>Oct. 30-Nov. 3, 1961</td>
<td>Minneapolis, MN</td>
<td><em>J. R. Hay, Chicago, IL</em></td>
<td><em>Dr. R. A. Hendershott, Trenton, NJ</em></td>
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<td>65</td>
<td>Oct. 15-18, 1963</td>
<td>Washington, DC</td>
<td><em>W. L. A. Hendershott, Richmond, VA</em></td>
<td><em>Dr. R. A. Hendershott, Trenton, NJ</em></td>
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<tr>
<td>66</td>
<td>Oct. 19-23, 1964</td>
<td>Albuquerque, NM</td>
<td><em>W. F. A. Hendershott, Trenton, NJ</em></td>
<td><em>Dr. R. A. Hendershott, Trenton, NJ</em></td>
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<tr>
<td>67</td>
<td>Oct. 25-29, 1965</td>
<td>Memphis, TN</td>
<td><em>W. F. A. Hendershott, Trenton, NJ</em></td>
<td><em>Dr. R. A. Hendershott, Trenton, NJ</em></td>
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<tr>
<td>68</td>
<td>Oct. 10-14, 1966</td>
<td>Lansing, MI</td>
<td><em>W. F. A. Hendershott, Trenton, NJ</em></td>
<td><em>Dr. R. A. Hendershott, Trenton, NJ</em></td>
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<tr>
<td>69</td>
<td>Oct. 16-20, 1967</td>
<td>Buffalo, NY</td>
<td><em>W. F. A. Hendershott, Trenton, NJ</em></td>
<td><em>Dr. R. A. Hendershott, Trenton, NJ</em></td>
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<tr>
<td>70</td>
<td>Oct. 31, 1968</td>
<td>Phoenix, AZ</td>
<td><em>W. F. A. Hendershott, Trenton, NJ</em></td>
<td><em>Dr. R. A. Hendershott, Trenton, NJ</em></td>
</tr>
<tr>
<td>71</td>
<td>Nov. 1-5, 1969</td>
<td><em>Dr. Grant S. Kaley, Albany, NY</em></td>
<td><em>Dr. R. A. Hendershott, Trenton, NJ</em></td>
<td><em>Dr. R. A. Hendershott, Trenton, NJ</em></td>
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<tr>
<td>Meeting</td>
<td>Date</td>
<td>Place of Meeting</td>
<td>President</td>
<td>Secretary/Executive</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>
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<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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<tr>
<td>77</td>
<td>Oct. 14-19, 1973</td>
<td>St. Louis, MO</td>
<td>*Dr. W. C. Tobin, Denver, CO</td>
<td>*Dr. W.L. Bendix, Richmond, VA</td>
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<tr>
<td>78</td>
<td>Oct. 13-18, 1974</td>
<td>Roanoke, VA</td>
<td>*Mr. O. H. Timm, Dixon, CA</td>
<td>*Dr. W.L. Bendix, Richmond, VA</td>
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<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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<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>
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<td>85</td>
<td>Oct. 11-16, 1981</td>
<td>St. Louis, MO</td>
<td>*Dr. L. W. Hinchman, Indianapolis, IN</td>
<td>*Dr. J. C. Shook, Hyattsville, MD</td>
</tr>
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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>
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<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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<tr>
<td>89</td>
<td>Oct. 27-Nov. 1, 1985</td>
<td>Milwaukee, WI</td>
<td>*Dr. David U. Walker, Montpelier, VT</td>
<td>*Dr. J. C. Shook, Annapolis, MD</td>
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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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### III. C. PREVIOUS MEETINGS

