PROCEEDINGS

ONE HUNDRED AND TWENTY THIRD ANNUAL MEETING

OF THE

UNITED STATES ANIMAL HEALTH ASSOCIATION

RHODE ISLAND CONVENTION CENTER
PROVIDENCE, RHODE ISLAND
OCTOBER 24-30, 2019
Special Thanks to all Committee Chairs and Presenters for contributions to these proceedings.
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.

USAHA MEMBERSHIP

State Official Agency Members (50)

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

Federal Official Agency Members (11)

USDA, APHIS, Veterinary Services
USDA, Agriculture Research Service
USDA, National Institute of Food and Agriculture
USDA, APHIS, Wildlife Services
USDHHS, Centers for Disease Control and Prevention
US Dept. of Homeland Security
USDI, US Fish and Wildlife Service

USDI, National Park Service
USDI, USGS, National Wildlife Health Center
USDOE, Lawrence Livermore National Laboratory
US Forest Service

Territory and Sovereign Agency Members (1)

North Mariana Island

International Animal Health Agencies (4)

Australia
Canada
Mexico
New Zealand
ABOUT USAHA (continued)

**Allied Industry Organizations (38)**

- Alpaca Owners Association
- American Association of Avian Pathologists
- American Association of Bovine Veterinarians
- American Association of Equine Practitioners
- American Association of Small Ruminant Practitioners
- American Association of Swine Veterinarians
- American Association of Veterinary Laboratory Diagnosticians
- American Association of Wildlife Veterinarians
- American Association of Zoo Veterinarians
- American Cervid Alliance
- American Dairy Goat Association
- American Association of Equine Practitioners
- American Farm Bureau Federation
- American Goat Federation
- American Horse Council
- American Sheep Industry Association
- American Veterinary Medical Association
- Association of American Veterinary Medical Colleges
- Association of Fish & Wildlife Agencies
- Battelle Memorial Institute
- Exotic Wildlife Association
- Livestock Exporters Association, USA
- Livestock Marketing Association
- National Association of State Public Health Veterinarians
- National Bison Association
- National Cattlemen’s Beef Association
- National Chicken Council
- National Dairy Herd Information Association, Inc.
- National Institute for Animal Agriculture
- National Milk Producers Federation
- National Pork Board
- National Pork Producers Council
- National Renderers Association
- National Turkey Federation
- North American Deer Farmers Association
- North American Elk Breeders Association
- Professional Rodeo Cowboys Association
- US Poultry & Egg Association

**District Delegates**

Northeast: K. Lopez; B. Thompson
North Central: J. Eggers, P. Brennan
South: L. O. Lollis; E. Jensen
West: T. Hanosh; H.M. Richards

**Individual Members: 716**
**Life Members: 143**
**Student Members: 87**
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COMMITTEE ON ONE HEALTH
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I. 2019 Officers and Directors

A. Officers

Front row (from left): Barbara Determan, IA, Immediate Past President; Kristin Haas, VT, President; Marty Zaluski, MT, President-Elect. Back row (from left): Dustin Oedekoven, SD, Second Vice President; Charlie Hatcher, TN, First Vice President; Annette Jones, CA, Treasurer; Steve Rommereim, SD, Third Vice President.
## B. USAHA Board of Directors, 2019

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<td>Chris Ashworth</td>
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<td>Isaac Maeda</td>
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## I. B. USAHA BOARD OF DIRECTORS

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<thead>
<tr>
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<tr>
<td>Barbara Determan</td>
<td>District-at-Large</td>
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<td>Bill Barton</td>
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<td>Mark Ernst</td>
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<td>Bret Marsh</td>
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<td>Jeff Kaisand</td>
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<td>Lorraine O’Connor</td>
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<td>Manoel Tamassia</td>
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### I. B. USAHA BOARD OF DIRECTORS

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<tr>
<td>Ralph Zimmerman</td>
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<td>New Mexico Livestock Board</td>
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<td>Ernest Zirkle</td>
<td>USAHA Past President</td>
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<td>Burke Healey</td>
<td>USDA-APHIS-VS</td>
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<td>Thomas DeLiberto</td>
<td>USDA-APHIS-WS</td>
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<td>Cyril Gay</td>
<td>USDA-ARS</td>
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<td>Robert Smith</td>
<td>USDA-NIFA</td>
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<td>Jonathan Sleeman</td>
<td>USGS-Natl Wildlife Health Center</td>
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<td>Chelsea Crawford</td>
<td>Utah Dept of Agric</td>
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<td>Kristin Haas</td>
<td>Vermont Dept of Agric</td>
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<td>Charlie Broaddus</td>
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<td>Brian Joseph</td>
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<td>James Maxwell</td>
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<td>Darlene Konkle</td>
<td>Wisconsin Dept of Agric</td>
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<td>Herbert Richards</td>
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<td>Jim Logan</td>
<td>WY Livestock Board</td>
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C. 2019 USAHA Committees

- COMMITTEE ON ANIMAL EMERGENCY MANAGEMENT
- USAHA/AAVLD COMMITTEE ON ANIMAL HEALTH INFORMATION SYSTEMS
- COMMITTEE ON ANIMAL WELFARE
- USAHA/AAVLD COMMITTEE ON AQUACULTURE
- COMMITTEE ON BIOLOGICS AND BIOTECHNOLOGY
- COMMITTEE ON CATTLE AND BISON
  - SUBCOMMITTEE ON BRUCELLOSIS
  - SUBCOMMITTEE ON BVDV
  - SUBCOMMITTEE ON CATTLE IDENTIFICATION
  - SUBCOMMITTEE ON TRICHOMONIASIS
  - SUBCOMMITTEE ON TUBERCULOSIS
- USAHA/AAVLD COMMITTEE ON DIAGNOSTIC LABORATORY AND VETERINARY WORKFORCE DEVELOPMENT
- COMMITTEE ON EQUINE
  - SUBCOMMITTEE ON EQUINE VIRAL ARTERITIS (EVA)
- USAHA/AAVLD COMMITTEE ON FOOD AND FEED SAFETY
- COMMITTEE ON FOREIGN AND EMERGING DISEASES
- COMMITTEE ON GOVERNMENT RELATIONS
- COMMITTEE ON GLOBAL ANIMAL HEALTH AND TRADE
- USAHA/AAVLD COMMITTEE ON NATIONAL ANIMAL HEALTH LABORATORY NETWORK
- COMMITTEE ON NOMINATIONS AND RESOLUTIONS
- COMMITTEE ON PARASITIC AND VECTOR BORNE DISEASES
- COMMITTEE ON PROGRAM
- COMMITTEE ON ONE HEALTH
  - SUBCOMMITTEE ON PHARMACEUTICAL ISSUES
  - SUBCOMMITTEE ON RABIES
  - SUBCOMMITTEE ON SALMONELLA
- COMMITTEE ON SHEEP, GOATS AND CAMELIDS
  - SUBCOMMITTEE ON SCRAPIE AND IDENTIFICATION
- COMMITTEE ON POULTRY AND OTHER AVIAN SPECIES
  - SUBCOMMITTEE ON AVIAN INFLUENZA (AI) AND NEWCASTLE DISEASE (NDV)
I. C. USAHA COMMITTEES

- COMMITTEE ON SWINE
- COMMITTEE ON WILDLIFE

Rosters of each committee as of the 2019 Annual Meeting are included within each report.

A current listing for committee rosters can be found on the USAHA website, listed under each committee page, respectively.
II. 2019 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
II. A. USAHA/AAVLD President’s Reception and Dinner

INVOCATION
Charlie Hatcher

MEMORIAL SERVICE
Marty Zaluski

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:

Thomas G. Murnane, Texas (July 2017)
Max L. Crandall, Virginia (June 2014)
Robert A. Crandell, Texas (December 2019)
Bob Dittmar, Texas (August 2020)
II. A. USAHA/AAVLD PRESIDENT’S RECEPTION AND DINNER

PRESIDENT’S DINNER SPONSOR’S RECOGNITION

Special Thanks to our 2019 President’s Dinner Supporter, Boehringer Ingelheim

Steve Parker, Boehringer Ingelheim
Thank you for the opportunity to share some reflections with you about the U.S. Animal Health Association.

During this past year, I checked a box by taking a lifelong bucket-list trip to Botswana for two and a half weeks in June. I went for the animals but ended up being most blown away by the people of that country. While I was there, I met a friend named Joseph, who is from the village of Pandamatenga and was employed as a driver for the eco-lodge where I was staying. We had a lot of windshield time together as he drove me around to all of the beautiful sights that country has to offer, and when I met him, it was at the end of my trip so I was already pretty enamored with Botswana by the time I interacted with Joseph. On one of our trips together, I asked the question, “Joseph, what makes Botswana such a special place?” I assumed he would say that it is the amazing wildlife that is responsible for that. Instead, he answered “Miss Kristin, most think it is the animals, but it is the people of my country who work so hard to preserve and protect our heritage and our beautiful animals. The people are responsible for the character of my country, not the animals.” I thought this was an incredibly insightful observation from a man who has lived his entire life in a village with no electricity and no running water.

So, since June and in anticipation of this night coming up, I have been trying to decide what drives and defines the ethos of the U.S. Animal Health Association. Ethos is a Greek word meaning “character” and its used to describe the guiding beliefs or ideals of a group. I made a good faith effort to research this question via all the usual science-based channels – I googled it, I asked my dad, and I asked Siri, the woman who lives in my iPhone, and the woman who repeatedly disappoints me with her lack of insight. Coming up empty there, I have had to go old-school with this one and spend some time just thinking, an activity that in today’s world we often don’t have much
time to do. I have decided that the answer is again very simple – it is all of you, the members, that define and drive the ethos of USAHA. Passion, integrity, perseverance, and collegiality are words that I use to describe my colleagues in this organization, and I have been impressed and humbled by everyone I meet in USAHA. My admiration of you all has been reinforced numerous times, especially during this past year while serving as your president.

My first exposure to the “people of USAHA” (a phrase not to be confused with the “People of WalMart” video which you can find on YouTube and which I do not recommend watching) was in 2008 when my favorite state of Maine hosted the Northeast USAHA meeting in Bar Harbor. There is an image from that meeting that is burned into my brain forever, for better or worse, and I want to share it with you. I had never met anyone in the NEUSAHA in person as I had only been in my job for a few months, and I walk into the hospitality suite, and there were the patriarchs of the northeast: Don Hoenig, Steve Crawford, Chip Ridkey and Guy Hohenhaus, kicked back on this expansive deck overlooking a beautiful harbor with the moonlight bouncing off of it, each sipping top shelf amber liquid out of fancy glasses and balancing cigars between their teeth. These were probably cigars that Don Hoenig had imported from Cuba, since he has the nickname in the northeast of “World’s Most Interesting Man”.

I remember thinking to myself as I was still trying to scrub horse manure out of the cracks in my hands accumulated from 13 years of private veterinary practice, “What in the world is going on here?”

I literally almost turned around and walked out, thinking that there is no way this could be the right hospitality suite. Despite my initial hesitation and my tendency toward introversion, I powered on and I am glad I did! These colleagues are now my mentors and my friends, and on that night and during the days following, could not have been more welcoming, professional and friendly. And we got a tremendous amount of work done at that meeting. That was also the meeting where everyone was fed two lobsters each due to an alleged ordering error, but that is a story for a different time. My point now is that the bar was set very, very, very high by my northeast colleagues, and now happy to say my friends, on that inaugural year.

No way could it get any better than that, right?

Well, it has…

Multiple times over…

Since 2008, USAHA has topped that bar for me too many times to count, and I have enjoyed every minute of this organization since then, including my interactions with executive committee members, our amazing support team of Ben and Kelly, our committee and subcommittee chairs, task force members, federal partners, industry members, and all members who contributes to this impressive organization, not only at this meeting but throughout the year by carrying U.S. Animal Health Association’s mission back into states and agricultural sectors across the country.
This is the 123rd time we or those before us have gathered for an annual USAHA meeting somewhere in this country. There are not many organizations that have that level of staying-power and are able to evolve to remain relevant, but U.S. Animal Health Association has done that and I know will continue to do it. We have welcomed 127 first-time attendees this year and have a total registrant count of over 1,100, and it's only Sunday.

How many in this room are first-time attendees at this meeting?

For you and others who are creating your “people of USAHA” memories for the first time, your homework assignment, if I am allowed to stand up here and hand those out, is to make sure you actively engage in the proceedings this week and that you continue to push this organization forward so we can collectively remain as the go-to organization for all things animal health.

For those in the room tonight who are seasoned members and veteran attendees of this meeting, you are the foundation of U.S. Animal Health. Your mission, if you choose to accept it, is to share and use your wisdom to support and guide our new members and this organization as we continue to evolve in a busy world.

So, back to my original contemplation – what is the ethos of the U.S. Animal Health Association? Passion, integrity, perseverance, collegiality ring true, thanks to the collective contributions of all of you.

And relevance – I would add relevance to that list.

I would add one more thing – fun.

We are a fun bunch, and as long as we get our work done, I think we can let our collective guard down a little bit and really enjoy the relationships that this meeting fosters. We don’t get the opportunity every day to immerse ourselves in the company of more than 1,000 colleagues who we can also call friends. It’s a special privilege.

I cherish the friendships that I have made through USAHA, and I have enjoyed immensely the privilege of serving as your president over the past year and as the northeast district representative on the executive committee for the past five. I can’t wait to see what we can accomplish next with each other’s support and camaraderie, and I look forward to being a part of those future accomplishments. I do think if my friend Joseph from the little village of Pandamatenga ever had the opportunity to meet the people who are responsible for the ethos of USAHA, he would be a better person for knowing all of you, as am I. Thank you.
Dr. Keith Bailey serves as the director of the Oklahoma Animal Disease Diagnostic Laboratory (OADDL). Bailey earned his DVM and PhD degrees from the University of Missouri-Columbia. He is also a diplomate of the American College of Veterinary Pathologists. Bailey joined OADDL’s team in 2010 as a clinical associate professor of pathology. His research interests focus on laboratory animal research and diseases of production animals such as cattle, swine and poultry.
II. A. USAHA/AAVLD PRESIDENT'S RECEPTION AND DINNER

RECOGNITION OF 2019 SPONSORS

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   Tetracore
   Thermo Fisher
Trace First, Inc.
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   Zoetis
Dr. Beate Crossley, Davis, California. A 1994 veterinary graduate of Free University of Berlin in Germany, Dr. Crossley is an associate professor and virologist at the University of California-Davis’ California Animal Health and Food Safety Laboratory.
AAVLD Distinguished Service Award

Dr. Francisco Uzal

Francisco A. Uzal is a Professor of Diagnostic Pathology and Branch Chief of the San Bernardino Laboratory of the California Animal Health and Food Safety, UC Davis, where he has worked since 2001. He was born in Argentina and received his DVM from University of Buenos Aires (1982), MSc (pathology) from Swedish University of Agricultural Sciences, Sweden (1989), and PhD from University of Queensland, Australia (1998). He did his post-doc at the University of Queensland, Australia (1998). He became ACVP Board certified in 2006. He is a leading expert on clostridial diseases of animals with special emphasis in enteric diseases. Dr. Uzal has published ~250 articles in peer-reviewed journals. He is the senior author of the chapter on “Alimentary Diseases”, for the 6th edition of “Jubb, Kennedy and Palmer's Pathology of Domestic Animals” (2015, Elsevier) and the first author of the recently published textbook on clostridial diseases of animals (2016, Wiley Blackwell). He has served AAVLD through numerous activities with the Pathology Committee, and as Section Editor and Images Editor of JVDI.
Dave Steffen is Board Certified in Veterinary Pathologist (Diplomate American College of Veterinary Pathologists), providing veterinary pathology service including histologic evaluation and interpretation of tissue changes for veterinary clinical diagnostics and comparative research purposes. He is experienced in projects of infectious disease pathogenesis and immunopathology, and consults widely in inherited diseases of cattle.
AAVLD Lifetime Membership Awards

Dr. Grant Maxie

After 22 years as AHL Director, including 12 y as co-Executive Director of Laboratory Services Division, Grant Maxie is retiring. Beginning in Guelph as an intern in OVC right after graduation from the Western College of Veterinary Medicine in Saskatoon in 1969, Grant has been in and about Guelph for the past 50 y. After his internship, he completed his PhD in clinical pathology under the guidance of Dr. Ted Valli. He then undertook a 3-y stint as a hematologist within the International Development Research Center project in Kenya on trypanosomiasis (sleeping sickness of cattle) and theileriosis (East coast fever). Returning to OVC as faculty in the Department of Pathology, he taught cardiovascular and urinary pathology for 5 y before moving to the Veterinary Services Branch of OMAFRA in 1982 as an anatomic pathologist, completing the ACVP boards in 1984, and becoming Guelph lab head in 1994. VLSB was transferred to the U of Guelph in 1997 as part of the Common Sense Revolution; Lab Services is administered within the Office of Research. Retirement plans include continuing as editor-in-chief of JVDI, farming (hay-making, fence building), home repairs, travel, spending time with family, dancing, and the occasional round of golf.
Dan Shaw grew up in Oregon and attended Oregon State University from 1971–1984 where he majored in Poultry Science. He attended the College of Veterinary Medicine at Kansas State University and graduated in 1978. After graduation, he worked in a mostly dairy practice in southeastern Minnesota for 3 y before entering residency training in Veterinary Pathology at the University of Pennsylvania from 1981–1984. He earned a PhD from the University of Missouri in 1987. He is board certified by the American College of Veterinary Pathologists and by the American College of Poultry Veterinarians. He was on the faculty of the College of Veterinary Medicine at the University of Minnesota from 1987–2000 where he worked in the VDL in rotation with the other mammalian diagnosticians and handled most of the poultry cases. He was the director of the Animal Diagnostic Laboratory at Pennsylvania State University from 2000–2004. He joined the faculty at the University of Missouri in the College of Veterinary Medicine in 2005. There he handled the poultry case load and worked in rotation with the mammalian diagnosticians in the Veterinary Medical Diagnostic Laboratory. Dr. Shaw retired at the end of August 2019. He is married and has an adult married daughter. He is an avid bird hunter and dog trainer in his spare time.
USAHA Federal Partnership Award

Dr. Barb Porter-Spalding

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.

Tonight, we recognize Dr. Barbara Porter-Spalding, DVM, MVPH, Director of the Veterinary Services (VS) National Training and Exercise Program (NTEP) for the 2019 United States Animal Health Association (USAHA) Federal Partnership Award.

Dr. Porter-Spalding is a Senior Staff Officer with the USDA, APHIS, Veterinary Services (VS), in Raleigh, North Carolina. She received her DVM from Michigan State University College of Veterinary Medicine in 1991 and her Masters of Veterinary Public Health from North Carolina State University in 2007. In her current position, Dr. Porter-Spalding serves as Senior Staff Officer on the National Preparedness and Incident Coordination (NPIC) Staff, and Director of the VS Training and Exercise Plan.

Dr. Porter-Spalding leads the VS NTEP and has built it with the foundation of establishing and developing supportive and cooperative interactions between the entire agriculture response community, including supporting federal agencies, states, tribal nations, and agriculture industries. Through these efforts, hundreds of stakeholders are routinely engaged as
volunteers in VS NTEP workgroups that are developing trainings and exercises. Through this high-tempo program, stakeholders use these tools daily to increase the preparedness and resiliency of U.S. agriculture to mitigate, respond to and recover from emergencies and disasters that threaten U.S. agriculture.

Under Dr. Porter-Spalding’s direction, the VS NTEP is responsible for the highly regarded and successful 2018 Agriculture Response Management and Resources (ARMAR) Functional Exercise. This exercise was developed as a cooperative effort between VS, the Multi-State Partnership for Security in Agriculture, and aligned industries. This project spanned nearly four years of VS NTEP activity, taking its stakeholders through a clearly defined process of preparedness activities culminating in a four-day multi-state national exercise conducted in May 2018. Thirteen states participated in the ARMAR exercise, involving almost 2,000 state, federal and industry players.

Before joining APHIS, Dr. Porter-Spalding worked in a dairy practice in Pennsylvania. After spending two years in Morocco in the Peace Corps, she worked with the Food Safety and Inspection Service in North Dakota, joining VS as a Veterinary Medical Officer in 1998. In 2000, Barbara became a Regional Epidemiologist in Raleigh, North Carolina working on issues in poultry, swine, traceability and foreign animal disease investigations. She served on the Swine Commodity Staff prior to joining NPIC.

Based on the unifying implementation and conduct of the VS NTEP, as well as its broad impact on agricultural emergency preparedness, Dr. Barbara Porter-Spalding 2019 is most definitely deserving of the USAHA Federal Partnership Award.

Barb, congratulations, please come forward. On behalf of USAHA, congratulations for all you have done for the advancement of our efforts in animal health.
The USAHA Medal of Distinction is awarded annually to recognize one or more distinguished USAHA members who have demonstrated outstanding leadership, provided exemplary service, and have made significant contributions to the advancement of the Association.

Tonight, we honor one of USAHA’s finest, hailing from the State of New York.

Dr. Belinda Thompson of Cornell University exemplifies the dedication of a USAHA member.

Dr. Thompson has made outstanding contributions to the national and international livestock and equine industries as well as the public health community. This is demonstrated in Belinda’s involvement with USAHA in several committees, such as chair of the Committee on Animal Welfare Committee, and also active on the Committees on One Health, Rabies and Salmonella subcommittees, as well as the Committee on Animal Emergency Management and Committee on Foreign and Emerging Diseases. She has also been an active participant in the USAHA Board of Directors as one of the NEUSAHA delegates.

Thompson has recently been reappointed (2019) to the Secretary of Agriculture’s Advisory Committee on Animal Health and continues to participate on the USDA NIFA Veterinary Services Grant Program proposal review panel, this year as the Panel Manager. She also has been involved in the development of ten USDA Modules on animal diseases, diagnostics, animal welfare, emergency response, and use of antibiotics. Dr. Thompson has been a willing and able representative of USAHA, and interest of its mission in many facets.
II. A. USAHA/AAVLD PRESIDENT’S RECEPTION AND DINNER

Dr. Thompson is a 1981 graduate of the College of Veterinary Medicine at Cornell, and a 1977 Animal Science graduate of the Cornell College of Agriculture and Sciences. She grew up in Oceanside, New York. Belinda milked cows in Northern Vermont before attending veterinary college. She was a partner in a private, large animal veterinary practice serving the Twin Tiers of New York and Pennsylvania for 20 years.

Her history as a dedicated educator, a progressive advocate for the advancement of producer programs, and willingness to share her expertise at the national level, often carrying the banner of USAHA, make her the choice candidate for the USAHA Medal of Distinction this year.

Thank you for your service to our industry, and our organization, Belinda. Congratulations on this well-deserved acclaim.
The National Assembly Award is given to an active regulatory official or an industry representative for outstanding service in animal health regulatory programs. Dr. Keller was born and raised on a dairy, beef and crop farm near Corning, Kansas. She earned a bachelor’s degree in animal science and industry in 1981 and her Doctor of Veterinary Medicine degree in 1985, both at Kansas State University. She has been serving as the North Dakota State Veterinarian in Bismarck, North Dakota, since 2004. She has served North Dakota as the designated state tuberculosis and brucellosis epidemiologist, foreign animal disease diagnostician and as a member of the North Dakota Veterinary Medical Examining Board.

Prior to becoming the state veterinarian, Dr. Keller served as the deputy state veterinarian for North Dakota from 1997 to 2004. Before that she owned and operated the Countryside Animal Clinic for 10 years. Earlier in her career she was employed by Midway Veterinary Clinic and Bowman Veterinary Clinic, both in North Dakota.

Dr. Keller and her husband, Dwight, have three children, Luke, Jake and Tess, and live on the Keller Broken Heart Ranch, south of Mandan, North Dakota.
II. B. USAHA/AAVLD Keynote Session

Understanding and Overcoming the Challenges for the Control of African Swine Fever: A Global Threat in Your Backyard - Dr. Juan Lubroth, chief veterinary officer for the United Nations Food and Agriculture Organization
Abstract:
After its introduction into the Republic of Georgia in 2007, African Swine Fever (ASF) spread into several countries eastern and central Europe, and subsequently reported in China in August 2018 where it has affected neighboring countries and is likely to become established for years to come, if not decades. In a world where people and products easily move across the globe, all continents can learn from the success and failures of current ASF control efforts.

As the Chief Veterinary Officer of the Food and Agriculture Organization of the United Nations (FAO), Dr. Lubroth will discuss risk management, diagnostic challenges and opportunities, politics and economics and how these affect control strategies in the field. He will examine approaches to better risk management.

Finally, Dr. Lubroth will identify areas needed to ensure preparedness for incursion of ASF in North America.

Biography
Since 2009, Dr. Juan Lubroth is the Chief Veterinary Officer of the Food and Agriculture Organization of the United Nations (FAO). Dr. Lubroth previously served for seven years as the senior officer of FAO’s animal health service and head of the infectious diseases group/emergency prevention system in charge of worldwide surveillance, capacity development, and progressive control of transboundary animal diseases. A native of Madrid, Spain, Dr. Lubroth received his bachelor’s degree (biology) from Whitman College in Washington State, USA and worked as a wildlife biologist before continuing studies at the University of Georgia, USA, where he earned both a master’s degree in medical microbiology in 1982 and his DVM in 1985. After a stint as a wildlife veterinarian with the Southeastern Cooperative Wildlife
Disease Study, University of Georgia, Dr. Lubroth joined the diagnostic services section of the Foreign Animal Disease Diagnostic Laboratory, Plum Island Animal Disease Center, U.S. Department of Agriculture. He was posted in Mexico at the Mexico-U.S. Commission for the Prevention of Foot-and-Mouth disease and other exotic animal diseases, returning for advanced studies in the United States. In 1992 he received an M.Phil degree (arbovirology and epidemiology of infectious diseases) and in 1995 his PhD both from the Department of Epidemiology and Public Health, Yale School of Medicine, Yale University, USA.

Dr. Lubroth was seconded to Panaitosa/Pan American Health Organization as a visiting scientist in Brazil before being named head of diagnostic services and subsequently head of reagents and vaccines at Plum Island.

In 2002, Dr. Lubroth joined the Animal Health Service of FAO. He has worked extensively throughout Latin America, South and Southeast Asia, North Africa and the Middle East. He has initiated several major initiatives for the control of transboundary animal diseases in Central Asia, South Asia, southern Africa, and has served on the Pan African Programme for the Control of Epizootics Advisory Committee. Dr. Lubroth was the driving force behind several key cooperative initiatives with the World Health Organization (WHO) and World Organisation for Animal Health (OIE), including: The Global Framework for the Progressive Control of Transboundary Animal Diseases, the Global Early Warning System for major animal diseases including zoonoses (GLEWS), and the establishment of the Emergency Management Centre for Animal Health. In collaboration with colleagues at WHO and Wildlife Conservation Society, Dr. Lubroth was one of the authors of the Manhattan Principles considered as the guiding document that unleashed – or rediscovery – of the One Health approach.