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<tr>
<th>Meeting</th>
<th>Date</th>
<th>Place of Meeting</th>
<th>President</th>
<th>Secretary/Executive</th>
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<tr>
<td>96</td>
<td>Oct. 31- Nov. 6, 1992</td>
<td>Louisville, KY</td>
<td>Dr. J. Lee Alley, Montgomery, AL</td>
<td>*Dr. J. C. Shook, Mechanicsburg, PA</td>
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<tr>
<td>97</td>
<td>Oct. 23-29, 1993</td>
<td>Las Vegas, NV</td>
<td>Dr. J. Lee Alley, Montgomery, AL</td>
<td>*Dr. J. C. Shook, Mechanicsburg, PA</td>
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<tr>
<td>98</td>
<td>Oct. 29-Nov. 4, 1994</td>
<td>Grand Rapids, MI</td>
<td>Dr. J. B. Finley, Jr., Enid, OK</td>
<td>*Dr. J. C. Shook, Mechanicsburg, PA</td>
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<tr>
<td>99</td>
<td>Oct. 12-18, 1995</td>
<td>Reno, NV</td>
<td>Dr. H. W. Sherrill, Salt Lake City, UT</td>
<td>*Dr. J. C. Shook, Mechanicsburg, PA</td>
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<tr>
<td>100</td>
<td>Oct. 17-24, 1997</td>
<td>Little Rock, AR</td>
<td>Dr. M. R. Marshall, Lincoln, NE</td>
<td>*Dr. J. C. Shook, Mechanicsburg, PA</td>
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<tr>
<td>101</td>
<td>Oct. 3-9, 1998</td>
<td>Minneapolis, MN</td>
<td>Dr. Larry W. Bryan, Columbus, SC</td>
<td>*Dr. J. C. Shook, Mechanicsburg, PA</td>
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<td>102</td>
<td>Oct. 7-14, 1999</td>
<td>San Diego, CA</td>
<td>Dr. Richard H. McCaslin, Davis, CA</td>
<td>Mr. Bob Frost, Lincoln, CA</td>
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<td>103</td>
<td>Oct. 19-26, 2000</td>
<td>Birmingham, AL</td>
<td>Dr. Bob R. Hillman, Bismarck, ND</td>
<td>*Mr. Bob Frost, Lincoln, CA</td>
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<tr>
<td>104</td>
<td>Nov. 1-8, 2001</td>
<td>San Diego, CA</td>
<td>Dr. Richard D. Willer, Phoenix, AZ</td>
<td>*Mr. Bob Frost, Lincoln, CA</td>
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<td>105</td>
<td>Oct. 1-24, 2002</td>
<td>Minneapolis, MN</td>
<td>Dr. Bret D. Marsh, Indianapolis, IN</td>
<td>*Mr. Bob Frost, Lincoln, CA</td>
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<tr>
<td>106</td>
<td>Oct. 9-16, 2003</td>
<td>Hershey, PA</td>
<td>Dr. Richard E. Breitmayer, Sacramento, CA</td>
<td>*Mr. Bob Frost, Lincoln, CA</td>
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<tr>
<td>107</td>
<td>Oct. 21-27, 2004</td>
<td>Greensboro, NC</td>
<td>Dr. Donald E. Hoenig, Belfast, ME</td>
<td>*Mr. Bob Frost, Lincoln, CA</td>
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<td>108</td>
<td>Nov. 3-9, 2005</td>
<td>Greensboro, NC</td>
<td>Dr. Richard E. Breitmayer, Sacramento, CA</td>
<td>*Mr. Bob Frost, Lincoln, CA</td>
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<td>109</td>
<td>Oct. 23-29, 2008</td>
<td>San Diego, CA</td>
<td>Dr. David L. Marshall, Raleigh, NC</td>
<td>*Mr. Bob Frost, Lincoln, CA</td>
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<td>111</td>
<td>Oct. 8-14, 2009</td>
<td>Greensboro, NC</td>
<td>Dr. David L. Marshall, Raleigh, NC</td>
<td>*Mr. Bob Frost, Lincoln, CA</td>
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<tr>
<td>112</td>
<td>Nov. 11-17, 2010</td>
<td>Minneapolis, MN</td>
<td>Dr. David L. Marshall, Raleigh, NC</td>
<td>*Mr. Bob Frost, Lincoln, CA</td>
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<tr>
<td>113</td>
<td>Nov. 29-Oct.5, 2011</td>
<td>Buffalo, NY</td>
<td>Dr. Steven L. Hallstedt, East Lansing, MI</td>
<td>Mr. Benjamin Richey, St. Joseph, MO</td>
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<td>114</td>
<td>Oct. 18-24, 2012</td>
<td>Greensboro, NC</td>
<td>Dr. David L. Marshall, Raleigh, NC</td>
<td>Mr. Benjamin Richey, St. Joseph, MO</td>
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<tr>
<td>115</td>
<td>Oct. 17-23, 2013</td>
<td>San Diego, CA</td>
<td>Mr. Benjamin Richey, St. Joseph, MO</td>
<td>Mr. Benjamin Richey, St. Joseph, MO</td>
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<tr>
<td>116</td>
<td>Oct. 16-22, 2014</td>
<td>Kansas City, MO</td>
<td>Mr. Benjamin Richey, St. Joseph, MO</td>
<td>Mr. Benjamin Richey, St. Joseph, MO</td>
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### Key

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<td>**</td>
<td>Resigned Dec. 12, 1977</td>
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<tr>
<td>†</td>
<td>Reprinted in 54th 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, in lieu of the Secretary, effective 2006-2007</td>
</tr>
<tr>
<td>††</td>
<td>Reprinted in 66th Annual Proceedings</td>
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</table>
III. D. USAHA Award Winners
III. D. USAHA 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. Don H. Lein, Ithaca, New York