Dr. Lubroth lives in the Italian Sabine countryside with his wife, Adriana Saldarriaga, an accomplished filmmaker and journalist, and a menagerie of animals and olive trees, which have produced an award-winning extra virgin olive oil.
II. C. Joint Scientific Session Papers, Abstracts, and Posters

1. Papers and Abstracts

Determination factors associated with the mercury-selenium ratio in cat food and tuna – Q. Yuan

Diagnostic performance of the POCKITTM for detection of African Swine Fever and Foot and Mouth Disease viruses using insulated isothermal PCR – J. Trujillo

Quantitative real-time PCR detection of African Swine Fever virus on a field-based PCR platform, the Biomeme Franklin hand-held thermocycler – J. Trujillo

Whole-Genome Sequencing to predict genotype and antimicrobial resistance in *Escherichia coli* isolated from pigs – N. Macedo
Mercury (Hg) is a toxin that can have deleterious effects on humans and other animals. It arises from natural and anthropogenic sources; as an element, it does not degrade in the environment. Mercury bioaccumulates and biomagnifies in the aquatic food chain, thus people and other fish consumers are likely to have higher Hg concentrations, leading to the risk of neurotoxic and teratogenic effects. Numerous studies have shown the protective effects of selenium (Se) against Hg, as well as the usefulness of the Se: Hg molar ratio as the indicator of selenium’s protective capacity. With more study, the Se: Hg molar ratio is a potential guide for risk assessments in fish consumers. However, there is little research on the Se: Hg ration in fish based wet cat food and tuna. In this study, we collected 42 samples (cans with unique lot numbers) of different brands of cat food and 30 samples (cans with unique lot numbers) of tuna from local grocery stores, and determined the dry weight, Se, and Hg concentrations. We are interested in whether the Se: Hg molar ratio is consistent in these specific food sources, and if there are implications on the effects of mercury on consumers. Linear regression will be performed to evaluate if the Se: Hg molar ratio is impacted by commercial brand, dry weight, measured Se and Hg concentrations, and, for cat food, type of fish involved. If necessary mixed effects will be included.
II. C. 1. PAPERS AND ABSTRACTS

DIAGNOSTIC PERFORMANCE OF THE POCKIT™ FOR DETECTION OF AFRICAN SWINE FEVER AND FOOT AND MOUTH DISEASE VIRUSES USING INSULATED ISOTHERMAL PCR
Jessie D. Trujillo¹, Russell Ransburgh¹, Anthony Craig², Mark Tsai³, David Tsai³, Thomas Wang³, Livio Heath⁴, Juergen Richt¹

¹DMP, Kansas State University, Manhattan, KS; ²Vectors and Vector-borne Diseases Research Programme, Department of Veterinary Tropical Diseases, University of Pretoria, Pretoria, South Africa; ³GeneReach, Boston, MA; ⁴Transboundary Animal Diseases, Agricultural Research Council, Onderstepoort Veterinary Institute, Pretoria, South Africa

African Swine Fever virus (ASFV) and Foot and Mouth Disease virus (FMDV) are major concerns for the global agricultural industry. ASFV expansion out of Africa in the past decade and recurrent FMDV outbreaks within and outside of Africa demonstrate real risks due to epidemiological globalization. Surveillance and immediate response are critical to prevent, identify or control outbreaks. Our group has performed extensive evaluation of the analytical and clinical performance of the POCKIT™ for ASFV and FMDV. The POCKIT™ is a portable PCR machine for the point of need detection using lyophilized, insulated isothermal PCR reagents (iiPCR) and nucleic acids (NA) purified using a portable automated NA extraction platform, the Taco Mini (GeneReach). FMDV and ASFV qPCR detection assays (Callahan, 2002 and Zask, 2005) were adapted to the iiPCR with analytical sensitivity tested using the NAHLN controls and NAHLN proficiency panels, provided by USDA-FADDL. Analytical sensitivity determination was performed using serial dilutions of the NAHLN surrogate NA controls followed by testing 10x serial dilutions of NA purified from viral reference strains (n=10 for ASFV and n=7 for FMDV) using the Taco bead processor and the taco DNA/RNA extraction (GeneReach). This extraction platform was demonstrated to yield equivalent NA as the NAHLN protocol using respective extraction controls, reference standards and proficiency tests. Reference assay testing was performed side by side using NAHLN PCR/RT-qPCR protocols using validated low cost PCR master mixes (Quanta qScript XLT 1-step RT-qPCR ToughMix or the PerfeCTa Fastmix II). Results demonstrate equivalent analytical sensitivity for the detection of ASFV and FMDV nucleic acids (10-500 copies per reaction) on the POCKIT™ when compared to testing on the reference assays on the CFX. Diagnostic sensitivity and specificity for ASFV and FMDV detection on the POCKIT™ was determined using 192 and 176 clinical samples, respectively. Clinical samples consisted of tissues or lymph node pools or vectors (ticks and lice) for ASFV and epithelium or swabs from vesicles, blood and probang samples for FMDV. Samples originated in the Republic of South Africa and
II. C. JOINT SCIENTIFIC SESSION PAPERS, ABSTRACTS, AND POSTERS

were derived from experimental or natural infections of ruminants and swine, domestic or wild, with confirmed or suspected infections. The clinical sensitivity and specificity on the POCKIT™ was 100% /100% for ASFV and 98%/100% for FMDV, respectively. The exceptional diagnostic performance for detection of these two high priority infectious agents on the point of need POCKIT™ iiPCR platform suggest that when used properly, point of need PCR/RT-PCR could help mitigate livestock and economic losses or help control and eradicate such devastating diseases.
II. C. 1. PAPERS AND ABSTRACTS

QUANTITATIVE REAL-TIME PCR DETECTION OF AFRICAN SWINE FEVER VIRUS ON A FIELD-BASED PCR PLATFORM, THE BIOMEME FRANKLIN HAND-HELD THERMOCYCLER

Jessie D. Trujillo¹, Russell Ransburgh¹, Anthony Craig³, Livio Heath², Juergen Richt¹

¹DMP, Kansas State University, Manhattan, KS; ²Transboundary Animal Diseases, Agricultural Research Council, Onderstepoort Veterinary Institute, Pretoria, South Africa; ³Vector and Vector-borne Diseases Research Programme, Department of Veterinary Tropical Diseases, University of Pretoria, Pretoria, Pretoria, South Africa

African Swine Fever virus (ASFV) is a major concern for the global swine industry. The expansion of this virus from Africa into Asia and Eastern Europe and its established presence in populations of domestic and wild suids in new regions reinforces the notion that diligent surveillance coupled with rapid and extensive control programs are critical to identify and curtail outbreaks and prevent an endemic state. Our group has evaluated the feasibility of point of need detection of ASFV on a hand-held PCR platform, the Franklin three9 (Biomeme), which is capable of quantitative real-time PCR (qPCR) detection of pathogen nucleic acids. As a real-time PCR machine with nine PCR wells using three fluorophore detection channels, the internal battery-powered Franklin is controlled by a smartphone. Data sets including GPS location can be transmitted to a secure cloud via cellular phones or WiFi.

One limitation to performing real-time PCR in the field is the need to maintain polymerase enzyme function with ready-to-use room temperature stable PCR reagents. Lyophilized PCR master mix (LyoDNA, Biomeme), preloaded in reaction tubes, are available for use with the Franklin. Using DNA from tissue lysates (N=14) and ASFV reference strains (n=7), purified using a validated magnetic bead extraction protocol, we determined the sensitivity for ASFV detection using the USDA p72 qPCR assay (Zsak 2005) on the Franklin PCR machine using LyoDNA. A side by side performance comparison of the same PCR assay run on the CFX 96 (BioRad) using Fast mix II (QuantaBiosciences) was made. Tissue lysates were derived from clinical samples from pigs or arthropod vectors, confirmed or suspected of ASFV infection in the Republic of South Africa. Initial testing of the LyoDNA master mix on the field PCR machine resulted in equivalent sensitivity as the reference assay on the CFX 96 with equivalent or improved PCR Cq.

A syringe-based, silica DNA binding column extraction method with extraction materials preloaded in a closed cartridge (M1 Sample Prep, Biomeme) addresses a critical limitation to field PCR which is the ability to rapidly prepare PCR-quality nucleic acids without the need of special lab equipment or electricity. To test this system, we determined the clinical sensitivity (30 positive and 15 negative samples) of the end-to-end
II. C. JOINT SCIENTIFIC SESSION PAPERS, ABSTRACTS, AND POSTERS

Biomeme platform (M1 Sample Prep, LyoDNA master mix, and the Franklin thermocycler). The diagnostic sensitivity/specificity of the deployable Biomeme platform for detection of ASFV was 100% when compared to the laboratory-based extraction and PCR protocols. Results warrant further investigation of the performance of the Biomeme deployable PCR platform for ASFV detection in the field which could prove to be a useful tool for ASFV preparedness and surveillance.
WHOLE-GENOME SEQUENCING TO PREDICT GENOTYPE AND ANTIMICROBIAL RESISTANCE IN *ESCHERICHIA COLI* ISOLATED FROM PIGS

Nubia Macedo, Rodger Main, Ganwu Li, Orhan Sahin
VDPAM, Iowa State University, Ames, IA

Ninety *E. coli* strains isolated between 2016 and 2018 by the Iowa State University Veterinary Diagnostic Laboratory were characterized by genotyping PCR and WGS for detection of enterotoxins and adherence genes. The phenotype of antimicrobial resistance of a subset of 70 isolates was also tested by broth microdilution, and compared with their respective antimicrobial resistance genes detected by WGS. Preliminary results showed that 81 (90%) and 75 (83.3%) of isolates were classified as ETEC strains producing enterotoxins LT, STa and STb by both PCR and WGS, respectively. Kappa agreement between both tests were either very good (k=0.81-1) or good (k=0.61-0.80) for genes such as EAST, STA, STX2, F18 and K88, and moderate (k=0.41-0.6) for genes LT and STb. Kappa agreement was either fair (k=0.21-0.4) or poor (k≤0) when genes such as STX1, K99 and F41 were present in very low prevalence. Because the magnitude of kappa is affected by the prevalence of genes, if most of the genes are either present or absent, kappa agreement coefficient is reduced accordingly. Among the 70 strains characterized by antimicrobial susceptibility, all isolates were resistant to penicillin. Other common resistances were to oxytetracycline (98.6%), chlorotetracycline (90%), ampicillin (84.3%), sulfadimethoxime (71.4%), spectinomycin (61%), enrofloxacin (61%), neomycin (50%) and gentamycin (41%). We detected relatively low levels of resistance to trimethoprim/sulphamethoxazole (31.4%), florfenicol (30%) and ceftiofur (23%). By WGS, 50 resistance genes were detected, which are involved in resistance to beta-lactams, aminoglycosides, chloramphenicol, quinolones, sulfonamides, and tetracyclines. When comparing WGS to antimicrobial resistance phenotypes, the resistances to ceftiofur, trimethoprim/sulphamethoxazole, florfenicol and sulfadimethoxime were highly correlated between genotypes and phenotypes. Because of the 100% presence of the *ampC* gene, the genotype of beta-lactam resistance was 100%, but for penicillin and ampicillin, their genotypic resistance was 100% and 84%, respectively. Resistance to ceftiofur was highly associated with presence of *bla-CMY* or *blaCTX-M* genes, with sensitivity and specificity of 94% and 100% respectively. Detection of genes involved in acquired quinolone resistance was very low, even though 61% of isolates were phenotypically resistant, probably due to mutations in the quinolone resistance-determining region. The majority of isolates carried genes conferring resistance to aminoglycosides and tetracyclines, even though a subset of isolates were still phenotypically susceptible to those antimicrobials, resulting in high sensitivities (90 and 80% respectively), but lower specificities (45 and <1%, respectively). In
II. C. JOINT SCIENTIFIC SESSION PAPERS, ABSTRACTS, AND POSTERS

general, WGS accurately predicted *E. coli* genotypes and the majority of resistance phenotypes from *E. coli* strains, even though more studies are needed to better characterize some of the mechanisms of antimicrobial resistance.
II. C. 2. Posters

Molecular mycological detection and phylogenetic analysis of Mycoleptodiscus indicus infection in a cat – G. Maboni

Prevalence of Salmonella serovars in submitted clinical samples of food and companion animals to Texas A&M Veterinary Medical Diagnostic Laboratory (TVMDL): Year 2014 to 2018 – O. Khan

Phenotypic characterization, antibiogram and risk factors of Salmonella isolates from Chicken, Stool, Farm and Market’s eggs in Jimma Town, Ethiopia – D. Legesse

Rapid sequence-based diagnostic characterization of African Swine Fever virus using Oxford Nanopore Minion sequence sensing device along with a companion analysis software tool – V. O’Donnell

Whole-Genome Sequencing for detecting serotypes and virulence genes in Haemophilus parasuis isolates – N. Macedo

Respiratory viruses identified in Western Canadian beef cattle by high throughput sequencing and their association with bovine respiratory disease – M. Zhang
MOLECULAR MYCOLOGICAL DETECTION AND PHYLOGENETIC ANALYSIS OF *MYCOLEPTODISCUS INDICUS* INFECTION IN A CAT

Grazieli Maboni\(^1\), Paula Krimer\(^2\), Rodrigo de Paula Baptista\(^1\), Ana Lorton\(^2\), Suan Sanchez\(^2\)

\(^1\)University of Georgia, Athens, GA; \(^2\)Athens Veterinary Diagnostic Laboratory, University of Georgia, Athens, GA

*Mycoleptodiscus indicus* is a dematiaceous hyphomycete fungus found on plant leaves. It has been reported rarely as a cause of human or animal disease, possibly because it is difficult to culture and identify from clinical specimens. Infections are presumably acquired by traumatic implantation of the fungus, with plants implied as potential sources of infection. *M. indicus* is typically found in immunocompromised human hosts causing subcutaneous lesions, cellulitis and sometimes myositis. Here we report a previously undescribed presentation of *M. indicus* causing a subcutaneous infection in an immunocompetent cat with successful antifungal treatment. An 8-year-old non-immunosuppressed cat from Georgia, USA, presented with a left front leg swelling without lameness. A fine-needle aspirate was collected from the swelling area and submitted for fungal culture. A mold with circular shape, white fleecy surface and a light beige reverse was isolated. After five days of incubation, colonies were brown with a diffusive brown-yellow pigment. Microscopically, the hyphae appeared septate and branched. Application of a pan-fungal PCR followed by Sanger sequencing of the PCR product revealed 99% homology to sequences from *M. indicus*. Phylogenetic analysis was performed to determine the possible epidemiological and ancestral correlation to other known cases of *M. indicus*. Our results indicate that the strain infecting the cat was closely related to *M. indicus* strains that infected a dog and humans in North America. In addition, these sequences were closely related to sequences from fungal isolates obtained from infected plants. This may support the hypothesis that this fungus, which is well adapted in plants, may have initially evolved from plants to adapt and infect different mammals. This also supports previous reports suggesting that plants were the potential source of *M. indicus* infection in humans. In summary, our findings highlight the potential of *M. indicus* to infect immunocompetent animals and suggest that the veterinary medical community should be aware of its unusual clinical and microbiological presentation.
PREVALENCE OF SALMONELLA SEROVARS IN SUBMITTED CLINICAL SAMPLES OF FOOD AND COMpanION ANIMALS TO TEXAS A&M VETERINARY MEDICAL DIAGNOSTIC LABORATORY (TVMDL): YEAR 2014 TO 2018

Owais Ahmed Khan¹, Jessica D. Monday², Russell H. Raleigh³, Sonia W. Lingsweiler⁴, Amy K. Swinford⁵

¹Bacteriology and Serology, Texas A&M Veterinary Medical Diagnostic Laboratory, Amarillo, TX; ²Diagnostic Services, Texas A&M Veterinary Medical Diagnostic Laboratory, Amarillo, TX; ³Bacteriology and Serology, Texas A&M Veterinary Medical Diagnostic Laboratory, Amarillo, TX; ⁴Bacteriology, Texas A&M Veterinary Medical Diagnostic Laboratory, College Station, TX; ⁵Bacteriology, Texas A&M Veterinary Medical Diagnostic Laboratory, College Station, TX

Salmonellosis is an economically important disease of food and companion animals of different age groups mainly of younger age. It has various clinical manifestations viz; fever, diarrhea, dehydration, anorexia, respiratory illness, septicemia, abortion and decreased production. *Salmonella enterica* is important zoonotic agents and the foodborne Salmonellosis is attributed to consumption of uncooked, contaminated meat and dairy products as well as in contact with Salmonella shedding animals.

The aim of present study was to determine the prevalence percentage of *Salmonella* isolates at TVMDL from submitted clinical samples of food and companion animals during years 2014 to 2018. Furthermore, the available serovar results from Salmonella NVSL serotyping were analyzed to examine the serovar diversity among studied species. Data were retrospectively collected from USALIMS on all accessions submitted into two TVMDL lab locations (Amarillo and College Station) for *Salmonella* isolation during years 2014 to 2018. These samples received from 15 states with the majority from Texas.

A total of 1946 (20.73%) *Salmonella* isolates were recovered from 9384 clinical samples. These samples were comprised of feces, fecal swabs, enteric tissues, and swabs from various organs. Of these samples, cattle 32.45% (1212/3946); horses 21.34% (503/2357); donkey and mule 19.35% (13/65); goat 3.6% (9/244); sheep 7.94% (10/126); Pig 23.20% (103/443); dog 8.25% (76/921) and cat 7.12% (19/267) were positive for *Salmonella* isolates. Out of 1212 cattle *Salmonella* isolates 1073 isolates were serotyped and 71 serovars were isolated, the top five serovars were Dublin (12.58%), Montevideo (12.40%), Heidelberg (10.72%), Typhimurium (8.38%) and Newport (7.82%). In horses out of 503 isolates 405 were serotyped, 51 serovars were isolated. The top five serovars were Newport (18.02%), Typhimurium (13.58%), Muenster (10.62%), Anatum (8.64%) and *Salmonella* ser. 4, [5], 12:i-. Similarly in pigs out of 103 *Salmonella* isolates, 86 were serotyped and 21 serovars were isolated, the top five
serovars were *Salmonella* ser. 4, [5], 12:i (44.19%), Derby and Infantis (9.30%), *Salmonella* ser. 4, 12:i:- and Montevideo (4.65%). In dogs out of 76 *Salmonella* isolates 73 were serotyped and 29 serovars were isolated, the top five serovars were Newport (23.29%), Anatum and Rubislaw (8.22%), Heidelberg and Infantis (6.85%). In cats out of 19 isolates 18 were serotyped, 12 serovars were isolated, the top four serotypes were Newport and Typhimurium (16.66%), Enteritidis and Typhimurium var 5 (11.11%). In the rest of the species few serovars (<9) were isolated.

The above study will provide an overview of the prevalence of various *Salmonella* serovars in the studied species and diversity of serovars among *Salmonella enterica* species. The presence of serovars Newport and Typhimurium in cattle, horses, dogs and cats is noteworthy as these are of public health concern due to emergence of multidrug resistant (MDR) bacteria.
Salmonella is the most important causes of foodborne illness globally. Foods of animal origin, especially poultry and poultry products, including eggs have been consistently implicated in sporadic cases and outbreaks of Salmonellosis. The objectives of this study was to carryout phenotypic characterization, antimicrobial susceptibility pattern and risk factors of salmonella isolates from chicken, stool, farm and market’s egg in Jimma town. A cross-sectional study was conducted from January 2018 to September 2018 in Jimma town, on egg samples collected from farm and market, and on cloacae swab of laying chicken and stool of egg collectors from poultry farm. Samples were, processed, cultured and salmonella isolates were identified by OmniLog test. Phenotypically identified salmonella isolates were tested for antimicrobial susceptibility. Over all; 13(2.98%) of salmonella enterica species were phenotypically characterized out of 436 sample from farms egg content (n=83), farms eggshell (n=83), cloacae (n=83), stools (n=21) market eggshell (n=83) and market egg contents (n=83) at a rate of 2.4%, 0%, 2.4%, 9.52% 4.8% and 3.6% respectively. From antimicrobial susceptibility tested isolates, 9(69%) displayed multidrug resistance. All the isolates showed susceptibility to Gentamicin, Kanamycin and Streptomycin. Lack of separating cracked eggs, not washing hand, eggs stay longer unsold, and mixing excreta with feed were associated risk factors for salmonella presence (p-value<0.05) at farm’s and market’s egg. The presence of drug resistant salmonella enterica within egg/and chicken can pose serious health problem. Good hygienic practices are important to reduce the risk of salmonella enterica contamination.
RAPID SEQUENCE-BASED DIAGNOSTIC CHARACTERIZATION OF AFRICAN SWINE FEVER VIRUS USING OXFORD NANOPORE MINION SEQUENCE SENSING DEVICE ALONG WITH A COMPANION ANALYSIS SOFTWARE TOOL
Diagnostic Services Section, Plum Island Animal Disease Center/USDA/APHIS/FADDL, Greenport, NY

African swine fever virus (ASFV) is the causative agent of a severe and highly contagious viral disease of swine, that can have devastating economic consequences to the swine industry due to the high mortality rate and impact on international trade. There is no effective vaccine to control African swine fever (ASF), and therefore, efficient disease control is dependent on early detection and diagnosis of ASFV. The large size of the ASFV genome (~180 kB) has historically hindered efforts to rapidly obtain full-genome sequence.

Here we investigate the utility of the Oxford Nanopore MinION sequence sensing device to act as a rapid diagnostic tool when coupled with our novel companion software script; African Swine Fever Fast Analysis Sequencing Tool (ASF-FAST). This tool enables the user to evaluate the output data in real-time and generate genome assemblies. Viral genome sequences were generated from various ASFV infected samples, including virus grown in cell culture and blood samples obtained from experimentally infected pigs. Removal of methylated DNA increased the number of ASFV-specific reads in relation to total reads. When samples were enriched by removal of host methylated DNA, sequencing reads specific to ASFV were improved due to a modest shift in the ratio of virus to host nucleic acid. The ASF-FAST detected viral genomic sequence generated by the MinION within 6 minutes after the start of sequencing and provided sufficient sequence for complete genome resolution within 20 minutes. In our hands, generation of sequencing libraries ready to load into the primed flow cell, required less than 2 hours and 15 minutes from nucleic acid extraction and enrichment. These ASF targeted sequencing libraries supported rapid the generation of ASFV genomic data that leverages the near real-time data processing and data generation capability of this platform.

We show that the nanopore technology, when coupled with the ASF-FAST, is a promising diagnostic tool to support rapid disease surveillance and monitoring. The MinION is accessible to most laboratories at a reduced cost and does not require sophisticated infrastructure in the field. This work demonstrates the potential to expand sequencing capabilities to low-resource settings to support sequence-based diagnostics for detection and surveillance of ASFV.
Glässer’s disease is considered one of the most prevalent bacterial diseases of nursery pigs, and it is caused by *Haemophilus parasuis* (HPS). PCR methods have been used to detect serotypes and virulence genes among HPS strains. More recently, considerable progress has been made in implementing whole-genome sequencing (WGS) as a routine diagnostic and typing tool for bacterial pathogens. The objective of this study was to compare the use WGS to detect HPS serotypes and a known HPS virulence factor, the virulence-associated trimeric autotransporter (*vtaA*) gene. Fifty HPS strains isolated between 2014 and 2017 by the Iowa State University Veterinary Laboratory (ISU VDL) were characterized by serotyping PCR and *vtaA* PCR. WGS was also performed to detect both serotype and virulence of strains based on the detection of different capsular genes and *vtaA* genes. These isolates were obtained from porcine clinical cases submitted to the ISU VD, and were isolated mainly from pericardium (n=15), lung (n=13), pleura (n=7), joint (n=7), brain (n=5), nasal (n=2) and liver (n=1). Both methods yielded one serotype for each strain, which demonstrated a striking reduction in the number of untypeable strains when compared to methods that use standard serotyping antisera. Preliminary results showed that 8 and 11 different serotypes were detected by PCR and WGS, respectively. However, neither PCR nor WGS were capable of discriminating between serotypes 5 and 12, since no capsular polysaccharide gene could be confirmed to differentiate between these serotypes. The serotypes most commonly detected by PCR were serotypes 5/12 (22%), 1 (20%), 4 (14%), 7 (14%), 13 (12%), 2 (8%), 14 (6%) and 6 (4%), while WGS detected serotypes 5/12 (22%), 2 (18%), 4 (14%), 1 (12%), 7 (12%), 13 (10%), 14 (6%), and 6, 11 and 15 (2% each). Overall, there was a very good agreement (kappa coefficient=0.81) between PCR and WGS. There was 100% agreement between PCR and WGS for serotypes 4, 5/12 and 14. However, from 10 isolates classified as serotype 1 by PCR, only five were serotype 1 by WGS, while four were classified as serotype 2 and one as serotype 11. Moreover, three isolates classified as either serotypes 6, 7 or 13 by PCR, were classified as serotypes 1, 15 or 2 by WGS, respectively. When comparing the detection of a known HPS virulence factor (*vtaA*), 100% agreement between PCR and WGS was observed. PCR methods have been widely used to type bacterial pathogens. Nevertheless, these methods only detect particular genes and are unable to uncover new or rare changes in the genome. In this study, we showed that WGS is a powerful tool for identification of serotypes and virulence factors in HPS. Moreover, the comprehensive information provided by WGS will greatly enhance the monitoring of HPS strains and serotypes circulating in the herds. Utility of WGS for prediction of HPS resistance to antimicrobials is currently underway.
RESPIRATORY VIRUSES IDENTIFIED IN WESTERN CANADIAN BEEF CATTLE BY HIGH THROUGHPUT SEQUENCING AND THEIR ASSOCIATION WITH BOVINE RESPIRATORY DISEASE

Maodong Zhang\textsuperscript{1}, Janet E. Hill\textsuperscript{3}, Yanyun Huang\textsuperscript{1,2}

\textsuperscript{1}Veterinary Pathology, University of Saskatchewan, Saskatoon, SK, Canada; \textsuperscript{2}Veterinary Pathology, Prairie Diagnostic Devices Inc., Saskatoon, SK, Canada; \textsuperscript{3}Veterinary Microbiology, University of Saskatchewan, Saskatoon, SK, Canada

Bovine respiratory disease (BRD) causes significant economic losses in western Canada despite viral vaccination and massive antimicrobial treatment. The pathogenesis involves interactions between bacteria, viruses, environment and management factors. Primary viral infection can greatly increase susceptibility of beef cattle to bacterial infection, and is thus a vital part of BRD pathogenesis. The objective of this study was to use metagenomic sequencing to characterize the respiratory viromes of paired nasal swabs and tracheal washes from western Canadian feedlot cattle, with or without BRD. A total of 116 cattle (116 nasal swabs and 116 tracheal washes) were analyzed. Based on results generated from MiSeq, Illumina, the presence of influenza D virus (IDV), bovine rhinitis A virus (BRAV), bovine rhinitis B virus (BRBV), bovine coronavirus (BCV) and bovine respiratory syncytial virus (BRSV) was associated with BRD. Agreement between identification of viruses in nasal swabs and tracheal washes was generally weak, indicating that sampling location may affect detection of infection. Subsequently, qRT-PCR performed on IDV for all 232 samples, the sensitivity and specificity of Miseq was 58.06\% and 98.88\%, respectively. Furthermore, Nanopore sequencing was applied to 19 selected IDV positive samples and the results showed 74\% agreement of virus detection with those by Miseq and 84\% with those by qRT-PCR. This study reported several viruses for the first time in Canadian beef cattle, providing a basis for further studies investigating candidate viruses important to the prevention of BRD. We also demonstrated that next generation sequencing is a powerful non-targeted diagnostic tool for virus detection.
II. D. USAHA Membership Meetings
II. D. USAHA MEMBERSHIP MEETINGS

USAHA MEMBERSHIP LUNCHEON AND MEETING
MONDAY, OCTOBER 28, 2019
Kristin Haas, Presiding

The First Membership Meeting was called to order by Dr. Kristin Haas. Special thanks was given to Boehringer Ingelheim, represented by Steve Parker for their support of the luncheon.

Treasurer’s Report
Annette Jones, Treasurer

Although the United States Animal Health Association (USAHA) realized a minimal loss in 2018-19, the organization continues to operate on a sound financial basis. The annual audit conducted by Clifton, Larson, Allen LLP, quarterly sampling audits conducted by the USAHA Treasurer, and the review of the 2019 Statement of Financial Position by the USAHA Committee on Audit found all accounting practices and financial statements to accurately reflect the financial positions of USAHA and that all financial affairs of the Association are in order.

USAHA finished the 2018-19 fiscal year with a $17,593 net loss primarily due to lower than anticipated individual member revenue and unanticipated costs related to a business management software refresh. Considering that the USAHA management team controls a $500,000 budget, they did another excellent job of managing revenues and costs throughout the year.

The Association’s net worth on June 30, 2019 was $986,265. USAHA continues the policy of maintaining two years’ expenses in reserve. The current reserve is $1,069,256 held in securities divided as valued on June 30, 2019 to include: $854,719 CD’s, $4,069 money market, and $210,468 equity investments. During fiscal year 2018-19, the Association’s reserve accounted for $28,925 in realized and unrealized investment income.

Looking forward, costs, particularly annual meeting costs, are anticipated to continue increasing at a rate which cannot be absorbed without adjustments to dues and registration fees. As suggested in prior year Board of Directors meetings, such adjustments should be considered on an annual basis. To this end, the 2019 annual meeting registration fees were increased approximately 10% and the Treasurer will recommend a motion to the Board to increase membership fees by approximately 2.5% ($5 individuals, $15 for organizations).

On a final note, I will be rotating off the Executive Committee at the next annual meeting as I have exceeded the proposed tenure limit of six years as Treasurer. Any qualified member interested in this position should contact Ben Richey before the 2020 annual meeting.
II. D. USAHA MEMBERSHIP MEETINGS

State of the Association
Kristin Haas

We have spent considerable time since we all last met working on what I think your current executive committee has dubbed the unsexy stuff – the behind the scenes to do list that, once complete, will enable future executive committees to continue to carry this association forward. Similarly, I do want to recognize that we have only been able to dig down into making sure the current house is in order because of decisions made and actions taken by prior leadership teams, and the glue that binds these different executive generations together is the work that Ben and Kelly complete from the central office in support of all of us. So, what are some of the keynote accomplishments of USAHA over the past year? I want to remind everyone here that these have evolved from the current USAHA strategic plan that I can assure you has not just been collecting dust on a shelf in Ben’s office. I want to share a few of those outcomes with you:

Implementation and use of the new USAHA branding – logo, association brochures, website enhancements. The logo looks great on the signs in front of the convention center and elsewhere and I love seeing it on the nice logo wear that some members have purchased.

Member outreach and engagement – the Connection newsletter I hope has been valuable to you, the mentorship program continues to evolve and we will be making enhancements to that based on feedback from this year’s meeting.

Association relevancy – the world has changed tremendously in recent years, and we must recognize that continual evaluation is necessary to ensure USAHA is able to provide what you, its members, need. There is an annual meeting task force in place.
II. D. USAHA MEMBERSHIP MEETINGS

Report of the Committee on Nominations
Barb Determan

The action of the Report of the Committee on Nominations will take place at 2:05 p.m. on October 30, 2019, during the Membership Meeting. The 2019-2020 Nominations are:

2019-2020 OFFICER NOMINATIONS

PRESIDENT..........................................................Martin Zaluski, Helena, MT
PRESIDENT-ELECT...........................................Charles Hatcher, Nashville, TN
FIRST VICE-PRESIDENT.................................Dustin Oedekoven, Pierre, SD
SECOND VICE-PRESIDENT.........................Steven Rommereim, Alcester, SD
THIRD VICE-PRESIDENT.................................Manoel Tamassia, Trenton, NJ
TREASURER.......................................................Annette Jones, Sacramento, CA

DISTRICT DELEGATES

NORTHEAST......................................................Belinda Thompson, NY
                             Karen Lopez, DE
NORTH CENTRAL................................................Paul Brennan, IN
                            Jamee Eggers, IA
SOUTH.................................................................L. “Gene” Lollis, FL
                             Eric Jensen, AL
WEST.................................................................H. M. Richards, III, HI
                      Timothy Hanosh, NM

The nominations are as a report only at this time.

Committee Chair Recognition
The following committee chairs were recognized for their service:

- Tarrie Cnric - Rabies
- Ernest Oertli - Rabies
- Gary Anderson – Diagnostic Laboratory and Veterinary Workforce Development
- Valerie Ragan - Diagnostic Laboratory and Veterinary Workforce Development
- Dale Groteleuschen – Cattle and Bison
- Marianne Ash – Animal Health Surveillance and Information Systems
- Charlotte Krugler – Animal Emergency Management

With no further business, the First Membership Meeting was adjourned.
USAHA MEMBERSHIP MEETING
WEDNESDAY, OCTOBER 30, 2019
Kristin Haas, Presiding

The Second Membership Meeting was called to order by Kristin Haas.

Report of the Action of the Committee on Nominations
Barbara Determan

2019-2020 OFFICER NOMINATIONS

PRESIDENT..................................................Martin Zaluski, Helena, MT
PRESIDENT-ELECT......................................Charles Hatcher, Nashville, TN
FIRST VICE-PRESIDENT............................Dustin Oedekoven, Pierre, SD
SECOND VICE-PRESIDENT.........................Steven Rommereim, Alcester, SD
THIRD VICE-PRESIDENT.........................Manoel Tamassia, Trenton, NJ
TREASURER.................................................Annette Jones, Sacramento, CA

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NORTH CENTRAL............................................Paul Brennan, IN
Jamee Eggers, IA
SOUTH..........................................................L. “Gene” Lollis, FL
Eric Jensen, AL
WEST..........................................................H. M. Richards, III, HI
Timothy Hanosh, NM

A motion was made and seconded to approve the nominations report and elect the individuals as slated in the report. The motion was approved without dissent.
II. D. USAHA MEMBERSHIP MEETINGS

Passing the Presidential Gavel

Immediate Past President Kristin Haas presented incoming President Marty Zaluski with his president’s gavel and pin.

Recognition of Immediate Past President

Barbara Determan presented Kristin Haas with the Past President’s plaque, recognizing her dedicated leadership and service to USAHA.
Welcome everyone! It has been a productive and fruitful meeting this week. Not quite 1,300 people in attendance, but close, which is right on par with the last several years.

The productivity and dedication by everyone here cannot be noted enough. There are lots of people that make this meeting happen.

- Dr. Scott Marshall, Peter Belinsky and the staff here in Rhode Island.
- New England Veterinary Services (VS) office, for helping out with registration and workroom.
- Our committee chairs – the program is recognized as among the finest in all of animal agriculture. This is because of you and the passion and work you display.
- And the members, that all give us a reason to do this every year.

Special thanks to:

- Kaylin
- Kim
- Kelly and Maria.

The Executive Committee is an amazing group of individuals that despite how different everyone is, it is a puzzle that works – I’d put it up against any organization in the country.

Kristin, you have filled the role of President in exemplary fashion. Your Vermont attitude and willingness to take on anything have made the last year a pleasure. Hopefully you can endure this last round of Parliamentary procedure one last time here in a few minutes.

Marty, I look forward to the coming year under your leadership. You’re fearless in leadership, and full of great ideas – so we will see what sticks. I
am apologizing to your Asaho’s in advance. They might thank me - but I’ll return your undivided attention again in a year.

I want to welcome Manoel, I hope you know what you’re in for along with Charlie, Dusty and Steve. All I will say is bring you’re A-game to this group.

And to Barb – as you rotate off, the dynamic changes immensely. Your unique skill set has been a true asset, and hope you’ll still offer your wisdom for us from time to time as we need. Six years isn’t really that long, is it?

**Report of the Committee on Nominations and Resolutions**

Barbara Determan

The Committee on Nominations and Resolutions presented its report with the following recommendations:

Combine the following Resolutions:
4 Combined with 9, 15, 16
5 Combined with 17, 31
7 Combined with 36
11 Combined with 33

The following Resolutions were held for individual action, with final action indicated.
4, 5, 7, 10, 34: Approved as Amended
23: Postponed Indefinitely

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
COMMITTEE ON ANIMAL EMERGENCY MANAGEMENT
Chair: Charlotte Krugler, SC
Vice Chair: Sarah McReynolds, KS

Bruce Akey, TX; Catherine Alexander, MN; Gary Anderson, KS; Celia Maria Antognoli, CO; Marianne Ash, IN; Rich Baca, CO; Sarah Bailey, ND; Deanna Baldwin, MD; Erin Beasley, NC; Karen Beck, NC; Lisa Becton, IA; Danielle Bickett-Weddle, IA; Carolyn Bissett, VA; Fred Bourgeois, LA; Van Brass, AZ; Becky Brewer-Walker, AR; Charlie Broaddus, VA; Kenneth Burton, KS; Minden Buswell, WA; Gregory Christy, FL; Maria Cooper, IN; Dustin Cox, NM; Stephen Crawford, NH; Chelsea Crawford, UT; Terrie Crnic, KS; Marie Culhane, MN; Ignacio dela Cruz, MP; Amy Delgado, CO; Thomas DeLiberto, CO; Barbara Determan, IA; Leah Dorman, OH; Brandon Doss, AR; Roger Dudley, NE; Stéphie-Anne Duliétre, NY; Tracy DuVernoy, MD; Anita Edmondson, CA; Jamee Eggers, IA; Cheryl Eia, MN; Bridig Elchos, MS; Dee Ellis, TX; Larry Elsken, IA; François Elvinger, NY; Allison Flinn, DC; Larry Forney, MO; Tam Garland, TX; Cyril Gay, MD; Robert Gerlach, AK; Sandra Gilmore, IL; Michael Giltsdorf, MD; K. Fred Gingrich II, OH; Linda Glaser, MN; Alicia Gorczyca-Southerland, OK; Kristin Haas, VT; Rod Hall, OK; Timothy Hanosh, NM; Charles Hatcher, TN; Susannah Haupt, MI; Andy Hawkins, KS; Bill Hawks, DC; Burke L. Healey, CO; Carl Heckendorf, CO; Julie Helm, SC; Janemarie Hennebelle, GA; Warren Hess, IL; Heather Hirst, DE; Donald Hoening, ME; Dennis Hughes, NE; Pamela Hullinger, CA; David Hunter, MT; Carla Huston, MS; Annette Jones, CA; Jamie Jonker, VA; Subhashinia Kariyawasam, PA; Bradley Keough, KY; Naree Ketusing, VA; Darlene Konkle, WI; Charlotte Krugler, SC; T.R. Lansford, TX; Dale Lauer, MN; Elizabeth Lautner, IA; Brad LeaMaster, OR; Molly Jean Lee, IA; Randall Leavings, IA; Mary Jane Lis, CT; Eric Liska, MT; Lindsey Long, WI; Margie Lyness, GA; Kathryn MacDonald, VA; Kevin Maher, IA; Bret Marsh, IN; Scott Marshall, RI; Michael Martin, NC; Beatriz Martinez Lopez, CA; Chuck Massengill, MO; James Maxwell, WV; Katherine McNamara, VT; Sara McReynolds, KS; David Meeker, VA; Shelley Mehlenbacher, VT; Marvin Meinders, VA; Gay Miller, IL; Mendel Miller, SD; Fawzi Mohamed, CT; Peter Mundschenk, AZ; Lee Myers, GA; Yvonne Nadler, IL; Sherrie Nash, MT; Michael Neault, NC; Cheryl Nelson, KY; Dustin Oedekoven, SD; Kenneth Olson, IL; Greg Onstott, MO; Kristy Pabilonia, CO; Elizabeth Parker, TX; Steve Parker, GA; Boyd Parr, SC; Allison Phibbs, DC; Barry Pittman, UT; Barbara Porter-Spalding, NC; Lisa Quiroz, CA; Jeanne Rankin, MT; Julia Ridpath, IA; Jonathan Roberts, LA; Paul Rodgers, WV; Keith Roehr, CO; Susan Rollo, TX; James Roth, IA; Margaret Rush, MD; Mo Salman, CO; John Sanders, WV; Amy Schaffer, KS; Joni Scheffel, MN; David Schmitt, IA; Kathryn Simmons, DC; Julie Smith, VT; David Smith, NY; Justin Smith, KS; Harry Snelson, IA; Diane Stacy, LA; Patricia Stoner Lonsdale, WI; Nick Striegel, CO; Darrel Styles, MD; Gregory Suskovic, MN; Tahnee Szymanski, MT; Manoel Tamassia, NJ; Vincent Tavella, VA; Tod Tedrow, SD; Belinda Thompson, NY; Jimmy Tickel, NC; Peter Timoney, KY;
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Alyssa Toillion, KS; Liz Wagstrom, DC; Michele Walsh, ME; John Walther, LA; James Watson, MS; Patrick Webb, IA; Rodney White, MD; John Williams, MD; Mark Wood, GA; Melissa Yates, MD.

The Committee met on October 27, 2019, at the Rhode Island Convention Center in Providence, Rhode Island, from 1:00 until 5:45 p.m. There were 69 members and 68 guests present. During the welcome and overview, instructions for sign-in and requests to join the committee were shared, the committee mission statement was reviewed, and the status (and responses) of each of some past resolutions was briefly discussed: 2018 USAHA Resolution 4: *African Swine Fever (ASF) Surveillance Program and Tissues for Official ASF Testing in National Animal Health Laboratory Network Laboratories*; 2018 USAHA Resolution 5: *Enhancing Classical Swine Fever Surveillance in National Animal Health Laboratory Network Diagnostic Laboratories*; 2018 Resolution 6: *Implementation of Pseudorabies Virus Deoxyribonucleic Acid Detection (Polymerase Chain Reaction) in National Animal Health Laboratory Network Veterinary Diagnostic Laboratories*; and 2016 *Radiological Incident Response and Resources*.

**Presentations and Reports**

**Farm Bill Update**
Liz Wagstrom, National Pork Producers Council (NPPC)

The 2018 Farm Bill, through section 12101, established a three-part program to comprehensively support animal disease prevention and management. The bill included funding to create two new programs: the National Animal Vaccine and Veterinary Countermeasures Bank (NAVVCB) [vaccine bank] and the National Animal Disease Preparedness and Response Program (NADPRP). It also expands funding opportunities for the existing National Animal Health Laboratory Network (NAHLN). Over the five-year life of the Farm Bill there was $150 million of mandatory funding authorized. Of the $150 million, $38 million is required to be used to fund the NADPRP portion of the program.

In September, Animal and Plant Health Inspection Service (APHIS) issued a sources sought notice to gather updated information from vaccine manufacturers interested in supplying the vaccine bank. The information will be used to develop a forward-looking vaccine acquisition strategy leading to one or more requests for proposals for foot-and-mouth disease (FMD) vaccine to address a potential outbreak. For 2019, APHIS also made available up to $10 million in funding to be divided between *National Animal Disease Preparedness and Response Program* (NADPRP) and NAHLN based on the quality of proposed projects. Livestock commodity groups continue to engage with USDA on the implementation of the program.

**Emergency Management Response System (EMRS)2 Update**
Fred Bourgeois, EMRS, National Preparedness and Incident Coordination Center (NPIC), USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS)
The presentation was an overview of outbreak activities and exercise participation over the past year. It also included new and enhanced functionality of the EMRS.

Field Operations Logistics Center, National Veterinary Stockpile (NVS) Updates: NVS Organization, Training and Exercises, State Plans
Rodney White, NVS, USDA, Animal and Plant Health Inspection Service (APHIS)
Mr. White provided an update on the new Field Operations Logistics Center structure and the National Veterinary Stockpile Training and Exercise Program. He also shared updates on supplies and equipment available in the National Veterinary Stockpile.

Virulent Newcastle Disease (vND): New Insights into an Extended Response in Today’s World
Annette Jones, California Department of Food and Agriculture (CDFA)
Based on experience gained during the 2018-2019 emergency response to vND in Southern California, which spanned more than one and a half years, Dr. Jones briefly outlined several areas as important to a successful, sustained response in today’s world. Highlights covered included:

- **Response Triggers** – Emergency response plans should include triggers for declared emergencies and United States Department of Agriculture (USDA) extra-ordinary declarations in order to ensure appropriate priority and resources are applied in a timely manner. These triggers may also help appointees and elected officials make science-based decisions in the face of changing political pressures.

- **Incident Management Teams/Staffing** – National Incident Management Teams are essential to a prolonged response and training should continue to be a priority. Rotations introduce instability that can be partially managed through incident standard operating procedures, written delegation of authority, formal transition documents, embedded State staff, immediate hiring of local workers, robust just in time training, and assignment of one executive manager for the duration of the response.

- **Use of Epidemiologists** – Epidemiologists in the Planning Section can best be used to focus on advance planning, strategy development and progress reporting, while tactical epidemiologists embedded in the Operations Section or Planning Section can help direct and prioritize specific field activities. Off-site support is well positioned to analyze data and advise Planning Section Epidemiologists. Periodic conference calls between all epidemiologists rotating on-site helps ensure continuity of approach.

- **Laboratory Communication** – Laboratory Coordinator is critical as a single point of contact – one at the laboratory and one on the incident. Electronic messaging must include result, order nd
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collection components in order to reduce errors, speed result messaging and relieve staffing pressure at the laboratory.

- **Phylogenetic Analysis** – Particularly useful epidemiology tool, particularly for ribonucleic acid (RNA) virus and a prolonged outbreak. This analysis can inform response strategies and add information to support or refute epidemiologic assumptions. Continued resource support is critical.

- **Social Media** – While Agricultural Departments are well versed in outreach, social media best practices can be beyond current response staffing models. Several specific positions were created during the 2018-2019 outbreak that facilitated and improved response strategies.

- **Secure Food Supply (SFS)** – The vND outbreak provided an extensive opportunity to ground truth to the California SFS concepts. These principles will continue to be core to all responses in California and the semi-uniform application across states that is currently underway will serve the industry well, while preventing spread of disease between producers.

- **Data Management/ Emergency Management Response System (EMRS)** – Extended responses can involve more than 500,000 official documents making a single national data management system that all who rotate to assist can use critical system.

- **Law Enforcement** – Important enforcement tools include contracts with law enforcement agencies, notices of activity to local law enforcement and ability to rapidly obtain warrants in support of regulatory authority.

Framework for Interstate Movement Decisions During a Foot and Mouth Disease (FMD) Outbreak in the United States – Update

James A. Roth, Center for Food Security and Public Health, College of Veterinary Medicine, Iowa State University

In the event of a foot and mouth disease outbreak (FMD) in the U.S., each state will respond differently due to their individual situation. A draft document that proposes a potential framework to classify the status of FMD infection/vaccination in individual states has been developed for discussion. The draft Framework for Interstate Movement Decisions document provides a possible designation for the FMD status of individual states (see Figure 1).

The FAD PReP Strategy Document: Classification of Phases and Types of a Foot-And-Mouth Disease Outbreak and Response (http://www.cfsph.iastate.edu/pdf/phases-and-types-of-an-fmd-outbreak) addresses the FMD status of the U.S. on a national scale. Having a common agreement on status of the outbreak by state could lead to a framework for agreement on movement between states based on the status of each state, on priorities for allocation of vaccine and other resources, and a process for moving toward FMD free status for the nation.
The Agricultural Response Management and Resources (ARMAR) FMD exercise in May 2018 made it clear that individual states will respond differently to FMD outbreaks. Each State Animal Health Official (SAHO) is responsible for managing the outbreak response within their state. Livestock and processing industries vary widely between states and each state has different laws that impact their ability to respond to the outbreak and implement movement controls. There is a need for SAHOs to discuss approaches for controlling movement between states depending on the infection status of the states. This approach is likely to change from Phase 1 at the beginning of an FMD outbreak to Phase 2 as the outbreak is spreading and during Phase 3 as the outbreak is being brought under control. The approach taken by states needs to consider the recommendations that Federal Animal Health Officials make regarding animal movement, the SAHOs’ need to protect their livestock industries from infection, the business continuity needs of industry and the public’s need for a safe and wholesome food supply. In some cases, USDA may impose a Federal quarantine or other movement control by Federal Register Order (under the Animal Health Protection Act and Code of Federal Regulations) when requested by SAHOs or as directed by the Secretary of Agriculture. A framework of potential state responses and movement permitting based on the situation in each state will help to reduce uncertainty and encourage uniformity and cooperation. The response and recovery phases in an FMD outbreak will likely need to be individualized state by state.

The draft document has been presented to the National Assembly of State Animal Health Officials (NASAHO) and shared with USDA-APHIS, Veterinary Services (VS) leadership. NASAHO appointed a Working Group to review and make suggestions for revision of the document. This is still a work in progress. Any recommendations in this document will be guidelines only, and Responsible Regulatory Officials will make decisions based on available information at the time of the outbreak.
Figure 1.

**National Phase of FMD Response and Potential State Designations**

**Phase 1:** The period of time from the confirmation of the first FMD case in the United States until there is reasonable evidence to estimate the extent of the outbreak.

- State not known to be infected with FMD
- FMD Suspect State
- FMD Positive State

**Phase 2:** Surveillance and epidemiology provides timely evidence of the extent of the outbreak (characterized as one of six types) to support planning and decision making by Incident/Area Command.

- State not known to be infected with FMD
- FMD Free State
- FMD Suspect State
- FMD Positive State
  - Level 1, Stamping out
  - Level 2, Stamping out with vaccination
  - Level 3, Vaccination with limited stamping out
  - Level 4, Vaccination with no stamping out
  - Level 5, FMD Vaccinated State

**Phase 3:** Surveillance and epidemiologic evidence indicates that the outbreak is coming under control and a plan is implemented to regain FMD-free status (possibly with vaccination).
American Veterinary Medical Association (AVMA) Responder Certificate Program -- Warren Hess, AVMA
Veterinary Disaster Responder Entry Level Core Competencies (Awareness Level Training)

1. **Opportunities for Veterinary Responders**

   Comments: AVMA has a recorded webinar on opportunities for veterinary responders. National Alliance of State Animal and Agricultural Emergency Programs (NASAAEP) has a recording of a webinar that AVMA helped to present on licensing portability during emergencies. It has separate links for the slides and the audio.

   a. Understand formal opportunities for trained veterinary responders
   b. Explain why Spontaneous Unaffiliated Volunteers (SUVs) may create more of a problem that they help solve
   c. Explain three (3) possible avenues for veterinary license reciprocity during disasters or animal health emergencies

2. **Basics of Emergency Planning**

   Comments: Evacuation/Rescue should include “feed in place”. Some of these topics could utilize aspects of NASAAEP’s Best Practice Documents. 3a should provide big picture of how to address overall challenges that county/state level animal response might face and how to assess/understand what has happened. This will help to understand when, how, and where to start a response. Should include instruction on service animals with explanation of difference between service and emotional support animals.

   a. IS-10.A: Animals in Disasters: Awareness and Preparedness
   b. IS-111.A: Livestock in Disasters - FEMA
   c. Assessment of Animal/Owner Needs
   d. Animal Evacuation (livestock/pets)
   e. Animal/Owner Rescue
   f. Animal Decontamination
   g. Animal Disaster Triage
   h. Emergency Sheltering & Emergency Medical Care
   i. Reunification

3. **Introduction to Impacts of Disasters to include (Federal Emergency Management Agency (FEMA) Lifelines):**

   Comments: Should include discussion on how different types of disasters may lead to similar impacts (all can lead to food/water, fuel, shelter shortages). Power/Fuel should focus on how a lack of those resources can affect animal response.

   a. Safety & Security
   b. Food, Water, Shelter
c. Health & Medical  
d. Energy (Power, Fuel)  
e. Communications  
f. Transportation  
g. Hazardous Material  

4. Key Partnerships and Interagency Coordination

Comments: To include coordination with agencies and teams that don’t normally think about animals. Also, to include coordination and cooperation with animal agencies/teams from those rescuing animals from the event all the way to those working on reunification efforts and everything in between. Understanding of the agencies that have jurisdictional authority over specific classes of animals is essential. Veterinarians may be involved locally and be working with an interagency planning group through a local veterinary medical association (VMA) chapter or through their emergency management agency (EMA). Many states also have a state emergency response team. There also may be veterinarians that work locally with law enforcement but are also on a state animal search and rescue (ASAR) group. It would be helpful to veterinary students and veterinarians to understand how those lines of communication and authority are addressed.

Utilizes a network of traditional and non-traditional partners to identify and pursue preparedness and response goals.

a. ICS-100: Introduction to the Incident Command System (ICS)  
b. ICS-200: ICS for Single Resources and Initial Action Incidents  
c. IS-700: National Incident Management System, An Introduction  
d. IS-11.A: Animals in Disasters: Community Planning  
e. Develop partnerships with other agencies that have authority in animal-related situations including the Chief Animal Health Official (CAHO/State Veterinarian), Federal Area Veterinarian in Charge (AVIC), and animal control agencies; clarify roles and responsibilities.  
f. Maintain a current directory of partners and identify appropriate methods of contact in disasters and emergencies.  
g. Use established communication systems for coordination among the response community during a disaster or animal health emergency.  
h. Maintain regular communication with emergency response partners.  
i. Consider community needs when developing and implementing local/state animal preparedness, response, and recovery policies.
j. Foster community participation and involvement in local/state animal preparedness, response, and recovery initiatives.
k. Create or leverage opportunities to develop new partnerships.
l. Maintain agreements with partners from within the jurisdiction and from other jurisdictions to foster teamwork, information sharing, and cooperation.
m. Explain how various organizations, positions, and roles contribute to carrying out animal preparedness, response, and recovery functions and essential services.
n. Apply strategies to resolve conflicts.
o. Interact appropriately based on the situation.
p. Interact appropriately with persons from diverse cultural, socioeconomic, educational, racial, ethnic, and professional backgrounds.

5. **Utilization of Space for Animal Welfare/Disease Prevention, Biosecurity Principles, Personal Protective Equipment (PPE)**

   Comments: This would ideally include interactive activities (setting up zones, control areas and then practice PPE for example). APHIS has interactive modules in some of these subjects as part of National Veterinary Accreditation Program (NVAP). Here is a list of the modules that cover some of these areas:
   - Module 4 (Preventing Disease Introduction and Spread)
   - Module 22 (Animal Welfare: An Introduction)
   - Module 25 (Using Animal Behavior to Assess Animal Welfare)

6. **Public Health and Disease Response (zoonoses, food/water safety, wildlife interactions, FADs)**

   Comments: Keep in mind this is an awareness level training. Courses such as Foreign Animal Disease (FAD) Preparedness and Response Plan (PReP) and Colorado State University’s (CSU) FAD course would be far beyond what is expected here but would be a great next level training. Foreign Animal Disease Diagnostician (FADD) training would be a top-level training that is not available to just any veterinarian.

   Kansas State University (KSU) Animal Disease Response Training may be a model to use.

7. **Humane Euthanasia/Depopulation/Disposal**

   Comments: Again, this is an awareness level training. Concepts taught should be compliant with AVMA’s Guidelines for the Euthanasia of Animals and the soon to be released Guidelines for the Depopulation of Animals. Jan Shearer at Iowa State University has some video trainings and may have a recorded webinar.

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https://vetmed.iastate.edu/vdpam/about/production-animal-medicine/dairy/dairy-extension/humane-euthanasia

a. Explain the difference between euthanasia and depopulation
b. Explain under what circumstances depopulation techniques would be appropriate during disasters and animal health emergencies
c. Explain what agencies are involved in deciding how large quantities of animal carcasses are disposed
d. Understand current accepted methods of carcass disposal

8. Psychological First Aid
Comments: Bringing in a psychologist or social worker experienced in mental health impacts of disaster response would be very helpful. The following might be good places to get training ideas/resources:
https://www.criticalincidentstress.com/what_is_cism
https://mobile.va.gov/app/pfa-mobile

9. Disaster Responder Physical Fitness/Safety & Protection/Situational Awareness
Animal and Plant Health Inspection Service (APHIS) has interactive modules in some of these subjects as part of National Veterinary Accreditation Program (NVAP). Here is a list of the modules that cover some of these areas:

Module 10 (Personal Protective Equipment for Veterinarians)
Module 19 (Animal Health Emergency Response)

a. Physical Fitness
Understands the health and fitness requirements that may be encountered in austere environments during disaster and animal health emergencies.
   i. Explain general health risks associated with disasters and animal health emergencies
   ii. Explain personal fitness risks and requirements associated with disasters and animal health emergencies

b. Safety & Protection
Ensures health and safety of self and others.
   i. Explain general safety risks associated with disasters and animal health emergencies
   ii. Describe risk reduction measures that can be implemented to mitigate or prevent infectious and hazardous exposures in a disaster or animal health emergency
iii. Demonstrate proficiency in the assessment, selection, and use of health and safety measures (e.g., technology, equipment, devices, situations)

iv. Demonstrate effective use of personal protective equipment (PPE)

v. Adhere to applicable industry regulations, guidelines, and safety precautions related to the use of PPE and other devices

vi. Demonstrate effective use of emergency communication equipment

c. Situational Awareness

Maintains an awareness of the critical elements of an emergency by seeking, filtering, and processing information from available sources. Supports collective awareness through the provision of information.

i. Identify sources of information relevant to critical elements of disaster or emergency

ii. Use tools (e.g., communication) to support situational awareness

iii. Review situation reports to remain up-to-date on a crisis

iv. Attend to new information and adapt activities as appropriate

v. Contribute to the content of the situational report

vi. Maintain an awareness of own behavior and consider the perspectives of others to resolve or avoid cultural issues or misinterpretations

vii. Identify general indicators and epidemiological clues that may signal the onset or exacerbation of a disaster or animal health emergency

10. Veterinary Business Resiliency/Continuity of Operations

Comments: AVMA has a course developed and others are developing training as well. Should be National Fire Protection Association (NFPA) 1600 compliant.

a. Demonstrate personal and family preparedness for disasters and emergencies

b. Prepare a personal/family disaster/emergency plan

c. Gather disaster supplies/equipment consistent with personal/family plan

d. Practice your personal/family disaster plan at least annually

e. Describe methods for enhancing personal resilience, including physical and mental health and well-being, as part of disaster/emergency preparation and planning
f. Prepare a personal professional disaster plan consistent with one’s overall business, agency, organizational, and/or jurisdictional plan

g. Contact with your local (city/county) emergency manager and inform them of what resources your business can offer to the community and what resources you may need to be prioritized for during a disaster/emergency

h. Determine a consistent method of assessing risks to your business resources

i. Determine mitigation techniques to decrease the risk to your business resources

j. Create a rapid evacuation plan for your business, including animals

k. Practice your business disaster/emergency plan at least annually

Regional Alliance Updates:

**Southern Agriculture and Animal Disaster Response Alliance (SAADRA)**
Kathryn MacDonald, Virginia Department of Agriculture and Consumer Services

SAADRA was established after Hurricane Katrina in 2005 and is an interactive collaboration of states at risk from similar natural, intentional, technological, and disease disasters affecting agriculture and animals. It works to strengthen all-hazard capabilities through partnerships with the public, animal and agriculture industries, and every level of government. The thirteen SAADRA states work together to increase communication and coordination during emergency events, share training opportunities, share state plans and templates, and create working groups to develop practical solutions. The Southern Animal Health Association (SAHA) is working with USDA to conduct a regional foreign animal disease exercise in November 2020. The fully functional Foreign Animal Disease Southern Agriculture Functional Exercise (FAD SAFE) will simulate a Foot-and-Mouth Disease (FMD) outbreak affecting multiple states. SAADRA is supporting SAHA by assisting with planning efforts and helping to create a consistent and collaborative regional approach to a foreign animal disease response.