118th Annual Meeting, Kansas City, Missouri – 2014
Mr. William Hawks, Washington, D.C.
III. D. USAHA AWARD WINNERS

USAHA FEDERAL PARTNERSHIP AWARD RECEPIENTS

   Dr. Jack Shere, Raleigh, North Carolina
   Dr. William Smith, Sutton, Massachusetts

   Dr. Donald Otto, Knoxville, Iowa

117th Annual Meeting, San Diego, California – 2013
   Dr. Donald Evans, Topeka, Kansas

118th Annual Meeting, Kansas City, Missouri – 2014
   Dr. Sarah Tomlinson, Fort Collins, Colorado
IV. GLOSSARY OF COMMONLY USED ACRONYMS
### IV. GLOSSARY OF ACRONYMS

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>3D</td>
<td>Decontamination, depopulation, and disposal</td>
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<td>Animal Agriculture Coalition</td>
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<td>AADAP</td>
<td>Aquatic Animal Drug Approval Partnership</td>
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<td>American Association of Equine Practitioners</td>
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<td>AAHSC</td>
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<td>AASV</td>
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<td>AAVCT</td>
<td>American Academy of Veterinary and Comparative Toxicology</td>
</tr>
<tr>
<td>AAVLD</td>
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<td>AAZV</td>
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<td>ABADRL</td>
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<td>ABSL</td>
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<tr>
<td>ADDs</td>
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<tr>
<td>ADG</td>
<td>Average daily gain</td>
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<td>Acronym</td>
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<td>BCF</td>
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<td>Bovine tuberculosis</td>
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<td>Black-tailed deer</td>
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<td>BTRA</td>
<td>Biological Threat Risk Assessment</td>
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<td>BTV</td>
<td>Bluetongue virus</td>
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<td>BVDV</td>
<td>Bovine viral diarrhea virus</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>CAHFS</td>
<td>California Animal Health and Food Safety</td>
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<tr>
<td>CAHFS</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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### IV. GLOSSARY OF ACRONYMS

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<thead>
<tr>
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<th>Description</th>
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<tr>
<td>CAP</td>
<td>Conservation Assessment Program</td>
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<tr>
<td>CARB</td>
<td>Combating Antibiotic Resistant Bacteria</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>CATT</td>
<td>Card agglutination test</td>
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<tr>
<td>CBDD</td>
<td>Chemical and Biological Defense Division</td>
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<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>CCC</td>
<td>Consumer Complaint Coordinators</td>
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<tr>
<td>CCT</td>
<td>Comparative cervical tuberculin</td>
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<td>CD</td>
<td>Clostridial Dermatitis</td>
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<td>CDA</td>
<td>Colorado Department of Agriculture</td>
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<td>Centers for Disease Control and Prevention</td>
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<td>Center for Disease Detection</td>
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<td>Committee on Diagnostic Laboratory and Veterinary Workforce Development</td>
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<td>CDPHE</td>
<td>Colorado Department of Public Health and Environment</td>
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<tr>
<td>CDR</td>
<td>Complementarity determining regions</td>
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<tr>
<td>CD-ROM</td>
<td>Compact disc, read-only-memory</td>
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<tr>
<td>CEAIH</td>
<td>Centers for Epidemiology and Animal Health</td>
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<tr>
<td>CEEZAD</td>
<td>Center of Excellence for Emerging and Zoonotic Animal Diseases</td>
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<tr>
<td>CEI</td>
<td>Center for Emerging Issues</td>
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<td>CEM</td>
<td>Contagious equine metritis</td>
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<tr>
<td>CENAPA</td>
<td>National Parasite and Toxic Residue Laboratory (Mexico)</td>
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<tr>
<td>CENASA</td>
<td>National Animal Disease Laboratory (Mexico)</td>
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<tr>
<td>CEO</td>
<td>Chick embryo origin</td>
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<tr>
<td>CF</td>
<td>Complement fixation</td>
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<tr>
<td>CFIA</td>
<td>Canadian Food Inspection Agency</td>
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<td>CFR</td>
<td>Code of Federal Regulations</td>
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<td>CFSAN</td>
<td>Center for Food Safety and Applied Nutrition</td>
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<td>CFSPH</td>
<td>Center for Food Security and Public Health</td>
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<tr>
<td>CFT</td>
<td>Cattle fever tick</td>
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<td>CFT</td>
<td>Caudal fold tuberculin</td>
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<td>CFTEP</td>
<td>Cattle Fever Tick Eradication Program</td>
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<td>CFU</td>
<td>Colony forming units</td>
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<tr>
<td>CGAHR</td>
<td>Center for Grain and Animal Health Research</td>
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<tr>
<td>CI/KR</td>
<td>Critical infrastructure and key resources</td>
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IV. GLOSSARY OF ACRONYMS