**Multi-States Partnership for Security in Agriculture (MSP) – including a proposal for a National Secure Food Supply System Framework**
Mike Starkey, Minnesota Department of Agriculture

The MSP held their annual meeting in St. Paul, Minnesota, this past spring with 17 of the 18 member states participating. As a precursor to the annual meeting, in conjunction with the Veterinary Services Training and Exercise Plan (VSTEP) was a Secure Milk Supply (SMS) pilot exercise that was held with industry representatives from Minnesota and Wisconsin.
Secure Food Supply planning continues to be a priority for the MSP. The MSP also approved funding to support the Center for Food Security and Public Health website with the vast resources such as Just-in-Time trainings and message maps for animal disease emergencies.

MSP is a collaborator on the National Pork Board (NPB), American Association of Swine Veterinarians (AASV), and Iowa State Authorized Swine Testing Agent program. MSP states are going to pilot the program. Another focus is swine cold weather depopulation, carcass disposal, and cleaning and disinfection research and training.

New England States Animal Agricultural Security Alliance (NESAASA)

NESAASA coordinates regional discussions on issues including emergency management and disaster response. In the absence of a regional exercise this year, NESAASA worked through a number of issues that created challenges and problems for animal health regulators in the northeast.

Members discussed the use of waivers of Certificate of Veterinary Inspection (CVI) requirements in animal welfare cases where livestock are seized and may need to be moved immediately across state lines for safe housing. NESAASA continued to seek a resolution to the fact that cattle imported from Canada are not necessarily required to have complete and accurate traceability information (e.g. accurate address-of-destination, etc.) on import documents. USDA, Veterinary Services (VS) and NESAASA members worked with USDA, Food Safety and Inspection Service (FSIS) to update written protocols for handling neurological animals at slaughter in the region. NESAASA members continue to work on resolving a lack of reporting of reportable diseases in the region by private laboratories.

The State of Maine and USDA-VS are in the planning and development stages for a National Veterinary Stockpile table-top exercise in 2020 and a full scale NVS exercise in 2021.

Committee Business:

Five (5) resolutions were submitted by committee members. The following four (4) were adopted/approved through motions made, seconded and passed by voice vote:

- Adequate Funding for Vaccine/ Countermeasures Bank and NAHLN
- American Veterinary Medical Association (AVMA) Veterinary Responder Certification Program
- Strengthening the U.S. Animal Disease Traceability and Disease Prevention Infrastructure

The meeting was adjourned at approximately 5:10 p.m.
The Committee on Animal Health Surveillance and Information Systems (CAHSIS) met from 3:00-6:00 p.m. on October 27, 2019 at the Rhode Island Convention Center in Providence, Rhode Island. There were 29 committee members and 25 guests present. Dr. Ash welcomed those present and gave a short presentation on basic housekeeping. The audience was also informed of the approved status of all five of the committee’s 2018 resolutions.

Presentations and Reports

Update: Subcommittee on Electronic Certificate of Veterinary Inspection (eCVI) Standards National Assembly of State Animal Health Officials’ (NASAHOs) Traceability and Technology Committee

Stacey Schwabenlander, Minnesota Board of Animal Health

A brief history of the eCVI Standards was presented as follows. On October 20, 2018 the concept of an eCVI standards subcommittee was presented to the National Assembly on behalf of their Traceability and Technology Committee (TTC) during the annual USAHA meeting. A request was made for the National Assembly to approve a group to develop eCVI standards for all eCVI vendors in an effort to support national approval of eCVIs and thus advance electronic data sharing, animal disease traceability, and streamline eCVI use for states, accredited veterinarians, airlines, and
others who utilize the information conveyed on CVIs. This request was approved and lead to the development of the eCVI Standards Subcommittee under the TTC. Standards were then developed by a group of State Animal Health Officials (SAHOs) representing different regions of the country. These standards were presented to the National Assembly in April 2019 and approved.

The XML data exchange standard developed by the Subcommittee on eCVI Data Standards of the AAVLD/USAHA Committee on Animal Health Surveillance and Information Systems is only one of many standards included in the eCVI standards developed by the eCVI Standards Subcommittee of the TTC.

There are six different areas the standards cover, and the members of the subcommittee use these standards to guide review of vendor platforms that produce eCVIs. As of October 2019, one vendor platform has been reviewed and approved. A second has been reviewed and approval is being recommended (recommendation will be made to the National Assembly on October 26, 2019). A third vendor platform is still under review. In total, 13 vendors have been contacted and made aware of the review process.

Veterinary Services (VS) Integration Systems Update
Orlando R Baca, USDA, Animal and Plant Health Inspection Service (APHIS)

Rich Baca provided an update covering recent accomplishments at USDA-APHIS-VS regarding enhancements and additions to information systems. He covered tools used for data collection, integration, reporting, and analytics. New systems now running include the VS Messaging Services, Data Integration Services, and Tableau reporting. On the horizon for FY20 are modernization of the mobile information management system and enhancements to the VS Process Streamlining System (VSPS).

A notable feature of the VS Message Service is its ability to receive a USAHA compliant eCVI message. Enhancements to VSPS requested in the 2018 resolutions 7 and 11 have been considered and included in the current scope of work for VSPS enhancements. The combination of the VS Message Service and VSPS enhancements will meet the requested features in these two resolutions.

African Swine Fever (ASF)/ Classical Swine Fever (CSF) Surveillance Update National and Global
Gericke L Cook, APHIS, Center for Epidemiology and Animal Health

Swine hemorrhagic fevers such as classical swine fever (CSF) and African swine fever (ASF) are highly contagious viral diseases that affect domestic and feral pigs, as well as wild boar. USDA-APHIS has prepared extensively in several scientific areas to ready the U.S. in the event of an ASF or CSF incursion. These preparations include global monitoring for situational awareness, entry assessments, in-depth risk assessments, drafting and updating national surveillance plans, training and exercises, enhancing diagnostic capacity, and collecting surveillance data.
High Quality Veterinary Diagnostic Laboratory Data Streams: Missed Opportunities for Animal Health!
Craig N. Carter, University of Kentucky

The day-to-day (non-FAD) diagnostic testing data generated by our American Association of Veterinary Laboratory Diagnosticians (AAVLD) Accredited National Animal Health Laboratory Network (NAHLN) member laboratories (42) is of very high quality and quantity (re “big-data”). Unfortunately, this data is under-utilized for valuable regional and national animal health studies due to the time needed to collect and standardize data sets for summarization and analysis. Requiring NAHLN laboratories to map their testing data to an international standard such as Systematized Nomenclature of Medicine - Clinical Terms (SNOMED CT), would make it much easier and faster to summarize, report and analyze this big-data set. The 2018 USDA-APHIS NAHLN Antimicrobial Resistance Pilot Project is a case in point. In order to do this pilot study, the NAHLN had to initiate a joint working group to standardize the susceptibility data and port it to a centralized data base. Despite the aggressive effort by the AAVLD and the USDA to garner participation, only 19 diagnostic laboratories contributed antimicrobial susceptibility testing data for four pathogens. If all NAHLN Laboratory Information Management Systems (LIMS) diagnostic data elements were mapped to a standard, the ability to conduct similar studies by etiology, sensitivity, or diagnosis would be unlimited and could be done in near-real-time.

The Farm and Ranch Planner - A Functional Web-Based System to Collect and Securely Store Data for Livestock Premises
Shaun Kennedy, Food Systems Institute LLC

The Farm and Ranch Planner (https://www.farmandranchplanner.com) was developed as part of a broader effort by the Minnesota Board of Animal Health to support improved preparedness for foreign animal disease events following the Agriculture Response Management and Resources (ARMAR) Exercise in 2018. Overseen by the Minnesota Beef Council and the Minnesota Cattleman’s Association, the Food System Institute and the University of Minnesota have collaborated to develop a platform that builds off prior efforts to develop a similar system for the poultry industry. The earlier project was funded by the U.S. Poultry and Egg Association and the Foundation for Food and Agricultural Research (https://poultrydiseaseplanning.com/login).

The Farm and Ranch Planner provides various tools to assist cattle and dairy farmers in assembly and maintenance of data on their operations. Outputs can range from maps of their operations and general services down to individual animal treatment and movement information. It also provides a cloud-based approach for maintaining records and assessments for the Secure Beef Supply and Beef Quality Assurance programs. Beyond its utility for cattle and dairy producers, it also provides outreach and emergency contact tools for the Minnesota Board of Animal health, the Minnesota
Department of Agriculture, Minnesota Beef Council and Minnesota State Cattleman’s Association. The goal is to provide a range of tools that support cattle and dairy producers during their normal operations so that they are comfortable using them in the case of a foreign animal disease event, natural disaster, fire or other disruption. Importantly, the platform utilizes state-of-the-art security tools to ensure that cattle and dairy producers are always in control of their data. They determine who and when others can access it. This builds from experience in development and hosting of the National Animal Health Laboratory Network (https://www.nahln.org/) and the Food Emergency Response Network (FERN) (https://www.fermlab.org/) collaboration platforms which both require high levels of data security. The platform also has built-in extensibility such that extension to other states or geographies is a very low-cost option as very little new coding would be required.

National List of Reportable Animal Diseases (NLRAD) and National Animal Health Reporting System (NAHRS) Updates

Rebecca Jones, USDA-APHIS, Veterinary Services (VS), Science, Technology, and Analysis Services (STAS), Center for Epidemiology and Animal Health (CEAH)

The National List of Reportable Animal Diseases (NLRAD) is a proposed regulation that will create an obligation to report detections of animal disease to the Animal and Plant Health Inspection Service (APHIS) and to State Animal Health Officials (SAHOs). The joint effort of many stakeholders, including the United States Animal Health Association (USAHA), the American Association of Veterinary Laboratory Diagnosticians (AAVLD), and the National Assembly of State Animal Health Officials (NASAHO) resulted in the creation of the NLRAD. The purpose of the NLRAD is to have consistent animal disease reporting across the United States and to help animal health officials protect the U.S. agriculture infrastructure. The NLRAD also supports domestic and international commerce; helps meet international reporting obligations to the World Organization for Animal Health (OIE) and trading partners; supports the creation of export certifications; contributes to the knowledge of zoonotic and endemic animal diseases; and aids in the response to an emerging disease or issue in the United States. The national animal disease list is based on the OIE list of reportable diseases and is intended to complement and supplement State reportable disease lists. The NLRAD builds on the current National Animal Health Reporting System (NAHRS) that facilitates voluntary disease occurrence reporting by state animal health officials to APHIS.

The NLRAD includes two categories: 1) Notifiable Diseases and Conditions and 2) Monitored Diseases. The term ‘disease’ includes disease agents and pathogens. Notifiable diseases and conditions (notifiable diseases) consist of emergency incidents, emerging disease incidents, and regulated disease incidents. Any animal health professional who suspects or diagnoses a notifiable disease will be required to report it immediately to the
SAHO and to APHIS. Monitored diseases generally are those that are endemic in the United States and are required to be reported in 6-month and annual reports to the OIE. APHIS also uses data gathered to monitor changes in disease occurrence over time. States and laboratories will be required to report occurrence information (yes/no) on monitored diseases monthly; laboratories will report to SAHOs and States will report to APHIS. Stakeholder collaboration and feedback has been important in the development of the NLRAD and APHIS would like to continue with this engagement into the future. Additional information about the stakeholder engagement process will be made available on the APHIS website when the proposed rule is published for public comment in the Federal Register. APHIS encourages and welcomes all stakeholders to review and comment on the proposed rule when it is published.

The NAHRS is designed to provide summary-level data on the presence/or absence of all NLRAD in the U.S. Reporting occurs monthly by States on the presence of NLRAD-listed diseases for which occurrence has been identified with a high level of certainty. NAHRS is a voluntary, collaborative effort between participating States, AAVLD, USAHA, and APHIS. NAHRS functions under the direction of the NAHRS Steering Committee, which includes representatives from the AAVLD, USAHA, APHIS, participating States, and experts representing each major commodity group: cattle and bison, cervid, sheep and goats, equine, swine, avian, and aquaculture. NAHRS is managed by APHIS. The NAHRS is an important component of comprehensive and integrated surveillance in the United States and its primary objectives are:

- To demonstrate the integrated and transparent nature of disease surveillance and reporting in the United States and ultimately help protect the global market share of U.S. animals and animal products sold.

- To provide the primary source of information used in the completion of OIE reports by APHIS. This disease occurrence information is critical for the facilitation of U.S. international trade and for the United States to meet its reporting obligations as a member of OIE.

- To provide reporting that reflects the comprehensive summary-level animal disease status of the United States, and individual State reporting that reflects the summary-level disease status in that State.

- Contribute to the assessment and reporting of listed zoonotic and endemic animal diseases.

Forty-two states have submitted at least one report to NAHRS for FY19 so far, and 19 States have submitted all 12 reports. We expect the number of reports for FY19 to increase in the coming months. Reporting to NAHRS can be difficult due to participant password issues, State personnel changes, and limited State resources. To help facilitate reporting, APHIS developed a new web reporting tool for NAHRS. The new NAHRS web reporting tool integrates with State animal disease data received through other APHIS systems, provides dashboards to see reporting histories, and is flexible to accommodate any future NAHRS changes. The new NAHRS system will
require level 2 e-authentication access, which is an increase in security from the old system. The old NAHRS system will be retired on January 1, 2020.

Committee Business:
No resolutions were presented to the membership this year.
Dr. Martin announced that the version two electronic certificate of veterinary inspection (eCVI) data standard is gaining wide acceptance. A few issues were addressed over the last year that brought the standard up to version 2.2. Work this year included two substantive updates that involved address-block elimination and allowance of repeatable group-lot-IDs. There were also a few typographical and documentation updates made during the year. Outstanding issues were discussed and included such things as: Canadian and Mexican radio-frequency identifications (RFIDs), Tribal Nation’s addresses, Group-Lot inspection dates, total number in consignments, multi-species CVIs and various other loopholes. Dr. Martin noted that there are still challenges out there; however, the standard is alive and well, participation has improved and there is pressure to move on.
The Committee met on Wednesday, October 30, 2019 at the Rhode Island Convention Center in Providence, Rhode Island, from 8:00 to 11:50 a.m. There were 48 members and 23 guests present.

**AAAP Broiler Chicken Lighting Review**
Suzanne Dougherty, American Association of Avian Pathologists (AAAP)
ANIMAL WELFARE

The amount, intensity, and color of light is important in different stages in poultry production. It affects the ability to get chicks on feed, gain, and reproduction issues. However, too much lighting results in higher mortality and leg issues. Bird size, sex, and genetic breed effect how the birds respond to light.

Various animal welfare audits and certification programs require different intensities and durations of lighting. The recommendations within different programs have evolved over the years. Most certification programs reference non-U.S. literature.

The AAAP animal welfare committee has asked Tom Table, Ph.D., Mississippi State University, to produce a white paper looking at the more than 180 scientific papers regarding all aspects of lighting. A draft of the paper is currently under review by AAAP.

Animal Health Risks of Importing Dogs and Cats as Rescues
Lynne White-Shim, USDA, Animal and Plant Health Inspection Service (APHIS)

Passed by Congress in 1966, the Animal Welfare Act (AWA) seeks to ensure the humane handling, care, treatment, and transportation of certain animals that are used or intended for use in research, exhibition, or as pets. In August 2014, APHIS amended the AWA to require that dogs imported into the United States for resale are healthy, vaccinated, and are over six months of age, with limited exceptions. Since November 2014, importers, prior to import, are required to demonstrate proof of age, vaccination, and health of dogs imported for resale. In this context, “resale” includes, but is not limited to, dogs imported for sale in wholesale channels, at retail, and for adoption after arrival in the United States, as well as dogs imported for other purposes involving transfer of ownership or control of imported dogs to another person for more than de minimis consideration. APHIS maintains limited exceptions for this rule, which dogs imported for resale with veterinary treatment needs not able to be provided in the country of export, research purposes, as well as dogs imported into Hawaii from the British Isles, Australia, Guam, and New Zealand.

APHIS has seen significant growth in this area in the last couple years. In FY19, APHIS issued 2,002 permits covering 6,263 dogs entering the United States, compared to 579 permits covered 2,050 dogs in FY18. To ensure the Agency is providing high quality customer service to importers, APHIS has automated the permitting process. Importers can now obtain a permit online, resulting in 50 percent faster permit processing, from 135/month prior to the upgrade to 253/month in the two months after implementation.

Managing Analgesia on Farms
Abbie Viscardi, Kansas State University

Pain results in changes to behavior and physiology. Sources of pain in livestock production systems include elective procedures, such as surgical castration, tail docking, and dehorning/ debudding.
There are numerous challenges in managing livestock pain, including it being difficult to recognize pain.

Dr. Viscardi discussed pain assessment tools including behavior, plasma cortisol (from blood, hair, or saliva), algometry (pressure tolerance at the surgical site), infrared thermography, and pressure mat analysis. Dr. Viscardi also discussed options to eliminate painful husbandry procedures, such as the polled gene.

The Food and Drug Administration (FDA), National Pork Board (NPB), and American Association of Swine Veterinarians (AASV) are partnering on a pain mitigation assessment protocol working group in swine.

Pain management literature for goats and sheep in the United States is limited, primarily due to lower animal numbers. There is greater U.S. literature for cattle.

**Fatigued Cattle Syndrome**
Tiffany Lee, North American Meat Institute (NAMI)

The mobility of finished cattle presented for slaughter gained attention after an adverse animal welfare event was reported in 2013, heightening awareness of and concern about severe fatigue and its effects, a condition now defined as “Fatigued Cattle Syndrome.” A similar condition has been described in swine where a portion of hogs exposed to stress at the time of transport display decreased mobility, and in extreme cases, become non-ambulatory as the result of metabolic acidosis and muscle fatigue. Reports of Fatigued Cattle Syndrome (FCS), typically occur in the hot summer months and manifest with clinical signs such as tachypnea, muscle tremors, a stiff gait with shortened strides, reluctance to move, and in severe cases, sloughing of the hoof wall. Reports involving cattle diagnosed with FCS describe radical elevations in certain hematological variables such as lactate, creatine kinase (CK), and aspartate aminotransferase (AST) when compared to normal reference ranges.

Measuring mobility scores and identifying the possible causes of decreased mobility can help producers further up the transport chain understand which practices to implement that will promote better health and mobility of fed cattle, and perhaps decrease the incidence of FCS in cattle presented to slaughter. For example, widespread use of mitigation strategies such as regular exercise and low-stress handling techniques may help address the most common mobility issues fed cattle experience. Further research is needed to more fully explore the risk factors associated with FCS.

**Access to Compounded Drugs for Use in Wildlife**
Gail C. Golab, American Veterinary Medical Association (AVMA)

Compounding, consistent with Food and Drug Administration (FDA) Extra-Label Drug Use regulations, is the customized manipulation of an FDA-approved animal or human drug(s) by a veterinarian, or by a pharmacist upon the prescription of a veterinarian, to meet the needs of a particular
ANIMAL WELFARE

Compounding drugs from unapproved (bulk) substances for animals is currently illegal under the federal Food, Drug, and Cosmetic Act (FDCA) and Animal Medicinal Drug Use Clarification Act (AMDUCA). That said, the AVMA recognizes that compounding of drugs from unapproved bulk substances for use in animals not intended for food (e.g., major and minor non-food animal species) is medically necessary when approved product is not commercially available, needed compounded preparation cannot be made from the approved product, or no approved product is available from which to compound the needed preparation. AVMA believes compounding from bulk substances should be allowed for non-food animals in these situations, but ONLY in the context of a veterinarian-client-patient relationship.

In response to a 2012 outbreak of fungal meningitis caused by a contaminated compounded corticosteroid product that sickened more than 750 people and killed 64, Congress passed the Drug Quality and Security Act of 2013. That law gave FDA more regulatory authority and enforcement ability over compounded products, but did not specifically address products compounded for animals. As a result, in 2015, FDA issued draft guidance on the compounding of drugs in veterinary settings. Prior to responding, the AVMA sought input from its Councils and Committees, as well as species- and practice-specific veterinary associations. This included 91-pages of comments from those working with animals in wild or zoo settings, which provided clear evidence that unwarranted restrictions on access to compounded drugs posed serious animal care and welfare concerns.

As part of its draft guidance, FDA referenced quality standards found in United States Pharmacopeia (USP) chapters <795> and <797>. AVMA initially didn't have concerns with these chapters as referenced in FDA draft guidance #230, but later learned that some aspects of these chapters were, in fact, problematic. And, when USP announced revisions to its chapters in 2018, even more concerns became apparent, including likely negative impacts of beyond-use-date assignments. During the spring and summer of 2019, AVMA staff met with USP staff and submitted written comments to share veterinary compounding practices, as well as requests for the creation of a veterinary-specific compounding chapter and a postponement of adoption of the current draft chapters until such time as a veterinary-specific chapter could be completed. While USP indicated its willingness to consider a veterinary-specific compounding chapter, it initially declined the AVMA's request for postponement. Subsequently multiple appeals were filed by other individuals and organizations, and USP has postponed implementation of <795> and <797> until such time as all appeals have been resolved.

Diminishing Options for Mortality Disposal and Animal Welfare
David Smith, New York State Department of Agriculture and Markets

The past 30 years have seen a steady decline in livestock owners’ options for carcass disposal. Injured and disabled large animals which previously could have been sold for slaughter are no longer eligible due to both humane concerns and public health concerns. Consumers’ high regard
for horses now precludes nearly all pet food manufacturers from sourcing protein from equines. Most recently, the discovery of euthanasia solution residues in pet food has caused renderers who market protein, protein meal, and rendered fats to the pet food industry to be unwilling to accept farm mortalities.

Dr. Smith discussed the lack of rendering options, its impacts on animal agriculture, how it adversely affects animal welfare, and possible ways to lessen the problem.

Committee Business:

There were no resolutions presented or other committee discussion.
USAHA/AAVLD COMMITTEE ON AQUACULTURE
Chair: William Keleher, ME
Vice Chair: Danielle Nelson, WA

Peter Belinsky, RI; Carolynn Bissett, VA; Y Reddy Bommineni, FL; Beverly Byrum, OH; Fred Cunningham, DC; Ignacio dela Cruz, MP; Larry Elsken, IA; Tony Forshey, OH; Richard French, NH; Kathleen Hartman, FL; Jennifer Haugland, NC; Warren Hess, IL; Donald Hoenig, ME; Brian Joseph, WA; William Keleher, ME; Donna Kelly, PA; Lester Khoo, MS; James Kober, MI; Christina Loiacono, IA; Beatriz Martinez Lopez, CA; Michael Neault, NC; Danielle Nelson, WA; Jenee Odani, HI; Lanny Pace, MS; Roger Parker, TX; Amar Patil, NJ; William Pittenger, MO; James Roth, IA; John Sanders, WV; Kevin Snekvik, WA; Manoel Tamassia, NJ; Michele Walsh, ME; Courtney Wheeler, MN; Richard Whittington, AL; John Williams, MD; Pamela Yochem, CA; Paul Zajicek, FL.

The Committee met on October 27, 2019 at the Rhode Island Convention Center in Providence, Rhode Island, from 12:30 to 5:00 p.m. There were 15 members and 37 guests present. We reviewed resolutions, made introductions, and presented announcements, as requested.

Presentations and Reports

Marine Finfish Aquaculture in the Northeastern U.S.
George Nardi, InnovaSea Systems

Mr. Nardi discussed different fish species, culture methods of land-based systems and coastal/off shore production. Nardi emphasized the importance of technical development and matching those with market opportunities. He shared the keys to success of aquaculture that are juvenile quality and managing system water quality. He spoke on health issues and the importance of robust facility biosecurity and appropriate quarantine. The biggest health issues for these species are insidious parasites and dissolved oxygen issues.

European Sea Bass Culture using Recirculating Aquaculture Systems
Eric Pedersen, Ideal Fish

Mr. Pedersen shared the history and growth of his company, Ideal Fish, which grows European Sea Bass. European sea bass are a nonnative fish species which is a popular food fish and can be grown well in recirculating aquaculture systems. Pedersen shared the production cycle of his fish. He imports juveniles from Europe, quarantines these animals and then moves them to the grow-out area. Whole fish leave the facility on ice. The benefit of the domestic grow out of these animals provides a fresher product to consumers. He attributed his success to direct sales of his product versus using a distribution network. He shared that Ideal Fish is looking forward to the release of a smoked product hitting shelves this December.

American Unagi — Eel Aquaculture in Maine
REPORT OF THE COMMITTEE

Sara Rademaker, American Unagi

Ms. Rademaker described the range of aquaculture practices from extensive to intensive production methods. American Unagi sources their animals from domestic collectors that collect wild elvers. The elvers come to the farm and complete grow-out in under two years. She shared why these eels are suited for recirculating aquaculture because they grow well in high densities and are a very adaptable species.

Emerging Aquatic Pathogens — Tilapia Lake Virus
Kathleen Hartman, USDA, Animal and Plant Health Inspection Service (APHIS)

Dr. Hartman shared the various detections of World Organization for Animal Health (OIE) listed and emerging pathogens that have occurred within the last year. Many of the detections have been linked to imports of species. Lessons learned from the past year include the need for import controls and the importance of implementing the commercial aquaculture health program standards (CAHPS).

NOAA Update
Kevin Madley, National Oceanic and Atmospheric Administration (NOAA)

Mr. Madley gave an overview of marine aquaculture within the United States and its importance toward addressing the seafood deficit. He talked about NOAA’s support of industry and programs they have in place including research and development for marine hatcheries. He talked about the potential for aquaculture in the U.S. in comparison to other countries, in particular underutilized resources and capacity.

Committee Update for Adapting BlueBook
Bill Keleher, Kennebec River Biosciences

Dr. Keleher updated the committee on funding regarding updating the Bluebook revisions. The ad hoc Bluebook committee is in the process of submitting a final report on their findings. It is expected that a plan will be developed for moving forward with changes to the Bluebook. Funding was obtained from Association of Fish and Wildlife Agencies (AFWA) through a grant and will support an administrative position to assist.

Committee Business:

Four resolutions were brought forth to the committee and all were discussed. Three resolutions were unanimously passed, and one was unanimously rejected.
The Committee met on Tuesday, October 29, 2019 at the Rhode Island Convention Center in Providence, Rhode Island, from 8:00 a.m. to 12:00 p.m. There were eight members and 14 guests present.

**Center for Veterinary Biologics (CVB) Update**

Byron Rippke, CVB

**Budget** - CVB’s budget has remained relatively flat for the past ten years; 2019 has been no different. The President’s budget indicated that FY20 will be fairly similar. Congress has actually indicated an increase. Currently, we are under a continuing resolution, and we'll see what the House and the Senate agree to once an appropriation is approved for this fiscal year.

**Staffing** - The result of steady budgets is that with increases in salaries, benefits, etc., added to other costs of operation, the funding available to support positions is effectively less. That results in fewer on-board staff each year. Currently, CVB has about 30 positions that it does not have the funding to support.
COMMITTEE ON CATTLE AND BISON
Chair: Dale Grotelueschen, NE
Vice Chair: Beth S. Thompson, MN

Dale Grotelueschen, NE; Beth Thompson, MN; Eric Liska, MT; Janemarie Hennebelle, GA; Rod Hall, OK; Charlie Broaddus, VA; Carl Heckendorf, CO; Jim Logan, WY; Michael VanderKlok, MI; Beth Carlson, ND; Bruce Addison, MO; Bruce Akey, TX; Carissa Allen, MN; Gary Anderson, KS; Chris Ashworth, AR; Rich Baca, CO; Nancy Barr, MI; Bill Barton, ID; Samantha Beaty, TN; Peter Belinsky, RI; Randall Berrier, CO; Danelle Bickett-Weddle, IA; Carolynn Bissett, VA; Kelley Black, OH; Brian Bohl, TX; Tom Bragg, NE; Van Brass, AZ; Richard Breitmeyer, CA; Becky Brewer-Walker, AR; Kevin Brightbill, PA; Charles Brown, WI; Michael Carter, MD; Robert Cobb, GA; Tim Condict, TX; Kathleen Connell, WA; Karen Cony ngham, TX; Walter Cook, TX; Maria Cooper, IN; Chelsea Crawford, UT; Stephen Crawford, NH; Angela Daniels, TX; Donald Davis, TX; Grant Dewell, IA; Lewis Dingess, TX; Leah Dorman, OH; Brandon Doss, AR; Mark Drew, ID; Edward Dubovi, NY; Roger Dudley, NE; Sean Eastman, SC; Anita Edmondson, CA; Misty Edmondson, AL; Cody Egnor, AZ; Dee Ellis, TX; Philip Elzer, LA; James England, ID; James Evermann, WA; William Fales, IA; Shollie Falkenberg, IA; Kathy Finnerty, NY; John Fischer, GA; Keith Forbes, NV; Larry Forgey, MO; Tony Forshey, OH; Tony Frazier, AL; Tam Garland, TX; Sunny Geiser-Novotny, CO; Robert Gerlach, AK; Michael Gil dsdorf, MD; K. Fred Gingrich II, OH; Linda Glaser, MN; Linda Gonzales, AZ; Chelsea Good, KS; Tony Good, OH; Alicia Gorczyca-Southerland, OK; Michael Greenlee, WA; Daniel Hadacek, VA; Keith Haffer, SD; Thomas Hairgrove, TX; Joel Hall, TX; Timothy Hanosh, NM; Noel Harrington, ON; Andy Hawkins, KS; Burke Healey, CO; Jamie Henning son, KS; Terry Hensley, TX; Bob Hillman, ID; Siddra Hines, WA; Bruce Hoar, WY; Donald Hoenig, ME; Dennis Hughes, NE; Noah Hull, WY; David Hunter, MT; Carla Huston, MS; Annette Jones, CA; Jamie Jonker, VA; Melissa Justice, IN; Anne Justice-Allen, AZ; Susan Keller, ND; Bradley Keough, KY; Kimberly Kirkham, KS; Diane Kitchen, FL; Terry Klick, OH; Charlotte Krugler, SC; Todd Landt, IA; John Lawrence, ME; James Leafstedt, SD; Brad LeaMaster, OR; Gregory Ledbetter, CA; Nicholas Ledesma, IA; Molly Jean Lee, IA; Wen Chi Lee, CA; Scott Leibsle, ID; Donald Lein, NY; Rick Linscott, ME; Mary Jane Lis, CT; Coleman Locke, TX; Laurent O'Gene Lollis, FL; Lindsey Long, WI; Pat Long, NE; Travis Lowe, MN; Mark Luedtke, MN; Kevin Maher, IA; Bret Marsh, IN; Scott Marshall, RI; Michael Martin, SC; Beatriz Martinez Lopez, CA; Chuck Massengill, MO; Jay Mattison, WI; Patrick McDonough, NY; Thomas McKenna, MA; Sara McReynolds, KS; Shelley Mehlenbacher, VT; Antone Mickelson, WA; Mendel Miller, SD; Richard Mock, NC; Eric Mohlman, NE; Jason Moniz, HI; Peter Mundschenk, AZ; Gleeson Murphy, IA; Sherrie Nash, MT; Alecia Naugle, MD; Michael Neault, NC; Cheryl Nelson, KY; Dustin Oedekoven, SD; Steve Olsen, IA; Gary Olson, MN; Kenneth Olson, IL; Greg Onstott, MO; Kathleen Orloski, CO; Lanny Pace, MS; Mitchell Palmer, IA; Elizabeth Parker, TX; Roger Parker, TX; Chris Parmer, AL; Boyd Parr, SC; Elisabeth Patton, WI; Janet Payeur, IA; William Pittenger, MO; Barry Pittman,
The Committee met on October 29, 2019, from 1:00–5:00 p.m. at the Rhode Island Convention Center, Providence, Rhode Island. Chair Grotelueschen welcomed the membership and introduced vice chair Beth Thompson. The Chair explained the mission of the Committee, and application of Robert’s Rules to the committee procedure. There were 68 members and 16 guests present.

**Reports and Presentations**

Dr. Eric Liska presented the report from the Subcommittee on Brucellosis. A full written report of the Subcommittee was provided to the Committee and is included at the end of this report.

Dr. Shollie Falkenberg presented the report of the Subcommittee on Bovine Viral Diarrhea (BVD). A full report of the Subcommittee was presented to the Committee and is included at the end of this report.

Dr. Rod Hall presented the report from the Subcommittee on Cattle Identification. A full written report of the Subcommittee was provided to the Committee and is included at the end of this report.

Dr. Carl Heckendorf presented the report from the Subcommittee on Trichomoniasis. A full report of the Subcommittee was presented to the Committee and is included at the end of this report.

Dr. Michael VanderKlok presented the report from the Subcommittee on Tuberculosis. A full written report of the Subcommittee was provided to the Committee and is included at the end of this report.
Dr. Andy Schwartz led a discussion about the work of the National Assembly of State Animal Health Officials (NASAHO or NA) Tuberculosis (TB) Working Group. The NA formed an internal working group in October 2017, charged with developing recommendations to USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) on the TB sections of the Code of Federal Regulations. The key point of NA recommendations was to preserve the elements of the 2010 Federal Order, which suspended automatic downgrade and interstate testing requirements for states with more than one TB affected herd if certain conditions were met. In October 2018, VS established a TB rule working group that includes the NA working group members. This VS/NA working group deliberated on approaches to state status, considering the traditional approach of prevalence/incidence, a standards-based approach, and a hybridization of the two. In May 2019, the working group reached consensus on a standards-based approach, with states classified as Consistent or Not Consistent. Both the NA and APHIS are in support of the standards-based approach in concept. Work will continue to develop standards. The NA strongly supports a continued disease eradication approach.

Dr. Dustin Oedekoven presented a report from the Brucellosis Vaccination panel, held at the National Cattlemen’s Beef Association, summer convention in Denver.

Dr. Chuck Fossler reported on the results from the National Animal Health Monitoring System (NAHMS) Beef 2017 Cow-calf study. The Beef 2017 study was conducted from October 2017 through May 2018. Results that were presented included information on preconditioning practices performed on calves before leaving the cow-calf operation, destinations for steers, heifers, or bulls intended for backgrounding or feeding, breeding soundness-related testing practices for bulls newly purchased, leased, or borrowed for the last breeding season, and information sources in the event of a foreign animal disease outbreak in the U.S. Many of the results were compared to previous NAHMS studies.

Dr. Shollie Falkenberg presented on Influenza D virus (IDV): What Do We Know about This Viral Pathogen? The major reservoir for IDV is considered to be domestic cattle. IDV infection has been confirmed from serum samples or clinical specimens collected from cattle in North America, Asia, Europe, and Africa. Research has indicated that IDV is transmissible, virus replication, and inflammation observed in upper respiratory tissues. Further, research describes Mh did not potentiate disease in a co-infection study, but IDV vaccine using killed antigen conferred partial efficacy in a vaccination challenge study. Seroprevalence of IDV is high in cattle, but the first IDV isolate was obtained from clinical material collected from a pig exhibiting influenza-like illness, therefore interspecies transmission of IDV was evaluated to determine differences in replication and transmission that may exist between IDV of different virus origin species. This data supports that cattle and pigs are permissive for IDV replication, IDV transmission is species-dependent, and suggest host-specific mutations influence transmission efficiencies between agriculturally important mammalian
species. Further studies are needed to determine the extent of IDV’s contribution bovine respiratory disease (BRD) and the underlying mechanisms.

Dr. Alecia Naugle presented the Animal and Plant Health Inspection Service (APHIS) Veterinary Services (VS) Update on proposed changes to the Brucellosis and Tuberculosis (TB) Programs. The bovine brucellosis and tuberculosis are two of the United States Department of Agriculture’s (USDA) longstanding animal disease control programs. In cooperation with State and industry partners, USDA has made considerable progress in reducing the prevalence of both diseases. However, the regulations and program requirements in place today are not appropriate given the current epidemiology of both diseases and changes in the structure and management of the cattle industry. USDA’s Animal and Plant Health Inspection Service (APHIS) has been working to update the brucellosis and TB programs for more than a decade. In 2018, APHIS reinitiated efforts to update these regulations. APHIS presented an overview of this process and the proposed State status system for separate brucellosis and TB rules.

**New Business:**

The Chair determined there was a quorum present and requested any proposed resolutions as new business.

Four resolutions were presented and accepted on a consent calendar. The vote to accept these resolutions was unanimous.

1. Adequate funding for National Animal Vaccine and Veterinary Countermeasures Bank (NAVVCB)
2. From the Subcommittee on Brucellosis: Removal of Select Agent Status for *Brucella* species
3. From the Subcommittee on Cattle Identification: Backup Identification of Livestock in Commerce
4. From the Subcommittee on Cattle Identification: Strengthening the U.S. Animal Disease Traceability and Disease Prevention Infrastructure.

Two resolutions presented by the Subcommittee on Cattle Identification were discussed, amended and passed unanimously:

1. Continuation of Proposed EID Transition Timeline
2. Funding for Infrastructure and Tags

One resolution presented by the Subcommittee on Cattle Identification was tabled. That resolution was entitled Dual Frequency Tags to Address Challenges with the Technology Neutral Approach to Animal ID.

The reports of the Subcommittees were accepted by unanimous vote of the Committee and have been included in the Committee report. The meeting was adjourned at 5:20 p.m.
The Subcommittee met on Monday, October 28, 2019 at the Convention Center in Providence, Rhode Island from 1:00 - 5:00 p.m. There were 55 members signed in and 26 guests present.

Presentations and Reports

National Brucellosis Eradication Program report
Michael A. Carter, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), Cattle Health Center

All 50 states are currently brucellosis class-free with one domestic bison herd under quarantine with test and remove herd plans in place. In FY2019, Wyoming found three new affected bovine beef herds in their Designated Surveillance Area (DSA). One voluntarily depopulated and the two remaining were tested clean and removed from quarantine.

Approximately 639,858 cattle and bison were brucellosis tested under the National Surveillance Plan for a total of one million cattle tested nationwide. There are four cattle and one bison national surveillance slaughter facilities. Approximately 3,752,112 calves were reportedly brucellosis officially calfhood vaccinated but the brucellosis committee felt that this was a reporting error and this number was too high to be accurate. In addition, approximately 18,176 animals were brucellosis adult vaccinated nationwide during FY2019. Approximately 337 herds were certified as Brucellosis-Free herds.

During June 24-28, 2019, APHIS completed a brucellosis program review in Montana. The review includes main objectives; 1) Review the Adequacy of Montana’s (MT) Brucellosis Rules to Prevent the Spread of Brucellosis Beyond the DSA, 2) Assess the Enforcement of Brucellosis-related Rules (Identification, Livestock Markets, Dealers and Slaughter Plant(s), 3) Assess Cattle Surveillance, Diagnostics/Laboratory Capability, and Producer Education for Program Support, 4) Evaluate Wildlife Surveillance and Mitigation, and 5) Evaluate DSA Boundaries, Testing, and Movement Restrictions. The review showed that Montana prevents brucellosis from escaping its DSA by testing cattle and bison when they change ownership and/or prior to leaving the DSA. Montana should be commended for its aggressive approach to defining and expanding its DSA and resisting the temptation to shrink the DSA too quickly. Montana’s strategy of testing elk at the outer edges of the DSA and expanding the boundaries as needed has prevent spread of the disease outside of the high-risk area.

Montana Designated Surveillance Area (DSA) Update and Response to USDA Review
Martin Zaluski, Montana Department of Livestock (MDOL)
Montana continued its robust brucellosis program last year running more brucellosis tests than the entire cattle and bison DSA inventory. In Fiscal Year (FY) 2019:

- 373 producers utilized the DSA
- 86,000 cattle and domestic bison utilized the DSA
  - 21,000 seasonal cattle
  - 3% of the Montana cattle herd utilize the DSA
- 96,000 brucellosis tests were run State-wide for DSA, CSS facilities, slaughter, export and other reasons
  - 91,000 tests were DSA specific
- 6,000 Adult Vaccinations were given
- One affected herd under quarantine—initially discovered in 2010 and is tested annually. This herd unfortunately has constant exposure to seropositive elk and therefore continued transmission is likely.

The USDA reviewed Montana’s brucellosis program in 2019. This review followed the review of Wyoming’s program in 2017 and Idaho’s in 2018.

**USDA review objectives:**

- Review the adequacy of MT’s brucellosis rules and infrastructure to prevent the spread of brucellosis beyond the DSA.
- Assess enforcement of brucellosis rules.
- Assess cattle surveillance, diagnostics/laboratory capability, and producer education and cooperation.
- Assess wildlife surveillance and risk mitigation activities.
- Evaluate DSA boundaries, testing, and movement restrictions for overall effectiveness.

**USDA key recommendations on their draft review:**

1. Continue to encourage herds to “whole herd test in the fall” to motivate DSA herds to take control of their own annual surveillance testing and have more DSA animals tested than with just pre-movement testing.
2. Continue to collaborate with other GYA States to keep programs similar and transparent.
3. Continue the current level of cattle surveillance, compliance monitoring, laboratory efficiency, customer service, and producer education for the brucellosis program.
4. Montana Department of Fish, Wildlife and Parks (MFWP) should continue to maintain and broaden its excellent relationship with MDOL and continue using USDA cooperative agreement funds to capture and sample elk each year on the outer boundary of the DSA.
5. Continue collaborative efforts with other GYA States.
6. Continue reimbursement program for testing and vaccination
7. USDA should prioritize Montana DSA program tag orders.
8. APHIS and MDOL should finalize and sign a Memorandum of Understanding (MOU)
9. Collaborate with Idaho and Wyoming to ensure that DSA cattle from the other states are identified and tested at Montana markets.
10. Request VS or State support for implementing the use of Mobile Information Management (MIM) for auction-market testing.

Montana appreciates the third-party review of our program and will work toward completion of recommendations. Montana’s response to these recommendations will be completed and shared with the subcommittee once the USDA document is final.

RFID Options for Vaccination Tags
Alex Turner, USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), Animal Disease Traceability (ADT)

The presentation briefly mentioned the previously planned transition timeline to Official Identification (ID) being radio-frequency identification (RFID) by 2023 and how that will affect the current Brucellosis rule, as well as considerations to meet the needs of a potential new rule. Current rules for Official ID and identification of Official Calfhood Vaccinates were discussed and how RFID can be utilized for vaccinates.

Farmed Cervid Brucellosis Testing Update
Travis Lowe, North American Elk Breeders Association

The presentation was a progress report update regarding a 2017 USAHA approved resolution that urges State Animal Health Officials (SAHOs) to no longer require brucellosis testing for farmed cervids for interstate movement. The resolution understood there is not a federal brucellosis rule for farmed cervids and this would be a state by state issue.

Since 2017, the cervid industry associations have worked with state animal health officials to amend their administrative rules and regulations to eliminate the testing requirement. As of September 2019, Colorado, Indiana, Minnesota, South Dakota and Texas have dropped the import testing requirement with several other states in the process of amending the rule.

Federal Select Agent Process: FBI Perspective
Joshua Canter, Federal Bureau of Investigation (FBI) Boston Division

The presentation revolved around the FBI’s role in the select agent program. In short, the FBI is part of the National Select Agent program as the law enforcement body for the intentional theft, sale or use of select agents in a criminal act. The FBI’s Criminal Justice Information System is used to run backgrounds on potential select agent laboratory workers through the FD-961 process. In addition, the FBI partners with the Centers for Disease Control and Prevention (CDC) on joint criminal and epidemiological investigation.
GYA Panel Discussion: Into the 10th Year

Moderator Misty Edmondson presented questions to the panel regarding their experiences in managing brucellosis through a designated surveillance area system over the last ten years. Idaho and Wyoming also gave brief annual updates. The audience had an opportunity to ask the panel questions and a productive discussion was held.

Idaho Brucellosis Update
Bill Barton and Scott Leibsle, Idaho State Department of Agriculture

The State of Idaho does not currently have any herds under quarantine for brucellosis. The last brucellosis reactor cow was identified in November in 2017 within Idaho’s Designated Surveillance Area (DSA) and, after conducting three negative whole herd tests in 2018 as well as an assurance test, no further reactors were found. The primary herd was released from quarantine in September 2018 with all of the first calf heifers being held separate and apart until a post-calving test could be performed. The heifer post calving test was completed in June 2019 and the remainder of the herd was released from quarantine.

In 2019, to-date, 9,873 cattle within Idaho’s DSA have been tested for brucellosis. Additional cattle will be tested this fall as they return from summer pasture. Total, in 2018, the USDA Idaho Brucellosis Laboratory conducted 415,766 brucellosis tests from live and slaughter cattle, with the majority of tests originating from CS Beef Packers in Kuna, Idaho.

The 2020 Idaho Legislature will be considering a proposal to lower the test eligible age from 18 months to 12 months. This rule change was based on a recommendation from the 2018 USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) audit of Idaho’s Brucellosis Management Program. Negotiated rulemaking was conducted this past summer with stakeholders, who were supportive of the change. Other audit recommendations included implementation of electronic records, which has already been completed, and increased wild elk surveillance and tissue collection, which will be implemented by Idaho Fish and Game in and around the DSA and will focus in hunting units north and west of the DSA and those that border Montana.

Wyoming Brucellosis update
Jim Logan, Wyoming Livestock Board

During October of 2018, three Brucellosis affected herds were found in Wyoming. One herd was in Park county, one in Sublette county, and one in Teton county. The Teton county herd was voluntarily depopulated at the owner’s request with all cattle in the herd going to slaughter. The brucellosis reactor cattle were removed from both the Park and Sublette county herds (one had three reactors and one had two) and following three consecutive negative herd tests, those herds were each released from quarantine in the spring of 2019. The Wyoming Livestock Board (WLSB) paid indemnity for all of the reactors removed from each of the three affected herds for a total of $7,666.61 expended from the indemnity account. These cases were all
determined to have been caused by exposure to Brucella abortus infected elk.

The Wyoming state veterinarian’s office is now investigating two new potential cases of Brucellosis in cattle in Park County. Both herds reside within the Wyoming Designated Surveillance Area (DSA). National Veterinary Services Laboratories (NVSL) serology results were reported on October 1, 2019 that a single animal (yearling heifer) from a herd of approximately 700 head in Park County tested positive for Brucellosis. A cow from a separate herd in Park County, not epidemiologically linked to the previously mentioned herd, was reported serologically positive on October 4, 2019. Both animals will be necropsied at the Wyoming State Veterinary Laboratory (WSVL) on October 23, 2019 and indemnified through APHIS (diagnostic purchase) and the state’s indemnity fund. Epidemiological investigations are in progress on these two herds. Elk are the likely cause of these cases. Quarantines have been issued and any contact or commingled herds will be quarantined and tested as the epidemiological investigation continues. Both of these serologic positive animals were found through our required surveillance testing and Brucellosis Mitigation Plan testing conducted in our Brucellosis DSA. The boundaries of the DSA are reviewed annually and are established by the WLSB on the recommendation of the State Veterinarian and the Director of the Wyoming Game and Fish Department (WGFD).

We are fortunate to have the valued assistance of the WSVL in the diagnostic work on all Wyoming brucellosis cases. The state of Wyoming purchases reactors through a state indemnity fund and those animals are necropsied at the WSVL or taken to slaughter plants with state/federal observation and tissue collection. The regulatory serology unit of the WSVL continues to provide excellent service for our Wyoming producers and veterinarians in testing brucellosis samples and reporting results quickly and accurately. We have also been fortunate to have the good cooperation of USDA, Animal and Plant Health Inspection Service (APHIS) in dealing with the epidemiology and regulation of these cases.

Boundaries of the Brucellosis Area of Concern now include only the WGFD Hunt Areas 39, 40 and 41 in Big Horn County. The boundaries were established by the board and approved by the Governor following extensive cooperation between WLSB and WGFD personnel using elk movement data to determine temporal and spatial Brucellosis exposure risks. The intent of the board and staff is to employ sound science, along with risk assessments, to determine the level of testing required. We are continuing to work with WGFD and preparing to do risk assessments with producers in the Brucellosis Area of Concern. WGFD reporting on the hunter-killed elk surveillance in the Bighorn Mountains did not find any sero-positive elk in that area during the 2018 hunt season (no seropositive elk have been found since 2015). All of Wyoming’s Brucellosis cases since we achieved brucellosis free status in 1995 have been within the Brucellosis DSA and have resulted from exposure to infected elk.
Fifty-six veterinarians conducted testing for brucellosis on cattle from the DSA and the Brucellosis Area of Concern during Fiscal Year (FY) 2019. Fifty-seven thousand, one hundred twenty-five (57,125) DSA-origin cattle/bison were tested on Wyoming ranches and at livestock markets and 5,785 cattle were sampled at WY slaughter plants to comply with WLSB Chapter 2 Brucellosis rules. Big Horn and Sheridan County producers tested 7,108 head of cattle/bison from near or in the Brucellosis Area of Concern. The WLSB paid approximately $315,902 to veterinarians and slaughter plant managers to conduct Brucellosis testing, and adult/booster vaccination of DSA and Brucellosis Area of Concern-origin cattle. In addition, the WLSB contracted $101,915 with the Wyoming State Veterinary Laboratory during the period July 1, 2018 through June 30, 2019 for support of laboratory costs associated with brucellosis testing.

Dr. Logan was notified on April 2, 2019 by the WGFD laboratory that three brucellosis seropositive elk were found on the Wind River Indian Reservation by testing done in conjunction with a UW/Tribal/U.S. Fish and Wildlife Service (USFWS) radio-collared elk and mule deer movement study. This is the first time there has been significant surveillance conducted on the reservation and 47 elk were collared and tested finding three sero-positives. Three elk were sero-positive out of approximately 80 total elk tested in a two year period (none found in 2018).

Dr. Logan held a meeting with the Joint Tribal Council on May 17, 2019 at Ft Washakie to discuss Brucellosis and the implications of the disease in resident elk on the reservation. Discussions are ongoing between the WLSB, Joint Tribal Business Council, USFWS, BIA, WGFD, and Tribal Game and Fish Department to determine a course of action going forward. Meetings have been held with cattle owners in the area where the seropositive elk are known to have been (from radio-collar data) to discuss Brucellosis issues and surveillance testing. Due to jurisdictional and legal issues, this presents challenges to state regulatory and animal health officials.

A Swine Brucellosis Cross-Sectional Study in Pigs with Outdoor Access in New York State: an overview and preliminary findings
Caroline Yancey, Cornell University, College of Veterinary Medicine

A study of swine brucellosis and farm biosecurity and management practices is underway in New York State. The target population is farms that raised pigs with outdoor access for commercial purposes. To date we have serology results from six farms, where we had 84 negative animals, and ten samples were hemolyzed; two farm results are pending. The questionnaire reveals that there is a mix of commercial activities undertaken by these farms, and that considerable interstate animal movement is occurring. Further, none of the farmers report feral swine sighting, and feeding practices are primarily via commercial feed, although two farms report using uncooked plate waste from their homes, which is allowable in New York State. We expect to sample an additional twenty farms this fall, winter, and spring.
Development of a DIVA ELISA for Detection of Anti-Brucella Species Antibody
Andrew Johnson, Veterinary Medical Research & Development (VMRD)

*Brucella abortus* is one of the causative agents of brucellosis, a zoonotic disease found worldwide in cattle, small ruminants and swine. The U.S. has successfully eradicated *B. abortus* from livestock using *B. abortus* strain RB51 vaccination as part of its control program. Critical serologic surveillance continues particularly in areas where livestock interface with wildlife reservoirs of brucellosis. The basis of current serologic screening assays, including the fluorescence polarization assay (FPA), is detection of antibody to the immunodominant O-polysaccharide (OPS) of *Brucella* spp.

Here we described the performance of an enzyme-linked immunosorbent assay (ELISA) screening assay utilizing synthetic antigen (sAG) derived from and reproducing the dominant antibody binding epitopes of the OPS. The sAG ELISA is a high throughput assay with comparable performance to the OIE recommended sLPS ELISA test, is differentiation of infected and vaccinated animals (DIVA) for RB51 vaccination, and the antigen can be reproducibly synthesized safely and cost effectively.

NADC Research Activities Update: Biosafety concerns related to *Brucella*
Steven Olsen, Agriculture Research Service (ARS), National Animal Disease Center (NADC)

In response to concerns raised with USAHA, we have evaluated the effects of negative sera from bison, cattle, elk, and swine in the fluorescence polarization assay on mean measurements of different sets of bison, elk, cattle, and swine sera. For bison, cattle, and elk, samples evaluated included negative samples, sera at peak titer after initial RB51 vaccinated, sera from later times after vaccination and/or after booster vaccination with RB51, sera obtained early (2-4 weeks) after experimental infection of pregnant animals with virulent *B. abortus* strain 2308, and sera obtained at later time points (6-12 weeks) after experimental challenge with strain 2308. For swine, samples included sera from negative controls, sera at peak titer after initial vaccination with *B. suis* strain 353-1 (a rough *B. suis* natural mutant), sera from later times after vaccination with 353-1, sera obtained at (2-4 weeks after experimental infection of swine with virulent *B. suis* strain 3B. In addition, samples obtained from cattle shedding RB51 in milk were also evaluated.

Subcommittee Business:
The business meeting was called to order. A show of hands indicated that a quorum was present for voting purposes. The first item of business was a status update on Resolutions from the 2018 meeting. The response to resolution 30 was deemed sufficient by members. The responses to resolutions 31 and 35 were unsatisfactory and additional follow up requested by the members.
Two new resolutions were introduced: removal of select agent status for *Brucella spp.* (directed to a different agency than resolution 30 from last year) and approval of the card test for use outside of stockyards. The first resolution passed unanimously. After some discussion, the second resolution did not pass. The chair introduced a recommendation that the technical advisory working group continue to review the diagnostic interpretation of FP for domestic bison and additional species as presented by Steven Olsen. A second recommendation charged the technical advisory working group to review an enzyme-linked immunosorbent assay (ELISA) test as a potential diagnostic tool as presented by Andrew Johnson. Last year, the members of the technical advisory working group were Dave Hunter, Valerie Ragan, Brant Schumaker, and Steven Olsen; the members will be reviewed by the chair and appointments made as appropriate. A motion was made to adjourn the meeting.
REPORT OF THE SUBCOMMITTEE ON BOVINE VIRAL DIARRHEA VIRUS (BVDV)
Chair: Shollie Falkenberg, IA
Vice Chair: Jamie Henningson, KS

The subcommittee met on October 28, 2019 at 3:00 p.m. There were approximately 30 people present. The topic for this year’s meeting was focused on BVDV control.