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<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<td>CIMBS</td>
<td>The Center for Research at the Interface of Mathematical and Biological Sciences</td>
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<td>CIPSEA</td>
<td>Confidential Information Protection and Statistical Efficiency Act</td>
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<tr>
<td>CIS</td>
<td>Integrated surveillance system</td>
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<tr>
<td>CISS</td>
<td>Comprehensive and Integrated Swine Surveillance</td>
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<tr>
<td>CK</td>
<td>Creatine kinase</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>
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<td>COEs</td>
<td>Centers of Excellence</td>
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<td>COMEXA</td>
<td>Mexico - United States Commission on the Eradication of Livestock Screwworm</td>
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<td>CONASA</td>
<td>National Council for Animal Health (Mexico)</td>
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<td>CONSULT</td>
<td>Collaborative, Online, Novel, Science-based, User-friendly, Learning, Tool</td>
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<td>COOL</td>
<td>Country of Origin Labeling</td>
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<td>Center for Public and Corporate Veterinary Medicine</td>
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<td>CPG</td>
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<td>CPI</td>
<td>Consumer price index</td>
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<td>CR</td>
<td>Continuing resolution</td>
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<td>CRADA</td>
<td>Cooperative Research and Development Agreement</td>
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<td>CRIS</td>
<td>Current Research Information System</td>
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<td>CRISPR</td>
<td>Clustered regularly interspaced short palindromic repeat</td>
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<td>CRM</td>
<td>Customer relationship management</td>
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<tr>
<td>CRWAD</td>
<td>Conference of Research Workers in Animal Diseases</td>
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<td>CSF</td>
<td>Classical swine fever</td>
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<td>CSL</td>
<td>Commonwealth Serum Laboratories</td>
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<td>CSPSI</td>
<td>Center for Science in the Public Interest</td>
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<td>CSPS</td>
<td>Caprine Scrapie Prevalence Study</td>
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<td>CSREES</td>
<td>Cooperative State Research Education and Extension Service (USDA)</td>
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<td>Canine Search Teams</td>
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<td>CSTE</td>
<td>Council of State and Territorial Epidemiologists</td>
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<td>Cycle threshold</td>
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<td>CTAB</td>
<td>Counterterrorism Advisory Board</td>
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<td>Customs Union</td>
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### IV. GLOSSARY OF ACRONYMS

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<th>Acronym</th>
<th>Description</th>
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<td>Center for Veterinary Biologics (USDA)</td>
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<tr>
<td>CVB-IC</td>
<td>Center for Veterinary Biologics - Inspection and Compliance (USDA)</td>
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<td>CVI</td>
<td>Certificate of Veterinary Inspection</td>
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<td>CVMA</td>
<td>Canadian Veterinary Medical Association</td>
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<td>CVMP</td>
<td>Committee for Medicinal Products for Veterinary Use (E.U.)</td>
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<td>Canadian Veterinary Reserve</td>
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<td>CWI</td>
<td>Cell-wall competent</td>
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<td>Chronic wasting disease</td>
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<td>DAL</td>
<td>District at Large (USAHA)</td>
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<td>Designated brucellosis epidemiologist</td>
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<td>DBL</td>
<td>Diagnostic bacteriology laboratory</td>
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<td>DEA</td>
<td>Drug Enforcement Administration</td>
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<td>DEG</td>
<td>Diethylene glycol</td>
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<td>DFM</td>
<td>Direct-fed microbial</td>
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<td>Department of Health and Human Services</td>
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<td>Dairy Herd Improvement Association</td>
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<td>DHS</td>
<td>Department of Homeland Security</td>
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<td>DIVA</td>
<td>Differentiating Infected from Vaccinated Animals</td>
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<td>Disease Management Area</td>
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<td>Dry matter intake</td>
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<td>Deoxyribonucleic acid</td>
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<td>Department of Natural Resources</td>
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<td>Department of Defense</td>
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<td>Day post inoculation</td>
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<td>City of Detroit Public Works</td>
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<td>Direct rapid immunohistochemistry test</td>
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<td>DRMS</td>
<td>Dairy Records Management System</td>
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<td>Doctor of Veterinary Medicine</td>
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<td>TLR</td>
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<td>TMP</td>
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<td>UHF</td>
<td>Ultra high frequency</td>
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<td>UM&amp;R</td>
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<td>USAMM</td>
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<td>USDOS</td>
<td>United States Disease Outbreak Simulation</td>
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<td>VAC</td>
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