Presentations and Reports

National Animal Health Monitoring System (NAHMS) 2017-2018 Beef Cow survey
Charles Fossler, USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), Center for Epidemiology and Animal Health (CEAH)

Dr. Fossler provided an overview of the NAHMS 2017-2018 Beef Cow survey, which is the fourth beef cow-calf survey with the other surveys taking place in 1992, 1997, 2007, and the most recent in 2017. Twenty-four states participated with selection being random. Free bovine viral diarrhea virus (BVDV) testing was offered as an incentive for the entire Spring calf crop similar to what was offered in 2007. The results presented were preliminary and will be published officially by NAHMS at a later date. Results observed between 2007 and 2017 were compared with the biggest difference being in the lack of uptake in the number of producers utilizing the free BVDV testing. While there was much lower uptake in testing, the number of positive herds was similar between 2007 and 2017 and the prevalence within herd was also similar. While previous years, vaccine usage was evaluated, new information this year was the type of vaccine used. The preliminary data would suggest that more killed vaccine is used in the cow-calf segment. Overall, the take home message was that more producers questioned in 2017 were utilizing BVDV testing and vaccines than those producers in 2007, and of those producers vaccinating, more were using killed vaccine. Again, these results were considered preliminary and were not statistically different.

Bovine Viral Diarrhea Virus (BVDV) Control Program - Texas
Andy Schwartz, Texas Animal Health Commission

Dr. Schwartz gave an overview of the reason the control program was considered, based on input from producers concerned about persistently infected (PI) calves being dumped back into the market. The major reason for considering a control program was to develop a program against buying these calves. The initial rule put forward to make BVDV a reportable disease did receive comments supporting that bovine viral diarrhea virus (BVDV) is important, but the majority of comments received did not support the initial rule put forward. The initial rule was pulled down and a new rule was drafted to address the main concerns. These concerns were if BVDV is reportable
and made actionable, that testing would actually go down, the program would create a burden to report, there should be monetary incentive if going to make reportable, concern with picking up vaccine virus, cost of electronic identification (eID) to tag the PI, and concerns that this program would go down the same path of other programs and would go to herd of origin and would restrict the herd. The next draft of the rule requires that if the seller has a PI, that they must disclose the PI status to the buyer either at the time of purchase, or prior to selling. This rule is currently out for comment.

Overview of Bovine Viral Diarrhea Virus (BVDV) Control - Canada
Frank van der Meer, University of Calgary

Dr. van der Meer gave an overview of the path they are taking to control bovine leukosis virus (BLV) and suggested that this path might be a template for BVDV control as well but commented that currently there is no official BVDV control program in Canada. Lessons learned from the BLV control program were that education was key prior to initiating the control program. Four years of education had been implemented prior to the start of the BLV control program. It has been demonstrated that showing the impact of the control program is instrumental and if an investment is necessary, what is the benefit. Based on prevalence surveys, similar results were observed for persistently infected (PI) prevalence as compared to the U.S., and >90% of Canadian producers claim to vaccinated replacement heifers, and the reason to vaccinate was to prevent a “wreck”. There is still concern that with the improvement in BVDV vaccines, that there has been no improvement in BVDV prevalence.

OTHER NOTES:

The presentations were followed by Will McCauley asking about the feasibility and achievability of being able to have a large enough source of fetal bovine serum (FBS) that is Bovine Viral Diarrhea Virus (BVDV) polymerase chain reaction (PCR) negative for vaccine manufactures. This question was posed based on the USDA draft memo 590 and there is concern that not enough BVDV PCR negative FBS would be available and could cause shortages in vaccines if this is implemented. Drs. Kirkland, Ferro and Joe Huff from Colorado Serum Company provided commentary and there is concern that this rule may cause unintended consequences.

Dr. Falkenberg asked about the differences in BVDV detection methods and the consistency in results between the methods. Others have observed similar trends, and this may be evaluated further.

The meeting was adjourned at 5:15 p.m.
The Subcommittee met Tuesday morning, October 29, 2019. We heard presentations from David Moss of the Canadian Cattlemen’s Association about their Traceability Program and changes they are undergoing. Chelsea Good from Livestock Marketing Association (LMA) summarized their listening sessions from the past summer. Drs. Sarah Tomlinson and Aaron Scott from Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) discussed ongoing changes and improvements to Mobile Information Management System (MIMS) and Veterinary Services Process Streamlining (VSPS), the status of identification of Mexican cattle that are imported into the USA, and the issues surrounding USDA’s decision to pause the timeline for transition to mandatory electronic identification (EID). Robert Bailey from Datamars and David McElhaney from Allflex USA discussed ultra-high frequency and low frequency technologies, their pros and cons, and new tools that we may see in the future. We heard updates on the traceability pilot projects from Dr. Justin Smith from Kansas, Dr. Mike Short from Florida, and Savannah Barksdale from Texas Cattle Feeders Association. Five resolutions were proposed, passed and forwarded to the Committee on Cattle and Bison for further consideration.
The Subcommittee met on October 28, 2019 at the Rhode Island Convention Center in Providence, Rhode Island, from 1:00–3:00 p.m. There were 28 members and one guest present. Dr. Carl Heckendorf called the meeting to order. The mission statement was discussed and amended per vote.

Subcommittee Mission Statement

The purpose of the Subcommittee on Trichomoniasis is to facilitate communications between key stakeholders and the United States Animal Health Association in an effort to provide recommendations towards the prevention and control of *Trichomonas foetus* from the U.S. cattle population. The subcommittee will also provide a forum for discussion of interstate regulations, research, and future harmonization efforts.

General discussion on Trich prevalence, industry, and regulatory needs in the U.S. was held.

Action items identified at 2018 meeting were reviewed.

1. State Veterinarians should meet annually with their laboratory directors to discuss sample submission and test protocols.
2. State Veterinarians should share a list of the approved Trich testing laboratories in their state with other State Veterinarians. Protocols for approving laboratories should be included on the list.
3. Subcommittee should work with American Association of Veterinary Laboratory Diagnosticians (AAVLD) to determine the laboratory performance testing process for individual Trich polymerase chain reaction (PCR).
4. States should have a veterinarian certification program for veterinarians performing individual PCR tests
5. State Veterinarians should work with their laboratory directors who will then contact the laboratory director in another state (state of origin) to determine if the testing protocol was sufficient to meet import requirements for an official test.
6. Require accession numbers and laboratory information on certificate of veterinary inspection (CVI).

Discussion of needing to continue the subcommittee: It was determined that the subcommittee should continue.

The following new action items were identified:

1. Investigate other transfer media
2. Investigate other/new collection techniques (i.e., preputial/penile swab)
3. Investigate the role of the female in disease propagation
4. Maintain harmonization among states
5. Testing laboratory reporting to origin state animal health official (SAHO)

Subcommittee Business:
There was no new business and no resolutions presented.
The Subcommittee met on October 27, 2019 at the Rhode Island Convention Center in Providence, Rhode Island, from 1:00 to 5:00 p.m. There were 68 members and 22 guests present. Dr. Michael VanderKlok welcomed committee members and guests, introduced Dr. Beth Carlson as Vice Chair, and determined there was quorum for the committee to meet and vote on all business, including resolutions.

Dr. VanderKlok provided a review of the agenda along with the mission and operating procedure for the Subcommittee on Tuberculosis, as well as the process for recommendations and resolutions.

Presentations and Reports

**Tuberculosis (TB) Scientific Advisory Working Group Report**
Kathy Orloski, USDA

Dr. Orloski provided a summary of the activities of the Scientific Advisory Working Group. A full paper is included at the end of this report.

**Tuberculosis (TB) Activities of the Bi-National Committee on TB, Brucellosis and Cattle Fever Ticks**
Dee Ellis, Texas A&M University

Dr. Ellis provided a summary of the activities of the Bi-National Committee pertaining to Tuberculosis. Current efforts are primarily focused on improving electronic data sharing. A full paper is included at the end of this report.

Updates were given by eight states which are currently investigating or have recently investigated cases of bovine tuberculosis:

**Texas Tuberculosis (TB) Update**
Susan Rollo, Texas Animal Health Commission

- **Status of the infected Herds in Parmer and Lamb Counties:** Two organic dairies and a feed yard (~12,000 head) completed an assessment test in April 2015 then 13 removal tests. The fourteenth removal test is pending completion. To date, there are 68 histocompatible samples disclosed.

- **Status of the infected dairy in Bailey County (feed yard and associated dairy in Parmer/Bailey):** Two organic dairies and a feed yard (~6500 head) completed an assessment test in the spring of 2016 with one positive disclosed. Two removal tests and one verification test have been conducted. Pending negative culture results, the dairy shall move to annual assurance testing. The whole genome sequencing of the TB strain indicates an association with the strain in the complex #1 under the same management.
REPORT OF THE COMMITTEE

- **Status of infected dairy in Sherman County and two associated infected grower operations in Dallam County that are epidemiologically linked to the positive dairy:**
  - The ~8,700 head dairy was previously tested annually 2015-2017 with negative test results. During the annual December 2018 test, a high rate of responders was disclosed. To date, 63 cows are confirmed since the first diagnosis on February 11, 2019. The second removal test is pending completion. Based on whole genome sequencing, two unique strains have been identified.
  - One associated grower facility is a ~70,000 head calf ranch. To date, one positive heifer was disclosed on March 1, 2019. Approximately 12,000 head are considered exposed. In addition to testing at the premises, epidemiologically linked dairies including one in Oklahoma, two in Kansas, and one in Texas also have required whole herd testing.
  - A second heifer raiser premises that manages heifers for this dairy and another dairy under the same ownership in Colorado had one positive heifer disclosed on April 8, 2019 on the first whole herd test of ~4500 head.

- **Status of infected beef herd in Austin County:** In June 2019, a positive beef herd was disclosed from a slaughter trace back. After one assessment test, an additional positive cow was identified. Whole genome sequencing described a unique strain to the U.S. with Mexican origin.

- **TB slaughter trace cases in the FY2019:** To date, there has been three slaughter trace investigations in 2019.

**Key Points/Questions Raised:**
- Unable to apply a sensitive enough test early on to stop the extended testing schedules
- Dairies can live with extended testing schedule but the removal of all CFTs becomes burdensome over successive years.
- Organic values are an issue with indemnity
- Organic milk values play a part in indemnity decisions
- Larger dairy sizes and complexity (i.e., larger ones and more grower operations)
- Good recordkeeping is very helpful
- Unable to truly assess the human contribution to TB transmission

**New Mexico Tuberculosis (TB) Update**
Ralph Zimmerman, New Mexico Livestock Board

Tuberculosis continues to be a top priority and time consumer. In September, a quarantined herd from 2017 was tested, after four negative test and removal whole herd tests. Their quarantine was removed. The sister
CATTLE AND BISON

herd had been removed from quarantine in September 2018 and had a successful first assurance test in September 2019. Testing continues in a dairy group quarantined in 2019. Testing is done every 90 days (third whole herd test going on now); group includes four dairies and four heifer facilities, in Dexter, New Mexico. Because of comingling of heifers from all four dairies, all of the dairies were required to test. At this point, there are two positive dairies (eight head so far), two negative dairies and no positive young stock. There have been issues with the bank, which have complicated conversations on herd plans for these herds; still working on herd plans. Ruminant Health seems willing to look outside the box for resolution.

Key Points/Questions Raised:
- Beware of the banks.
- Think outside the box. Not all dairies are alike. We are here to protect our producers, local economies, and our trading partners.
- Personnel and management changes in Veterinary Services (VS) appear to be favorable.
- Rules are rules but look to exploit the gray zones where it is beneficial.

Michigan Tuberculosis (TB) Update
Nancy Barr, Michigan Department of Agriculture and Rural Development (MDARD)

Michigan has been dealing with a bovine TB reservoir in free ranging white-tailed deer for more than 20 years. Extensive surveillance has demonstrated the boundaries of the problem area, enabling us to focus efforts within our current Modified Accredited Zone (MAZ), where we are working to mitigate risks and prevent the spread of TB by cattle. Our traceability, compliance and response systems are well developed and effective. Moreover, Michigan has implemented a novel approach to prevent the spread of TB in this zone and beyond, the Wildlife Biosecurity Program. This farm-by-farm specialized program is based on years of research and the extensive knowledge of our specialized teams, including USDA Wildlife Services (WS), Michigan State University extension, Michigan Department of Natural Resources (MDNR) and MDARD wildlife biologists and veterinarians.

In the past year, Michigan has found two positive herds in the MAZ. Both herds were found on routine surveillance and had a low level of infection in the herd. The first herd has completed their test and removal program and have implemented enhanced wildlife biosecurity measures and has been released from quarantine while the second herd is expected to complete their test and removal program and biosecurity implementation in early 2020.

This spring, a positive herd was found in Presque Isle County, which borders the MAZ and in which MDARD does routine surveillance in the cattle herds. This herd was found by the surveillance program. The herd was depopulated, and the farm will be eligible for quarantine release under a herd
plan that includes wildlife biosecurity. As a result of the trace investigation from this herd, a positive animal was found in an Emmet County herd. That herd is undergoing a test and removal plan. No additional positive animals have been found in that herd after two whole-herd tests (WHT). Enhanced surveillance areas have been placed in both Emmet and Presque Isle Counties in response to these findings.

North Dakota Tuberculosis (TB) Update
Susan Keller, North Dakota Department of Agriculture/ Board of Animal Health

- Sargent County beef herd identified as affected in December after M. bovis was identified in cull cows at two slaughter plants, three weeks apart. There was a delay in responding due to deoxyribonucleic acid (DNA) mis-match issues at National Veterinary Services Laboratories (NVSL), likely due to plant employees using a rag to wipe blood off of the tags. Whole-herd testing (WHT) of 103 cattle identified 14 reactors; euthanized on farm with assistance from USDA, Wildlife Services (WS) and transported to North Dakota State University (NDSU), Veterinary Diagnostic Laboratory (VDL) for necropsy by state staff. Nineteen feeders were finished on site and slaughtered locally under inspection by the state veterinarian and state meat inspector. Remaining cattle were shipped to Food Safety and Inspection Service (FSIS) slaughter in Wisconsin. A total of 9 positive cattle were identified, with significant variation in whole genome sequencing (WGS) of affected cattle. Testing of 1,149 cattle in five trace herds did not identify additional infection. Cleaning and disinfection (C&D) are complete, and restocking has been approved. Wildlife surveillance thus far has been negative but will continue.

- South Dakota feedlot trace led to investigation of 99 herds, 24 in North Dakota. Of the 24, three had dispersed, 19 herds (3,145 head) have been tested and two herd tests (~800 head) are still pending.

- Texas dairy trace: Received 315 heifers from Kansas that included an unknown number of heifers from an affected dairy in Texas. Twenty-nine heifers traced back to the dairy via official identification (ID) and were removed with indemnity. Multiple ID devices were present but were not recorded/correlated, and some heifers had lost tags, so the origin of 30 additional heifers in the group could not be determined with official ID and USDA will not approve indemnity. However, these 30 heifers have management tags that are in the same series as those that were indemnified. Due to the obvious likelihood that there are other exposed animals in the group, the North Dakota Board of Animal Health (BOAH) will not release the quarantine on them until they go to slaughter. Alternatively, that group may be held under quarantine and remain under a herd plan applied to the animals on that premises in an approved isolation pen.
Key Points/Questions Raised:

- Well-managed herd using normal slaughter channels seems to have escaped detection for several years. Could/should live animal testing be performed more often in “free” areas?
- Source of infection in Sargent County Beef Herd could not be determined, but there is an epi link to a TB investigation involving a community grazing operation in the 1980s. No DNA information is available, but the summary report included a statement that they hoped they had done enough. Are we doing enough?
- Should CFT +/CCT – cattle be voluntarily culled?
- The CFR defines a herd as a group of animals held together for four months. Has this increased the spread of TB?

Indiana Tuberculosis (TB) Update
Bret Marsh, Indiana Board of Animal Health

The previously TB-affected premises in Franklin County, Indiana was depopulated in August 2018, and it has been released from quarantine. The site is still under restocking restrictions until February 2020, although the property owner has no intention of restocking. After the cattle were removed, wildlife was harvested and sampled from the affected property as part of an advanced surveillance program. Wildlife sampling took place in September 2018 and again in March 2019. All 64 wild animals harvested from the premises (white-tailed deer, raccoons, opossums) in September 2018 were culture negative for TB. In March 2019, the wildlife surveillance area, which included the affected premises, was expanded to one and half miles around the affected premises. All cattle herds in the same area were tested again. One hundred and twelve wild animals (8 opossums, 25 raccoons, and 79 white-tailed deer) were harvested and sampled, and a single raccoon cultured positive for TB. Through whole genomic sequencing (WGS), the isolate from the raccoon closely resembles other isolates from cattle on the affected site. Additional wildlife sampling efforts are proposed and under consideration.

Key Points/Questions Raised:

Based on Indiana’s experience with Tuberculosis in cattle and cervids, the following should be considered if you are confronted with this challenge:

- Start with a robust communications plan. If the stakeholders are aware of the goal, and it makes sense, they will participate. Indiana used a variety of communication methods including print media, interviews, social media, text alerts and face-to-face meetings, to convey to elected officials, producers, veterinarians, hunters, extension personnel, and state animal health officials the objectives of the TB eradication effort. As changes were made to the program, the same communication channels were used to update information. We received excellent cooperation from our many partners, and their contributions were pivotal to our success.
Engage strategic partners. The commodity organizations, practicing veterinarians, extension personnel, the Department of Corrections and hunters were some of several willing partners, and they were essential to the eradication effort. Under Indiana law, practicing veterinarians were paid for testing cattle herds on a fee-basis agreement with the State of Indiana. Indiana utilized practicing veterinarians to enhance our testing capability and support the long-term relationship between the producer and veterinarian. Extension personnel in the affected county provided the county fairgrounds as a staging area for the testing equipment, and the commodity organizations communicated to their membership the importance of presenting cattle for testing on over 380 farms. Low level offenders from the Indiana Department of Corrections provided valuable assistance in building and removing corral gates on many farms. Hunters were essential for the wildlife surveillance component of the plan, and they provided thousands of deer for sampling.

Use the best available science. Whole genomic sequencing became available before Indiana’s most recent experience with TB, and it provided valuable information. Based on this relatively new science, we could advise our stakeholders that all TB isolates in southeastern Indiana were related to the cervid type of TB. Additionally, whole genome sequencing (WGS) solved an untraceable TB isolate from several years prior.

Traceability has improved. Although there remain traceability challenges, the overall improvement in traceability enhanced Indiana’s ability to rapidly identify affected sites. Premises registration was required of all Indiana livestock premises in 2006, and over ninety percent of the sites tested for TB had a premises registration when we began the eradication effort. Having premises registered in advance greatly assisted the Indiana eradication program. Additionally, individual animal identification has improved. Although not required by Indiana law, we have encouraged markets to apply backtags to fed cattle. Because the steers that were found to be TB positive had a backtag, we were talking to the owner of the cattle within three hours of being notified of the positive diagnosis. Indiana has distributed thousands of 840 tags to cattle producers, and these tags have also greatly improved our ability to rapidly trace animals.

Seek better solutions. Research is needed to provide a better test for TB. Although the caudal fold test (CFT) has brought the nation to near eradication, better methods must be identified to successfully eliminate the disease.
Tuberculosis was diagnosed in two cattle slaughtered in Nebraska slaughter plants this summer. Both cases were in feedlot cattle. The first case detected in July was from a Nebraska feedlot and was traced to a Nebraska cow herd. However initial testing of the herd did not confirm infection in this operation. Whole Gene Sequencing (WGS) determined that this TB strain was not related to any known TB infections in the United States. A second herd test is scheduled to begin in late October. The herd is split into seven different large pastures, so testing will take a few weeks—if harvesting and bad weather don’t interfere. The second case was detected in September and has been traced to a feedlot in Missouri. This diagnosis has not yet been confirmed by culture. NDA has also received numerous TB traces from South Dakota, North Dakota, Wisconsin, and Texas. So far, all traces have ended when cattle were finished in Nebraska feedlots and fed to slaughter.

Key Points/Questions Raised:

- Removing tissue from tags by Food Safety and Inspection Service (FSIS) personnel (and removing deoxyribonucleic acid [DNA]) is detrimental in proving TB lesions correlate with animal identification (ID).
- In-depth research of records with "some identification" that is animal specific for herd of origin can still be beneficial, even if not "official" ID.
- Contacting potential owners of herds of origin and explaining that we need to investigate and test for TB has to be tactful, but authentic.
- In this situation, we stated that if we were uncertain of the herd of origin, then we would be forced to quarantine many herds and make them all test.
- Lineage testing of parentage and sibling(s) to infected animal is valuable to prove herd of origin, especially if there is no DNA from the infected animal's identification tags.

Wisconsin Tuberculosis (TB) Update
Elisabeth Patton, Wisconsin Department of Agriculture, Trade, and Consumer Protection

Wisconsin Division of Animal Health identified a bovine TB positive herd in Dane County in October 2018. The source appears to be a human who had contact with the farm. To date, the farm has completed five removal tests, and is scheduled for a minimum of seven removal tests conducted not less than 60 days apart. In addition to the initial infected animal identified at slaughter, a total of nine animals taken following removal tests have been confirmed to be infected with bovine tuberculosis. The herd is under quarantine and the only movements off of the farm are under permit, directly to slaughter or restricted feedlot. Following satisfactory completion of all required removal testing, the herd will remain under quarantine until a quarantine release test is completed and found to be negative. Quarantine
release testing is conducted not less than six months following the final removal test. Annual testing of the whole herd will be conducted for five years following quarantine release.
Trace cases: 315 traces to premises in Wisconsin; 274 traces to 16 other states.
Key Points/Questions Raised:
  • One Health
    o Human WGS prevented a lot of testing
      ▪ Trace backs- source of infection
    o Established communication plan with other agencies
      ▪ Public Health
      ▪ Department of Natural Resources
    o Proactive Human Health Programs needed
      ▪ Producer driven
  • Trace Investigations
    o Official Identification Needed
      ▪ Farm of origin
      ▪ Recorded at points of concentration
  • Unified message to producers/practitioners
    o Joint public meetings with USDA/Public Health/DNR

South Dakota Tuberculosis (TB) Update
Dustin Oedekoven, South Dakota Animal Industry Board

A cow sold through a South Dakota Livestock Auction Market in November 2018 was found with a TB histo-compatible lesion at a federally inspected slaughter plant in South Dakota. The official National Uniform Eartagging System (NUES) tag collected at slaughter traced back to a North Dakota herd which was later confirmed to be infected with a novel strain of *Mycobacterium bovis*. Sales from the North Dakota herd prior to its identification as an infected herd resulted in the quarantine of six feedlots in South Dakota. Feeder cattle from those lots remain quarantined until marketed to slaughter. A second infected cow from the same herd was sold through a South Dakota market and slaughtered in Minnesota in December 2018.

In December 2018, a black steer with no official identification was found to be infected with a novel strain of *M. bovis* after samples were collected at a federally inspected slaughter plant in Aberdeen, South Dakota. The lot was comprised of 38 animals from a feedlot in Kingsbury County, South Dakota. Eleven of the calves originated in a breeding herd owned by the feedlot owner, and the remaining 27 head were purchased from a ranch in Montana and a red-angus ranch in South Dakota. All three source herds tested negative to a whole herd tuberculin test.

In March 2019, histo-compatible, polymerase chain reaction (PCR) positive results were collected from a cow owned by a large South Dakota terminal cull cow feedlot, slaughtered at a Nebraska plant. Feedlot records indicate the cow was one of 43 head purchased at a Montana auction.
market, and official identification collected at slaughter and recorded at feedlot entry indicated Montana origin. Montana officials reported negative results to a whole herd test. Whole genome sequencing (WGS) of the *M. bovis* isolate demonstrated common ancestry with isolates in Mexico and suggest it is unrelated to isolates previously found in the U.S.

Key Points/Questions Raised:

- Our experience with *M. bovis* in South Dakota beef herds is a collaborative project with neighboring states, USDA, and industry partners.
- Identification works and is dependent on accurate record keeping.
- Recent cases in South Dakota beef herds included multiple novel strains, and common risk factors were not present:
  - Mexican cattle
  - Dairy cattle
  - Wildlife reservoir
  - International workers

**USDA-APHIS-VS Tuberculosis (TB) Program Update**

**Sara Ahola, USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS)**

**National Program Status Overview**

All 50 states remain classified Accredited Free except four counties in Michigan (Alcon, Alpena, Montmorency, and Oscoda) which make up a Modified Accredited Zone (MAZ). In fiscal year (FY) 2019, USDA detected ten tuberculosis (TB)-affected cattle herds: three dairies, one dairy heifer grower feedlot, five beef herds, and one mixed beef-rodeo-exhibition herd. Overall, the incidence of TB in the U.S. remains small and relatively stable. Herds are increasingly managed via test and remove protocols, especially with large dairies; all dairies detected in FY2019 were placed on such protocols. Beef herds remain a mixture of test and remove or depopulation; three herds were depopulated in FY2019.

**Update on slaughter surveillance and TB granuloma Identification (ID) correlation**

Nine histo-compatible cases of TB were detected at slaughter in FY2019; eight were confirmed by polymerase chain reaction (PCR) and culture. One was PCR negative and culture is pending. Of the eight confirmed, four were adult cull cows and four were fed animals. From these, three new TB-affected herds were detected. Also, of the eight confirmed, six had deoxyribonucleic acid (DNA) in which the ID submitted matched the granulomas, one granuloma was submitted with no ID (fed animal), and one was submitted with ID but no tissue to test for DNA (a 75% match overall). Over 800,000 caudal fold tuberculin (CFT) tests were performed for live animal surveillance with no detections of TB. Over 10,000 dual path platform (DPP) assays and nearly 2,700 single cervical tuberculin tests were performed in cervids with no detections of TB.

**Update on interferon gamma testing in the U.S.**
The interferon gamma release assay (IGRA) was re-instituted as an official supplemental test in the U.S. in June 2019. Currently only the National Veterinary Services Laboratory (NVSL) is conducting the assay and Veterinary Services (VS) continues to collect data for further validation. Since re-instatement, 156 samples have been tested for routine movement from negative herds, primarily young dairy cattle in Texas with a zero percent positivity rate. One TB-affected herd sampled 533 CFT responders and found poor correlation with Comparative Cervical Tuberculin (CCT) [58 CCT suspect or reactors and two gamma suspects]. Disease status of these animals has not been confirmed due to lack of post-mortem exam at this time. VS intends to continue gathering data and will work with the TB Scientific Advisory Working Group to further validate the IGRA.

Subcommittee Business:
Dr. VanderKlok provided the response from USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) to the resolution brought forth by the Subcommittee on Tuberculosis (TB) at the 2018 meeting regarding the use of the Dual Path Platform (DPP) in cervids for interstate movement.

The Committee was asked for feedback on the resolution. Representatives of the cervid industry who brought forth the resolution indicated that the response was adequate, and their intent was to bring the issue to light for consideration in the developing TB rule.

Dr. VanderKlok then opened the floor for receipt of recommendations or resolutions regarding tuberculosis to be considered for discussion, approval, and forwarding to the Committee on Cattle and Bison, Committee on Farmed Cervid, or Committee on Wildlife and Captive Wildlife. There were no resolutions or recommendations brought from committee members.

There was no additional new business. A motion to adjourn was made and seconded. The meeting concluded at 5:00 p.m.
Antibody Responses and Differential Antigen Recognition in Three Bovid Species During *Mycobacterium bovis* Infection
Konstantin Lyashchenko, Chembio Diagnostic Systems, Inc.

Using Dual Path Platform (DPP) technology with two chimeric tests antigens for antibody detection, MPB70/MPB83 and CFP10/ESAT6, we compared predominant antigen recognition patterns in cattle, American and European bison, and African buffaloes infected with *Mycobacterium bovis*. The bovid species develop variable IgG responses to MPB70/MPB83 and CFP10/ESAT6, with IgM responses being less frequent, of lower magnitude, and limited to MPB70/MPB83 recognition. In cattle, MPB70/MPB83 protein is more antibody reactive than CFP10/ESAT6. In contrast, the infected bison and buffaloes recognize both antigens equally well, demonstrating increased rates of mutually complementary IgG reactivity. Antibody responses in European bison infected with *M. caprae* and in American bison infected with *M. bovis* showed similar characteristics of antigen recognition. These findings may be useful for development of improved serodiagnostic tests for use in multiple animal hosts of tuberculosis.

A Defined Antigen Skin Test for the Diagnosis of Bovine Tuberculosis
Sreenidhi Srinivasan, The Pennsylvania State University

Bovine tuberculosis (bTB) is a major zoonotic disease of cattle that is endemic in much of the world, limiting livestock productivity and representing a global public health threat. Because the standard tuberculin skin test precludes implementation of Bacille Calmette-Guérin (BCG) vaccine–based control programs, we here developed and evaluated a novel peptide-based defined antigen skin test (DST) to diagnose bTB and to differentiate infected from vaccinated animals (DIVA). The results, in laboratory assays and in experimentally or naturally infected animals, demonstrate that the peptide-based DST provides DIVA capability and equal or superior performance over the extant standard tuberculin surveillance test. Together with the ease of chemical synthesis, quality control, and lower burden for regulatory approval compared with recombinant antigens, the results of our studies show that the DST considerably improves a century-old standard and enables the development and implementation of critically needed surveillance and vaccination programs to accelerate bTB control.

(https://advances.sciencemag.org/content/5/7/eaax4899)

Identification of Truly Negative Animals to *M. bovis*
Rafael Paiva, IDEXX Laboratories, Texas A & M University

Until the 20’s when control measures started, tuberculosis was one of the main diseases in domestic animal’s worldwide. Today bovine tuberculosis is still one of the most important disease in cattle and wild fauna.
It is also an important zoonotic disease that represents a great problem in human and animal health. One single infected animal can spread the disease in the herd even before having clinical signs. (OIE).

For identification of infected animals, the skin tests are used worldwide, caudal fold test (CFT), cervical test (CT), and cervical comparative test (CCT). Control and eradication programs based on skin tests have been used for more than 60 years with very variable results, some countries have been able to eradicate and others are still in control programs with variable prevalence.

Programs are based on the identification of infected animals (reactors to skin tests), confirmatory tests and slaughter of positive animals. Unfortunately, the skin tests still leave some false negatives in the herd because of the sensitivity (68%-95%). (OIE).

The IDEXX *M. bovis* Antibody Test used in parallel or in series with the skin test, will:
1. Identify a higher proportion of infected cattle than the tuberculin test alone
2. Remove tuberculous animals before they might become infectious
3. Allow for earlier return of herd to trading status
4. Improve risk management practice

The IDEXX enzyme-linked immunosorbent assay (ELISA) Ab test result provides a sample to positive (S/P) ratio that will help identify “Risk Groups”. These groups will have negative animals with a S/P ratio that is very close to the test cutoff. These animals have a higher probability to be infected and become positives in the next skin test and/or ELISA Ab test.

The use of the antibody test as a complimentary to the skin tests program will have several advantages for producers and the state due to finding true positives earlier:

**Producers:**
- Reduce quarantine time
- Reduce animal movement
- Reduce morbidity and mortality
- Identify risk groups

**State:**
- Reduce the number of CFT and CCT tests
- Reduce labor
- Reduce overall costs of testing
- Identify risk groups for follow-up

Implementing the IDEXX *M. bovis* Antibody Test in the United States as a complementary test to the skin test will help operations return to trade status faster and reduce the number of episodes in the future.

**Update on Gamma Interferon Assay and Other Supplemental Testing in the U.S.**

Sara Ahola, Veterinary Services (VS), U.S. Department of Agriculture

Update on Interferon Gamma Release Assay (IGRA) or “gamma” performance since re-instatement in June 2019: IGRA was re-released as an
approved supplemental test in the U.S. in June 2019 to be conducted at the National Veterinary Services Laboratory (NVSL). It was withdrawn in May 2017 after inconsistencies were identified in test performance of the Bovigam® test kit due to low activity in certain lots of purified protein derivative (PPD) and varying test results across laboratories.

In an effort to re-release the IGRA for official use, USDA evaluated samples from four tuberculosis (TB)-affected herds for the sensitivity analysis and over 45 negative premises for the specificity analysis. Various PPDs were evaluated for performance and the IDVet PPD had the best performance. A cutoff of 0.3 was chosen to meet or exceed performance of the comparative cervical tuberculin test (CCT). This cutoff results in a sensitivity of 0.84 and specificity of 0.99.

Since re-instatement, it has been used solely in Texas for both routine testing for movement and in one tuberculosis-affected herd. Specificity in samples for routine movement from presumed negative herds has had excellent specificity with no positive samples. Sensitivity in the TB-affected herd cannot be analyzed at this time due to lack of post-mortem results on suspect animals at this time. VS continues to collect test data and will request the assistance of the TB Scientific Advisory Working Group (TB SAS WG) for further analysis as data increases.

Overview of VS’ use of IDEXX M. bovis Ab test in affected herds: This assay is approved for use in the U.S. in TB-affected cattle herds as a tool to aid in eradication of TB. Given the very low prevalence of TB in the U.S., this assay has been implemented in limited situations with varying results. Previous data from a 2017 presentation by Dr. Mark Schoenbaum to the TB SAS WG was presented showing sensitivity ranging from 0% to 70% in two herds in three sample sets. Recent data from Michigan (2019) showed better performance, of 36 animals sampled, 11 of which were confirmed positive, IDEXX M. bovis Ab had a test sensitivity of 82% and specificity of 85%. USDA continues to consider using this test on a case-by-case basis in TB-affected herds.

Tuberculosis (TB) Activities of the Bi-National Committee on Tuberculosis, Brucellosis and Cattle Fever Ticks
Dee Ellis, Texas A&M University

The Bi-National Committee for Cattle Fever Ticks, Brucellosis and Bovine Tuberculosis or “BNC”, is a private public partnership charged with dealing with the pest and diseases of concern in the name. It has been in existence for 25 years. Most of the impetus is on import/export cattle moving between the two countries and the affiliated U.S.- Mexico international border crossing processes.

The U.S. BNC is composed of:
- State Animal Health Officials (SAHOs) for the Southern Border States
- Stakeholder organizations
- Corresponding USAHA Committee leadership
The Mexico BNC is comprised of similar members

The respective federal governments are not members of the BNC but are the primary venues for the dialogue intended to discuss the same issues. They are who the BNC meets with on an annual basis. I want to thank all of the USDA staff involved with the BNC in both meetings and calls. They listen to concerns and provide answers as well as potential solutions for the concerns discussed.

There are two face to face meetings per year. The U.S. BNC hosts one meeting a year in conjunction with and just prior to the annual National Cattlemen’s Beef Association (NCBA) meeting which is usually held in late January or early February. A special thanks goes to Jessica Watson of NCBA who does yeoman work on behalf of the BNC in supporting the logistical needs for the meeting.

The Mexico BNC hosts one meeting per year as well which is just prior to their annual National Confederation of Livestock Unions (CNOG) (similar to NCBA) and is usually held May or early June. The Stakeholder organizations and SAHO pay a yearly participation fees to support expenses of the BNC.

The biggest expense is the support of the face to face meeting each year in conjunction with the NCBA annual meeting. Thanks also goes out to Ross Wilson who is the treasure of the BNC.

The USAHA staff supports the bank account for the BNC and a special thanks goes to Kelly Janicek and Ben Richey.

The BNC Committee met three times face to face in 2019 to date:

- NCBA (New Orleans)
  - This was technically not a full BNC meeting because of the federal government – USDA did not attend and subsequently the Mexico counterpart Secretariat of Agriculture and Rural Development (SADER) did not attend
  - It was a meeting of the Animal Health Officials (AHOs) and Stakeholders for both countries
  - The main topic was related to improving efficiency of crossing processes for Mexico feeder cattle entering the U.S. and creation of processes to ensure radio frequency identification (RFID’s) are able to be used and the data available for easy retrieval later for better traceability
  - As a result of this meeting, a future workshop on smart batch-processing protocol (SBP) and RFID issues was planned to be held in March where the issues identified in New Orleans were presented to USDA Veterinary Services (VS)
  - Buffer zone for cattle fever ticks on Mexico side of river was discussed
CATTLE AND BISON

- Mexico Dairy TB Control Program – producers in Mexico asked the BNC group to
  - Phase 1 would be to develop a model herd plan endorsed by the U.S. and Mexican dairy industries by joining the BNC that could be provided to dairy producers and animal health officials in Mexico.
  - Phase 2 would be to develop an implementation model for the same.

- El Paso
  - A meeting was held in El Paso on March 26-27
  - There were more producers than normal at this meeting
  - Approximately 40 participants attended
  - The first day the BNC, AHO’s and stakeholders met privately to finalize their issues to discuss with USDA
  - The second day the two parties met and discussed in detail:
    - Cattle Fever tick Buffer zone
    - Electronic data management processes at Southern Border Ports (SBP)
    - Databases needed to manage the data and access to the same
    - As a result, a formal submission of the priority issues was given to USDA
  - Those SBP issues were:
    1. Standardize electronic signatures that allow crossing documents to be endorsed, authorized and verified by both countries.
    2. Review which crossing papers must be presented as hard copies
      - Consider utilizing the Zoosanitary Certificate of Exportation of Animals as the only original paper to be presented at the port – all other documents are available electronically
    3. USDA Veterinary Services (VS) should:
      a. provide infrastructure at all southern border ports (SBP) to support seamless capture and transmission of electronic data including:
        i. Antennae
        ii. Panel readers
        iii. Wands
        iv. Handheld MIM’s devices
        v. Trained personnel
        vi. Other necessary equipment
      b. Create 2019 training schedule for all Mexican exporting states and brokers to upload RFID data
    4. Create a working group that includes BNC members to assist USDA VS staff in developing schemas (modules) to exchange data electronically between Mexico and U.S.
    5. Formally request in writing that SENASICA support BNC actions
6. Eliminate the clip tag as acceptable official identification for entry into the U.S. by September 1, 2022
7. USDA and SENASICA are requested to submit their plan at the Oaxaca BNC meeting to achieve the short-term goals by December 31, 2019

- **CNOG (Oaxaca City)**
  - Normal BNC meeting
    - 3 Sub-committee meetings – TB, Cattle Fever Ticks (CFT), Brucellosis
    - Fed-Fed
    - Mexico – US BNC groups meet
    - Mexico only and U.S. only meetings
  - USDA delivered timelines for delivery of an updated and functional electronic data process
  - Many of the factors related to the timeline are Mexico issues and USDA and the U.S. BNC members have little control over that, but the Mexico BNC members are working closely with SENASICA in that regard.
  - The timeline is as follows:
    1. Short-term (by the end of July, 2019)
       a. Mexico exports: Mexico proposed a pilot for cattle exports from Chihuahua. Mexico will email APHIS all supporting documentation for each export certificate for cattle. APHIS will be able to verify authenticity of the digitally signed health certificate online.
       b. US exports: APHIS will work to develop Veterinary Export Health Certification System (VEHCS) certificates for cattle and update the certificate for horses. APHIS will sign VEHCS certificates using digital signatures. APHIS will send Mexico model VEHCS live animal certificates and online verification instructions. This change for APHIS export will apply to all ports for cattle and horses.
       c. SENASICA and APHIS plan to meet during 2019 to evaluate progress of these short-term changes. After evaluation, Mexico and APHIS will determine the possibility of expansion of the Mexican export project to other states.
    2. Medium-Term (eight to 12 months)
       a. Mexico exports: Mexico will update their system to allow APHIS direct-download capability for all documents.
       b. After re-evaluation of the short-term goals and necessary changes to the Mexican system, APHIS will consider removing the need for original documentation at presentation of animals at the border.

The U.S. BNC also holds monthly phone calls with the USDA Veterinary Services (VS) staff
One special call was held to discuss the information technology (IT) issues at the SBP related to general IT issues related to data sharing and electronic documents acceptable to both sides
In summary, the two major issues for 2019 were E-data processes and Creation of a Fever Tick Buffer zone on the Mexico side of the Rio Grande.
Next formal meeting will be Feb 2-4, 2020 in San Antonio, Texas.

This means that we constantly are looking for more efficient ways to deliver our program, i.e. continuous process improvement.

**Staff Transition** - CVB was fortunate this fiscal year to have been able to replace everyone that we lost during that same period of time. Having said that, we are also in a time of generational turnover, and have lost staff with many years of experience to retirement. Fortunately, we have been able to hire some new, high quality individuals to help bridge those gaps. This retirement trend will be significant for the next several years.

**National Environmental Policy Act (NEPA)** - CVB published a new VS Memo 800.215 this year addressing the concept of categorical exclusions that was introduced as part of last year’s NEPA final rule. This concept should allow subsequent live-recombinant veterinary biological products to make it to market in a shorter period of time.

**Pharmacovigilance** - Last year, CVB published a final rule on a mandatory pharmacovigilance program. This year, we are in the process of gathering input from the regulated industry, developing our guidance documents, piloting the reporting software, and standing up a more robust system for adverse event reporting for veterinary biologics.

**Single-tier labeling** - the project continues on to simplify veterinary biologics labeling to a single tier claim. This project is intended to standardize labeling and provide practitioners and animal owners with more information about how the veterinary biological products are evaluated at licensure. Product summaries are uploaded to our website and available for viewing there. The implementation for this rule will continue until October 31, 2021.

**Cancer immunotherapies** - CVB published a draft memo for public comment earlier this year. We are actively engaged with researchers and stakeholders to help determine the best approach to regulating these new products.

**Autologous Products** - This group of products needs to meet the standards for conditionally licensed products, which means full safety and purity need to be established prior to sale, and expectation of efficacy needs to be established. These products are intended for distribution to veterinarians only. They also need to satisfy the regulatory standards for experimental product.

**National Centers for Animal Health (NCAH) Portal** - The ability to send and receive electronic submissions continues to be a huge accomplishment for the CVB. This year we’ve expanded the functionality to include Research and Evaluation permits, transit permits, and permits for Sale and Distribution. This upgrade will allow us to retire the first two types of permits from the EPermits system which was used previously.

**Salmonella sequencing** - CVB has been working with Food Safety and Inspection Service (FSIS) and Center for Disease Control (CDC) to identify any *Salmonellas* showing up in slaughter and/or public health surveillance streams as being related to vaccine strains. This issue was raised in relation
to a very low number of *Salmonella* that matched sequences of live *Salmonella* found in vaccines. No changes to regulatory requirements have been made at this time, but the situation continues to be monitored closely.

**Autogenous Product Policy** - The regulations governing autogenous products have not been updated in years. There is interest in reevaluating the requirements for maintaining autogenous isolates, defining herd/flock of origin, approvals of non-adjacent use, and third-party distribution. This policy revision is early in the process, and we hope to have a draft document available for comment early next calendar year.

**Ingredients of Animal Origin** - With the concern about African swine fever (ASF), foot and mouth disease (FMD), and other transboundary diseases, plus global movements of ingredients, CVB is taking a holistic look at how we regulate ingredients of animal origin. We have engaged with the regulated industry and other stakeholders to put together an updated Veterinary Services (VS) Memo addressing this issue. It won’t be publicly available till sometime late this fiscal year.

**Misc. topics** - Included are a number of other pertinent CVB topics that will likely be covered by others, so I will not go into them at this point, unless questions arise later in the meeting.

**Perspectives, Priorities, and Updates from the Veterinary Biologics Industry**

Will McCauley, Animal Health Institute

Dr. McCauley delivered updates on current issues in the veterinary biologics industry. Topics discussed included funding and staffing levels of the USDA’s Center for Veterinary Biologics (CVB), development of an in vitro potency assay for rabies vaccines in the U.S., a new reference document for easily comparing various international regulatory frameworks, and potential new testing requirements for ingredients of animal origin, among others.

**Swine Influenza A Viruses: A Cornucopia of Genetic Diversity Created by Interspecies Transmission Episodes and the Processes of Antigenic Shift and Drift**

Tavis K. Anderson, Jennifer Chang, Zebulun Arendsee, Amy L. Vincent, National Animal Disease Center, USDA, Agricultural Research Service (ARS)

Influenza A virus (IAV) of the virus family *Orthomyxoviridae* is one of the most important respiratory pathogens of swine. Infection causes mortality and morbidity in many animals, resulting in significant financial losses through decreased production, vaccination, and treatment costs. The RNA genome allows for rapid genetic evolution through mutation or through exchange of the gene segments during coinfection, a process known as genetic reassortment. These two processes lead to immune evasion by antigenic drift and shift and can also allow for adaptation to new hosts.

Although only H1N1, H1N2, and H3N2 subtypes are endemic in swine around the world, much diversity can be found in the genes coding for major surface proteins, hemagglutinin (HA) and neuraminidase (NA), and in the other six internal gene segments. This diversity is the result of bidirectional
transmission between swine and humans, the occasional transmission of an avian virus into swine, followed by periods of antigenic drift and shift.

Swine IAV emerged coincident with the 1918 Spanish flu, and genes derived from this lineage are classified as classical-swine H1N1 (1). In the late 1990s, triple-reassortant H3N2 viruses were identified containing gene segments derived from seasonal human H3N2 (HA, NA, and PB1), avian IAV (PB2 and PA), and the classical H1N1 swine IAV (NP, M, and NS) (2, 3). The HA persisted, evolving into phylogenetic clades that are detected to present day (Cluster-IV (C-IV) clades A-F) (4). The triple-reassortant H3N2 viruses also reassorted with classical-swine H1N1 viruses, driving diversification and new genetic clades of H1N1 and H1N2 viruses (5), but preserving the triple reassortant internal gene (TRIG) constellation. Genetically distinct human seasonal H1 also spilled into and established in swine in the early 2000s (6, 7). In 2009, a virus with NA and M genes from Eurasian-avian H1N1 swine in addition to TRIG and classical-swine lineage genes emerged in swine, and infected humans as a pandemic (H1N1pdm09). Although sharing common ancestors, the human H1N1pdm09 genes were phylogenetically distinct from contemporary swine IAV. Via reverse zoonoses, the H1N1pdm09 continues to contribute to genetic diversity in swine, particularly the internal gene segments (8, 9). More recently, a human H3N2 virus was transmitted to swine, H3.2010.1, this virus is distinct from the H3N2 lineage C-IV viruses (10). In 2018, a live-attenuated influenza virus (LAIIV) vaccine became commercially available in the U.S. (11). The LAIV uses HA (H1 and H3) and NA (N1 and N2) expressed on a TRIG internal gene backbone, with all components isolated from swine in the 1990s. These LAIV genes are distinct from contemporary IAV and reassorted viruses have been detected with vaccine-derived internal genes, and surface genes (12). Thus, interspecies transmission episodes and the processes of antigenic shift and drift have led to at least 16 distinct HA clades, four NA lineages, and three internal gene lineages circulating in the USA (13, 14).

Vaccine control efforts for IAV in swine have traditionally consisted of whole inactivated virus (WIV). In addition, individual production systems have implemented autogenous vaccines with the components derived from field sourced isolates. An RNA vaccine encoding the HA gene was recently made commercially available (15) as well as a live attenuated inactivated influenza vaccine (LAIV) based on mutations in the NS1 gene (11). While these licensed commercial vaccines are available, they are not updated as frequently as the virus evolves, or to reflect novel interspecies transmission episodes, resulting in antigenically mismatched formulations that can result in suboptimal protection. Custom or autogenous vaccines have the advantage of addressing updates more quickly but may lack standardization or immunogenicity against all antigens in multivalent formulations.

Surveillance and monitoring of circulating IAV strains are the critical foundations for making vaccine decisions. Unfortunately, simple measures of genetic sequence similarity are not always predictive of vaccine cross-protection and efficacy. In swine H3 viruses, significant antigenic change has
been associated with mutations occurring within six amino acids near the receptor-binding site of the HA (16, 17). Swine H1 viruses do not have quite as clear a picture, likely the result of more than 100 years of evolution in the swine population and repeated introductions of viruses from humans into pigs. Consequently, it is not clear whether single amino acid changes result in antigenic change, but observational data suggests that mutation in or near the receptor-binding site can have an important cumulative effect (18). Hence, antigenic characterization is a crucial step that should be used in combination with sequence analysis and epidemiological information to better inform on vaccine decision-making.

IAV in swine is highly diverse, with sustained transmission in the U.S. of two major H1 lineages and multiple lineages of H3 from human seasonal IAV that have become established across several decades. Following the spread of the H1N1pdm09 pandemic in humans, annual introduction of this virus into pigs has driven reassortment and diversification of HA and NA in endemic swine lineages. This diversity has important implications for both swine health and control of IAV using vaccines. The USDA IAV surveillance system, implemented in 2009, has greatly increased our understanding of the diversity of IAV in swine and has enabled the detection of emerging lineages following interspecies transmission episodes. Ideally, vaccine formulation and updates of swine IAV vaccines should be objective, incorporating empirical data from the surveillance system, and the new formulations should match the genetic and antigenic diversity of circulating viruses including newly emerged antigenically distinct viral strains. Subsequent antigenic characterization is also required to understand the efficacy of vaccine antigens, and efficacy should be evaluated in the context of the multiple cocirculating genetic clades of viruses. Given how rapidly these dynamics occur, these efforts should occur within a regular assessment system that prioritizes and evaluates evolving swine IAV in the context of current control measures.

Acknowledgment
We are grateful to the pork producers, swine veterinarians, and laboratories for participating in the USDA influenza A virus in swine surveillance system. Research reported in this summary and the efforts of the authors were supported by USDA-ARS and USDA-APHIS. Mention of trade names or commercial products in this article is solely for the purpose of providing specific information and does not imply recommendation or endorsement by the U.S. Department of Agriculture. USDA is an equal opportunity provider and employer.

AVMA Guidance and Advocacy: Antimicrobial Stewardship and Integrating Biologics, Including Autogenous Biologics, and the Therapeutic Use of Stem Cells and Regenerative Medicine
Gail C. Golab, American Veterinary Medical Association (AVMA)
Addressing concerns related to antimicrobial resistance is top-of-mind for veterinary practitioners. The AVMA has worked diligently over the past decade, but particularly aggressively during the past five years through the
Committee on Antimicrobials, to define antimicrobial stewardship, develop core principles around it, and share resources that can help veterinarians effectively implement stewardship in their practices, including a veterinary “checklist” and guidance on judicious use. While judicious use of antimicrobials is key, the AVMA recognizes it is only a piece of the broader concept of Antimicrobial Stewardship in veterinary medicine, which encompasses a multi-pronged approach to reducing antimicrobial resistance and maintaining the effectiveness of antimicrobials. Part of stewardship involves attention to alternative strategies for disease prevention and control, including the use of vaccines, bacterins, and antisera, as well as appropriate attention to the development of more effective and efficient diagnostic tests that support the early identification of disease. Vaccines and bacterins have been suggested as the single most cost-effective medical countermeasure to address antimicrobial resistance. And, in the context of reducing antimicrobial use, a variety of viral and bacterial targets for vaccine improvements for poultry, swine, fish, and cattle have been identified. When no vaccine is available, or in the face of antigenic variation that is outside the spectrum of protection afforded by commercially available vaccines/bacterins, autogenous biologics are posited as an option, as long as careful attention is paid to meeting associated regulatory requirements. AVMA has developed guidelines for their use accordingly.

In addition to its attention to antimicrobial resistance, the AVMA has seen much more interest on the part of its members in the therapeutic use of stem cells (sometimes referred to as regenerative medicine) particularly—at this point in time—for treating musculoskeletal disorders in canine and equine patients. At the same time the association, and specifically its Council on Biologic and Therapeutic Agents, has recognized and advised its members that regenerative treatments should be formulated using evidence-based medicine and that veterinarians should refrain from recommending procedures when benefit has not been shown by way of clinical trials. Failure to do so poses unnecessary risk to the patient, compromises treatment success, impedes the collection of therapeutic data, and may expose the veterinarian to liability. The AVMA has created policy on the therapeutic use of stem cells and regenerative medicine that includes steps it believes veterinarians must take when using this modality. Among those steps is recognizing the Food and Drug Administration (FDA) has often treated such cell-based products as ‘drugs’ and that associated regulatory requirements must be met.

**Anthrax Vaccination Study in American Bison**

Dave Hunter, Turner Enterprises, Inc. and Keith Haffer, Advantage Bio Consultants, Inc.

In 2008, an anthrax outbreak killed 298 American Bison on a Montana ranch. The ranch had not experienced any prior exposure to anthrax and the use of anthrax vaccines in any bison had not been studied. The reported study mapped the effectiveness of anthrax vaccination by the only USDA-licensed
Anthrax Vaccine. Serum IgG responses were measured by an ELISA developed in the aftermath of the 2001 anthrax bioterrorism attack in the U.S. Sixty-six (66) male bison, weighing an average of 725 lbs., were allotted to five groups and vaccinated intramuscularly with the commercial vaccine. Groups were as follows:

A: 1 x 1 ml dose; B: 2 x 1 ml dose (different sites), 1 x 2ml dose, 2 x 2ml dose (different sites) and 1 x 2ml dose-airgun. Two non-vaccinated contact controls were included as sentinels. Blood samples were drawn prior to vaccination, at one month, two months, four months and nine months post vaccination.

ELISA results indicated that all bison were serologically negative at time of vaccination and sentinel controls remained negative through nine months. All vaccinated groups demonstrated 100% positive seroconversion by 1-month post-vaccination but differed at positive titers by two months (A - 88%; B - 93%; C - 80%; D - 80%; and E - 100%). All titers waned by four months and were undetectable by nine months. Throughout the study the airgun method of vaccination with a 2 ml dose provided the best responses.

Results of the study suggested using a 2 ml doses of anthrax vaccine with an airgun for all bison in future vaccination programs. Since this program has been implemented, no new cases on anthrax have been seen.

Committee Business:

Since we did not have a quorum (only eight members) no resolutions were discussed.

The committee did discuss increasing membership through more biotechnology papers and representative. The Chair and Vice Chair will look into some of these matters, during the coming year. Since this committee deals with commercialization of products it is unique in the USAHA committees.
The Committee met on October 26, 2019 at the Rhode Island Convention Center in Providence, Rhode Island, from 1:00-3:00 p.m. There were ten members and 24 guests present. A response to the previous year’s resolution was received from the American Veterinary Medical Association (AVMA) a few days before the meeting and is discussed below under Committee Business.

Presentations and Reports

Update on International Efforts
Barbara M. Martin, World Association of Veterinary Laboratory Diagnosticians (WAVLD) - Presentation given by Dr. Valerie Ragan.

This presentation covered updates on the continued international development of veterinary paraprofessionals (VPP). Outcomes of the OIE ad hoc Group on Veterinary Paraprofessionals (VPP) were discussed. VPP documents are available online at:

https://www.oie.int/fileadmin/Home/eng/Support_to_OIE_Members/pdf/AF-CoreCV-ANG.pdf

The Global Laboratory Leadership Program Multisectoral Partnership was also presented. Partners developed a Laboratory Leadership Competency Framework and training package for a Global Laboratory Leadership Programme (GLLP) taking a One Health approach. Partners in the effort included:

- World Health Organization (WHO)
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• Food and Agriculture Organization of the United Nations (FAO)
• World Organisation for Animal Health (OIE)
• European Centre for Disease Prevention and Control (ECDC)
• U.S. Centers for Disease Control and Prevention (CDC)
• Association of Public Health Laboratories (APHL)

GLLP training focuses on nine core competencies. Those are:

1. Laboratory systems
2. Leadership
3. Management
4. Communication
5. Quality management system
6. Biosafety and biosecurity
7. Disease surveillance and outbreak investigation
8. Emergency preparedness, response and recovery
9. Research

Current activities of the GLLP include a pilot in Pakistan in October 2019, and both a pilot in Liberia and a partners meeting in November 2019. In December 2019, a complete initial GLLP Learning Package will be completed. There will be a final review by partners in 2020 and will be published online by the WHO.

The development of laboratory policy by the FAO was also presented. This effort was initiated after FAO noted a lack of a clear policy framework for veterinary laboratories in many countries while laboratory capacity was being strengthened. Laboratory policy includes issues such as the delegation of official tests to public or private laboratories, defining the role and mission of national reference laboratories, and others. The effort was initiated in 2013 through a consultative process, and was beta tested in Kenya in 2015. Currently in 2019, a process for finalization is under development.

Finally, the World Association of Veterinary Laboratory Diagnosticians will be meeting June 24-26, 2021 in Lyon, France. A Scientific Committee has been formed, and announcements will be out soon on abstracts submission. Participation is encouraged! For additional information, contact Barb Martin at martin.barbara.m@gmail.com.

APHIS Workforce Development Initiatives
Kimberly Dodd, Foreign Animal Disease Diagnostic Laboratory, Plum Island

The Foreign Animal Disease Diagnostic Laboratory (FADDL) is a national reference laboratory for USDA Veterinary Services (VS) and the National Animal Health Laboratory Network (NAHLN), and an international reference laboratory for the Food and Agriculture Organization (FAO) of the United Nations and the World Organization for Animal Health (OIE). FADDL is currently located at the Plum Island Animal Disease Center (PIADC), the only U.S. location approved for handling high-consequence foreign animal
diseases (FAD), including foot and mouth disease (FMD) and Rinderpest viruses. The majority of the U.S. FAD diagnostic expertise for livestock diseases resides at PIADC-FADDL, within approximately 20 scientists that include microbiologists, veterinarians, and veterinary scientists (DVM/PhD). The bulk of FADDL's subject matter experts (SMEs) will not relocate to the new National Bio and Agro-Defense Facility (NBAF) in Kansas, creating a FAD SME gap throughout the transition process and during stand-up of FADDL at NBAF. Furthermore, the FADDL mission will expand at NBAF to include zoonotic and emerging diseases, with a new emphasis on biosafety level (BSL)-4 pathogens. SMEs knowledgeable in these agents and with expertise in working in BSL-4 laboratories will be critical to develop BSL-4 programs at NBAF. Similarly, FADDL anticipates a gap in trained technical support, including laboratory technicians.

To minimize the anticipated SME and technical workforce gaps and to identify highly qualified candidates to fill key roles in the new NBAF facility, APHIS developed two workforce development initiatives. The first is a graduate training program, the APHIS NBAF Scientist Training Program (NSTP), for trainees interested in pursuing a career with APHIS at NBAF. Applicants for the program must be enrolled in a graduate level (MS, PhD, or DVM/PhD) program at a partner university and in a laboratory-based field of study, including microbiology, virology, molecular biology, diagnostics, and bioinformatics. APHIS will work with partner universities and laboratories to ensure the fellows' research projects address specific FADs and capability needs. Once accepted into NSTP, the fellows will receive funding to cover tuition and fees, stipend, health benefits, materials and supplies, travel, and publication costs, for a period not to exceed five years. Upon successful completion of the programs, each fellow will be offered a full-time federal position and required to fulfill a service commitment at NBAF and/or PIADC-FADDL, dependent on agency needs and timing of degree completion. The length of the service commitment will be tied and determined by the number of years of funding received (for example, four years of service are required for two years of funding, and seven years of service are required for five years of funding).

Current, APHIS NSTP has enrolled a total of 15 fellows from ten universities, including Kansas State University, Iowa State University, Mississippi State University, North Carolina State University, Auburn University, Tufts University, Colorado State University, Texas A&M University, Louisiana State University and the University of Georgia. Each of the selected individuals have a documented interest in pursuing a career at NBAF across a range of disciplines, from the development of novel diagnostic platforms and bioinformatics to elucidating the possible role of transmission of FADs through contaminated feed. One fellow, from Iowa State University, will complete his PhD research in collaboration with the Canadian Food Inspection Agency (CFIA) in CFIA’s BSL-4 facilities; another from Auburn University will complete her PhD in collaboration with the Centers for Disease Control and Prevention (CDC). The NSTP is a
nationwide program implemented in coordination with U.S. universities. Universities interested in partnering with APHIS for the NSTP are encouraged to reach out through NSTP@usda.gov.

The second initiative is the NBAF Laboratorian Training Program (NLTP), a program designed in collaboration with Kansas State University to develop a pipeline of laboratory technicians for work with high-consequence pathogens at NBAF, NVSL-Ames and in other containment laboratories. The program will include initial online coursework to provide broad didactic training in biosafety, biosecurity, Select Agent program, high consequence pathogens and basic laboratory techniques. A subsequent 8-week laboratory training will be held at the K-State Biosecurity Institute (BRI) that will give students an opportunity to gain hand-on experience working in biocontainment. Currently, a total of ten students will be trained in Summer 2020 and another ten in Summer 2021, with an option to expand into future years. Questions regarding NLTP can also be addressed to NSTP@usda.gov.

Workforce Development Efforts and Workforce Needs for the National Bio and Agro Defense Facility (NBAF)
Roxann Motroni, USDA Agricultural Research Service (ARS)

The USDA Agricultural Research Service serves as the intramural research arm of USDA. It houses 690 projects within 16 national programs and employs close to 2,000 scientists. The Animal Health National Program (NP103) delivers scientific solutions for animal health projects. It currently has 38 projects ranging over seven different research components and has an annual budget of $80.9M. There are currently 85 scientists within the Animal Health program and 99 students or post-docs currently in training within the national program. The NBAF program falls within the biodefense component of the ARS program along with the Southeast Poultry Research Laboratory (SEPRL), National Animal Disease Center (NADC), Arthropod-Borne Animal Disease Research Unit (ABADRU), Plum Island Animal Disease Center (PIADC) and the Animal Disease Research Unit (ADRU). In order to be prepared for emerging diseases, ARS is committed to maintaining the expertise in a wide range of diseases through training of the next generation of animal health researchers.

In FY17 congress specifically appropriated funds for workforce development for the NBAF. In FY17, ARS partnered with Mississippi State University for training four students and in FY18 ARS partnered with Kansas State University to train three additional scientists. In FY19, ARS partnered with three universities (University of Connecticut, Auburn University and University of Minnesota) to begin training for three additional students. Scientists and veterinarians in the ARS training program are gaining expertise in virology, immunology, epidemiology and bioinformatics. Unlike the APHIS program, ARS does not have the authorities to require a service agreement from funded students, but rather has focused
on creating a competitive workforce that can apply for federal positions when they become available. In FY20, ARS plans to continue developing the scientific and operational workforce using the appropriated funds.

Update on the Federal Veterinary Workforce
Michael Gilsdorf, National Association of Federal Veterinarians (NAFV)

There is an increase in the total number of Federally employed veterinarians within the United States compared to 2018. The total number employed is now 3,216 and increase of approximately 100 individuals. However, this increase is a result of an increase in veterinarians hired within the Centers of Disease Control and Prevention (CDC) located in Atlanta, Georgia. The total number of veterinarians employed with USDA continues to decline. The number of veterinarians within Food Safety and Inspection Service (FSIS) is only about 900 and they still maintain about an 11% vacancy rate despite the increase of $7.5 million to hire more veterinarians in 2018. FSIS has not reported how they have used the funds to hire more veterinarians. There is an effort in the current appropriations bill to require that FSIS report their efforts in hiring more veterinarians.

The number of veterinarians within APHIS Veterinary Services (VS) is a little higher than the number employed in 2018; which was the lowest number in decades. The agency has chronic problems with a shortage of employees within their human resources division that results in much longer timeframes to hire new employees.

In addition, in all USDA agencies including ARS, over 30% of the veterinary workforce has been eligible to retire and they have been retiring in larger numbers.

Federal Administration had proposed to shrink the size of the federal workforce and reshape many federal agencies in 2018 and that process has begun.

There is a bipartisan congressional bill designed to establish an interagency One Heath Program. The intent is to:

1. Develop a force readiness number for each federal agency.
2. Work with the Congressional Research Service and Office of Personnel Management to look at the possible gap in response capability.
3. Pass the Advancing Emergency Preparedness through the One Health Act.

Developing “Externship” Programs for Veterinarians
Valerie Ragan, Center for Public and Corporate Veterinary Medicine (CPCVM) with the Virginia-Maryland College of Veterinary Medicine

The concept of an "externship-type" program for practicing veterinarians was discussed as a way to provide more opportunities for veterinarians considering a career change to explore career options that they may have an
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interest in. Currently, veterinary students have externship opportunities to explore a potential career area, while graduate veterinarians do not. Although many veterinarians are interested in possible careers in public practice, they are often hesitant to apply without knowing more about what those jobs entail. The CPCVM is in discussion with government and industry collaborators about creating “externship-type” experiential opportunities for graduate veterinarians, similar to veterinary student externships. Information received from a national survey of veterinarians interested in a career change shows that veterinarians are excited about the concept, with an interest in unpaid opportunities lasting from one week up to a year.

Initially, two to three week opportunities are being considered, depending on the preferences of the hosting organization. Starting with a pilot program in a few places first before scaling up is envisioned. Veterinarians from organizations interested in participating should contact Dr. Valerie Ragan at vragan@vt.edu.

Committee Business:

The committee also discussed the response received from the American Veterinary Medical Association (AVMA) to the resolution sent last year. That resolution stated: “The United States Animal Health Association (USAHA) and the American Association of Veterinary Laboratory Diagnosticians (AAVLD) strongly urge the American Veterinary Medical Association (AVMA) to develop and implement an action plan to lead a public relations campaign with a goal to raise public and professional awareness of the breadth of skills of veterinarians in diagnostic and regulatory medicine and the contribution of veterinary medicine to public, animal and environmental health. This campaign would be similar to the public outreach campaign “Partners for Healthy Pets”, which has elevated public awareness of the value of private practitioners. Such a campaign could be called “Partners for a Healthy Planet”, “Partners for a Healthy Society”, or some such similar title. The resulting review and recommendations for consideration should be provided to each of the contributing organizations prior to the 2019 Annual Meeting of the USAHA and AAVLD.”

The committee appreciated the response from AVMA and would like to request that USAHA communicate back to AVMA, thanking the AVMA for their consideration of the resolution and their thorough response, and indicating that the committee would be willing to work with AVMA to provide information and “stories” to help with their messaging as requested. It would be helpful to be provided a contact person at AVMA who is working on the issue to be able to do so. In addition, the committee would like to invite an AVMA representative to attend the committee meeting next year, and provide an update on the status of AVMA’s efforts in raising the awareness of veterinarians in public practice. The committee looks forward to working with the AVMA to assist in the effort.
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The Committee met on October 28, 2019 at the Providence Rhode Island Convention Center, from 1:00-6:00 p.m. There were 34 members and 28 guests present. The meeting was chaired by Katie Flynn and Vice Chair Joe Fisch. The mission statement was reviewed. Responses to the 2018 resolutions were discussed.

Time Specific Paper
Bettina Wagner, Cornell University presented a time specific paper on Managing the Risk of EHV-1 Infection - A new tool and strategy to prevent EHV-1 disease outbreaks in the United States. The paper, in its entirety, is included at the end of this report.

Presentations and Reports

Committee on Equine Past, Present and Future
Katie Flynn, California Department of Food and Agriculture

The mission of the Committee on Equine is to address and seek solutions to infectious disease issues that can compromise the health and welfare of the nation’s equine population. As part of its purpose, the Committee undertakes to keep United States Animal Health Association (USAHA) members, the United States Department of Agriculture (USDA), the horse industry and other stakeholders informed of topical disease problems
confronting the industry. The committee also serves as a sounding board for discussion on equine health related issues and for the development of strategies/solutions to resolve such problems.

The USAHA Executive Committee conducted a review of the Committee on Equine. The review found the mission statement to be current and relevant, however, the committee may also consider covering equine identification and equine welfare issues in the future. Over the years, USAHA has identified a lack of equine industry participation in the organization. Due to the diverse nature of the equine industry (numerous breed and discipline associations that work independently), consideration should be given to other avenues of engagement. Since multiple equine-related entities did participate in the Equine Disease and Equine Identification Forums co-hosted by National Institute for Animal Agriculture (NIAA) and USAHA in 2016 and 2017, forums may be the most effective way to engage equine industry participation and to solicit feedback and collaboration.

In reviewing committee activities over the past fifteen years, it is notable that there were over 133 presentations on a variety of equine topics with equine piroplasmosis, equine infectious anemia, equine herpesvirus, contagious equine metritis, equine disease communication center, equine viral arteritis, and equine import/export issues being most prevalent. Additionally, the committee generated more than 40 resolutions. The majority of these resolutions sought USDA action related to some aspect of equine piroplasmosis, equine infectious anemia, contagious equine metritis and equine identification issues.

A closer review of the last five years of resolutions revealed eight specific equine-related resolutions directed to USDA for action. Although USDA made some progress in addressing some of the resolutions, there are resolutions that remain without any action. The committee recognizes the USDA efforts made to development of equine veterinary accreditation modules, enhancements to the contagious equine metritis import quarantine program, development of an equine infectious anemia working group, and approval of regulatory disease testing laboratories. However, the inconsistent USDA response forwarded to USAHA equine-related resolutions, raises questions on the appropriateness of USDA resolutions as the most effective route for advancing equine regulatory issues.

The committee recognizes the previous success of the 2016 -2017 topic-specific equine forums and acknowledges advancements in communications and collaborations with the equine industry entities since the forums. There are several forum-identified action items that are incomplete or are yet to begin. With committee recognition of these action items, consideration should be given to hosting another forum to build on collaborative efforts with equine industry entities.

The Equine Disease Communication Center (EDCC): Past, Present and Future
Nathaniel A. White and Katie McDaniel, EDCC
Posting alerts on the website started in April 2015 (http://equinediseaseecc.org). As the number of disease alerts increased, it became clear that a better system of record keeping was needed. An EDCC database was created to record the alert information and create a formatted alert and to provide disease information in reports by disease, date, state, county, and any configuration from the other data points.

Once a disease is confirmed it is posted on the website. If the disease is infectious from horse to horse, email messages are sent to the EDCC email list and the information is posted on Facebook and Twitter. During the season of vector borne diseases alerts are posted but the email may be sent as a digest at the end of the day. From September 17, 2018 through September 17, 2019 the website had 163,221 visits and of those 106,274 were to the alert page. The following is an example of the alert on the website:

The term outbreak has been eliminated from the website to decrease the misunderstanding that can arise from its use. Reporting disease as an outbreak will be restricted to when disease spread to multiple horses or locations and will be in the notes of the alert.

The EDCC website serves as an educational resource. The alerts have links to additional disease information about what horse owners can do to protect their horses including biosecurity, vaccination, disease descriptions, contacts for state and federal health officials, and links to information from supporting organizations. The EDCC Director and Communication Manager are members of the American Association of Equine Practitioners (AAEP) Infectious Disease Committee, which has oversight on the educational information on the website. The Communications Manager with support from subject matter experts on the AAEP infectious disease committee, keeps the fact sheets and biosecurity information on the EDCC website up-to-date and accurate.

Future plans also include increased reporting from the EDCC database and extending educational presentations for the industry. In an attempt to increase disease reporting, United States Equestrian Federation (USEF) is considering mandating event and show managers have their veterinarians submit confirmed or suspicious diseases to the EDCC. AAEP is also educating members about the need to increase reporting. Finding a way to decrease the time for submission is a goal to make sure the disease reports are timely.

Currently, the EDCC is supported by horse organizations including sponsorship from owners, breed associations and corporations. A fund-raising plan is being developed and will be implemented by the National Equine Health Plan (NEHP) EDCC Advisory Committee which is made up of representatives from all segments of the industry including State Veterinarians and USDA. The committee will be asking all involved in the horse industry to help support the EDCC.
Private Practitioner Perspective on Equine Regulatory Disease Events and Biosecurity
Barbara Jones, One Health Consulting, LLC

Equine regulatory disease events have increased in prominence throughout the equine industry. General practitioners have a very different perspective of these events than regulatory veterinarians. First, there are difficulties in knowing and staying abreast of changes in regulations and reportable diseases. Second, when an event occurs, general practitioners not only have to deal with the event, but also communicate with their regular clients and other equine owners calling with concerns and wanting answers. Finally, biosecurity is not a routine part of equine general practice. It can be difficult to rapidly identify the best protocols, cleaners, and disinfectants are for a suspected disease, what the various associations or federations require while in a field setting and how to handle the event in locations and facilities not designed for managing contagious diseases. The general practitioner can increase their preparedness for equine regulatory disease events by monitoring the Equine Disease Communication Center (EDCC), having mobile-friendly reference materials identified and available, and reviewing general biosecurity principles prior to an event.

Challenges of Biosecurity and Regulatory Disease Control at Thoroughbred Racetracks
Karen Lopez, Delaware Department of Agriculture

Biosecurity is an important component of safeguarding animal health at any equine facility. At a racetrack, however, there is an added financial concern as an outbreak of illness among equine athletes can lead to great economic losses if individual horses cannot race or all racing at the track is halted in the face of an outbreak. While there are several challenges to implementing biosecurity at a thoroughbred racetrack, points of implementation do exist where modifications to policy and management can be made to decrease the likelihood of introducing and spreading an equine infectious disease at the venue.

Challenges:

An enormous challenge regarding biosecurity at a thoroughbred racetrack lies in the design of the venue itself: unlike an equine veterinary hospital for example, stables and flooring generally consist of wooden stalls and dirt, which cannot be cleaned and disinfected of pathogens. Horses ship into the track at all times of day and night, oftentimes with no inspection for clinical signs of illness prior to being unloaded from the trailer and mixed with the rest of the population housed on site. While some horses may be stabled at the track for the entirety of the racing season, many move frequently (on the order of several times a week) between tracks and farms. This also means that the transport vehicles move between many tracks and farms, potentially serving as fomites for infectious diseases.

Many common equine caretakers exist on the backside of the track. In the course of their daily tasks, clothing, shoes, and/or hands will frequently
become soiled with saliva, respiratory secretions, blood, urine, and manure from multiple horses. Exercise riders and pony people may work for multiple different trainers, and thus with multiple groups of horses. Handwashing facilities outside of a restroom or office are an uncommon occurrence within the stables on the backside of a racetrack.

Trainers, grooms, and even veterinarians may have the opportunity to live on site on the backside of the track. They may be accompanied by small animal or livestock pets, which live alongside the racing equines or ponies, and can serve as reservoirs or mechanical vectors for equine pathogens. The expanse of the backside of the track means that cars, trucks, golf carts, and bicycles are often utilized to travel between destinations. These vehicles present conceivable fomites for disease-causing organisms.

Implementing biosecurity:

Unfortunately, many of the biosecurity recommendations presented here will not directly mitigate the challenges discussed above. This is because of limitations associated with practicality, cost, and the capabilities/facilities of tracks. The feasibility of the biosecurity recommendations offered will differ between tracks; many are based on the speaker’s experience with biosecurity on poultry farms.

It is suggested that a single-entry point to the backside of the track be established for trailers arriving with horses. Horses should be unloaded directly to holding barns for new arrivals, from which they will be released after a track regulatory veterinarian examines the horses for overt clinical signs of illness and confirms that CVI and vaccination requirements are met. Trailers should not move beyond the drop-off point at the new arrivals barn and veterinarians need to be provided with an enforceable policy to refuse entry of sick horses or those that do not meet the entry requirements. Prompt recognition of a sick animal is critical for effective biosecurity. Therefore, it is recommended that equines have rectal temperatures taken daily. Identifying and isolating a sick animal early, quarantining its contacts, and stopping movement of affected animals and associated people, manure, equipment, etc. is imperative. Sick horses should be handled with established isolation procedures including personal protective equipment (PPE), separate feed storage and waste disposal, and foot baths. The isolated horse should have a dedicated caretaker or be handled lastly following healthy horses first and contacts second. Contacts of the isolated horses should be allowed on the track for training last.

Routinely, all horses should have dedicated feed and water buckets, grooming equipment, and halters; other equipment should not be shared if it cannot be thoroughly cleaned and disinfected between horses.

Handwashing sinks with soap and paper towels available, or alcohol-based waterless hand sanitizers are recommended to be installed in barns. All track personnel should be expected to arrive in freshly laundered and dried clothing at the start of the day. The keeping of small animal and livestock pets on the backside premises should be prohibited; a lesser option would be to continue to allow the animals but mandate that preventive care
be kept up-to-date. To exclude pests and wildlife, especially rabies vector species, in barns, an integrated pest management program should be in place on the backside.

As was suggested for unloading horses, a single-entry point should be established for delivery and maintenance personnel, etc. These visitors should stop at the entry point, sign in, and be provided with plastic booties to wear over their shoes during their visit. When possible, they should be escorted to their destination in a site-dedicated vehicle so that their external vehicles are not driven around the backside.

Conclusions:

Though challenging, biosecurity at the thoroughbred racetrack can be established by starting with small implementations. Also, a steward or other staff member can be assigned as the biosecurity officer and an internal biosecurity accreditation program can be initiated at the track. There must be a commitment to the program by management staff at the track, as meetings, signage, and media advisories will be needed to garner support for the initiative.

References:


Equine Disease Surveillance and Response: Successes and Challenges
Angela Pelzel-McCluskey, USDA-APHIS-Veterinary Services (VS)

Over the past 15 years, state and federal animal health officials have jointly responded to many different outbreaks of equine regulatory diseases with valuable experiences gained and lessons learned in each incident. Some of the diseases/outbreaks encountered include: equine infectious anemia (EIA), equine piroplasmosis (EP), contagious equine metritis (CEM), equine viral arteritis (EVA), equine herpesvirus myeloencephalopathy (EHM), eastern equine encephalitis (EEE), West Nile virus (WNV), and vesicular stomatitis (VS). While future incidents involving these diseases will occur, it is important for our continued efforts to recognize the successes achieved in the battle against these diseases, the improvements in surveillance and response measures that have been developed, and challenges that remain to be conquered.
While EIA prevalence in the U.S. has declined over the years to an overall prevalence estimated at 0.004%, the epidemiology of the cases has shifted in the past few years revealing Quarter Horse racehorses as the predominant high-risk group and iatrogenic transmission among this population as the primary method of spread. The involvement of some of these horses in unsanctioned racing and the identification of illegal movements of exposed and infected horses from Mexico into this population has been a new challenge. Additionally, the recent retirement of a collective group of EIA researchers in the U.S. has left a gap that has yet to be filled.

EP cases being found in the U.S. share the same high-risk population and iatrogenic transmission route as the EIA cases with the same inherent challenges in associated illegal activities. While eradication has been successfully completed on our only finding of natural tick-borne transmission of T. equi in the U.S. from a Texas ranch identified in 2009, the risk remains that iatrogenic transmission cases in Quarter Horse racehorses could lead to another instance of tick-borne transmission in the future if those animals remain unknown and untreated. The most significant success against EP in the past ten years has been the development and implementation of the EP treatment program in which a published high-dose imidocarb dipropionate protocol is used to permanently clear the organism from the affected horse. Even with that important achievement through research in the past, our future in EP research looks limited and unknown at this time.

The U.S.’s success in recent responses to outbreaks of CEM has been well established with the source of introduction identified in many of the cases. The low level of national surveillance, however, continues to be a challenge and may lead to significant delays in our detection of a new incursion. The potential circumvention of CEM import requirements via moving horses into the U.S. by passing them through apparently CEM-free countries to disguise their actual origin is also an ongoing challenge without a current solution. Widespread improvements needed in biosecurity practices at breeding operations and semen collection centers in the U.S. is also a gap that has yet to be fully addressed.

The USAHA Committee on Equine has contributed significantly in the response to EHM outbreaks the past few years by publishing and keeping updated the “EHM Incident Guidelines for State Animal Health Officials”. This document and the California Department of Food and Agriculture’s “Biosecurity Tool Kit for Equine Events” has greatly improved the overall planning, preparedness, prevention, and response efforts to EHM cases. The industry-developed Equine Disease Communication Center (EDCC) with the widespread participation of state and federal animal health officials has revolutionized the timely sharing of equine disease outbreak information, especially in cases of EHM. While the scope and frequency of equine movements in the U.S. assures that continued exposure to and outbreaks of EHM will occur, it is hopeful that the increased awareness of the disease, the implementation of better biosecurity by individual owners/trainers, and the industry-driven improvements to biosecurity at equine events will serve to
reduce the scope and impact of these future outbreaks.

The response to VS outbreaks in the U.S. underwent significant changes in 2015 in light of the World Organization for Animal Health’s (OIE’s) delisting of the disease. USDA-APHIS and the historically-affected VS states jointly developed response improvements which included a reduction in quarantine period to more closely match the risk of viral shed from the lesions of affected animals, the use of accredited veterinarians to manage equine cases, the option to designate suspect equine cases in known positive counties without further testing required, and the activation of National Animal Health Laboratory Network (NAHLN) laboratories to assist in the response. These changes significantly reduced the strain on state and federal resources during an outbreak while still maintaining disease control and an appropriate response. The new multi-disciplinary approach to VS research through USDA-Agriculture Research Service’s “VSV Grand Challenge Project” insures that the use of a big data approach to VSV research will yield more information on predictability and epidemiology of the disease for response purposes in the future. Challenges in VS response still remain in the broad variability of interstate movement restrictions imposed during an outbreak, the severe impact of international movement restrictions, and the limitations in available vector mitigation strategies. Overall, a great deal of improvements have been made and successes achieved in these and other equine disease responses in just the past few years. Continued collaboration between state and federal animal health officials, the laboratories, academia, and the equine industry are needed to address the remaining and future challenges in equine disease surveillance and response.

USDA 2019 Summary of Advances in Equine Import
Rachel Cezar Martinez, USDA-APHIS, Veterinary Services (VS)

The USDA has made many advancements to promote the international movement of equine while protecting the domestic equine population and decreasing the risk of foreign disease introduction. The USDA has worked with industry to address many of the current import and animal health concerns which include consistency amongst the quarantine facilities, standardization of import procedures at the ports and evaluating the import process and requirements for U.S. horses returning from contagious equine metritis (CEM) affected countries. USDA continues to work both internally and with industry to ensure all requests for temporary quarantine facilities are processed and held to the same standards for approval. Horses permitted to complete quarantine in these approved facilities pose the same disease risk as those horses which are imported and complete quarantine at a federal or permanent private quarantine facility. Therefore, it is pertinent we uphold the temporary quarantine to standards that mitigate risk of disease and include adequate biosecurity measures. Through the partnership with the equine industry APHIS-VS has been able to provide services for multiple temporary
quarantine facilities and CEM and piroplasmosis monitoring for equine special events this year.

USDA has also been working with stakeholders that use the southern border port equine facilities to address their request for the ability to quarantine multiple lots on the same premise and also update standards for all quarantine facilities along the U.S.-Mexico border. Due to this feedback we reviewed and evaluated current guidance. During the latter part of fiscal year 2019, APHIS released the new guidance document for equine quarantine facilities across the U.S.-Mexico border. This guidance provides standards for both all in-all out and multi lot quarantine facilities and becomes effective January 1, 2020. APHIS is working with Mexico and has scheduled multiple stakeholder meetings to take place in October and November of 2019 to address any concerns related to the new guidance.

While there have been many advancements during this fiscal year, one of the challenges to which USDA has been working to address is the increase of sick horses arriving to the port of entry. USDA understands the potential risk of disease introduction and the impact to receiving states and domestic horses this can present. The import of sick horses also requires the use of extra resources to ensure these horses meet import requirements prior to release. USDA is collaborating with the European Union (EU) and other affected countries to identify solutions that can be implemented pre-export to prevent the arrival of sick and injured horses. USDA is also committed to working with importers in making them aware when sick or injured horses arrive to import quarantine and standards of procedures for handling such horses. In addition, the USDA developed an internal working group to further the conversation on procedures and steps to take while horses are in quarantine that can decrease the risk of horses potentially being released with a communicable disease. There have been great efforts amongst the USDA to collectively address this concern.

The equine import regulations are currently under review to see how they can better align with international standards and improve flexibility for both the equine industry and USDA. A part of this review incorporates the 60-90 day proposed regulation change for U.S. returning horses. We understand the great benefit this allowance will be for the equine industry. In reviewing this proposal, we have worked with exporting countries and stakeholders to update the import documentation requirements for U.S. return horses, while ensuring there is no increased risk to the domestic population. USDA is committed to facilitate the growth in international movement of equine by staying engaged with our stakeholders and working to find solutions.

Export of Horses and Equine Germplasm: Accomplishments and Updates
Shanna Siegel, USDA-APHIS, Veterinary Services (VS)

FY2019 Export Trade Accomplishments:
Export requirements found on APHIS’ International Regulations (IRegs) Website
REPORT OF THE COMMITTEE

➢ 5 New (Opened) Markets
  • Horses to Serbia
  • Competition horses to Peru
  • Equine embryos to Argentina
  • Equine semen to Guatemala
  • Equine semen to Barbados

➢ 6 Re-opened and/ or Retained Markets
  • Horses to Mexico
  • Horses to Chile
  • Horses to Australia
  • Horses to Taiwan (transits)
  • Horses to Brazil
  • Equine semen to Brazil

➢ 2 Expanded Markets
  • Horses to Japan
  • Horses to Canada

Vesicular Stomatitis (VS):
➢ Vesicular Stomatitis has been confirmed in seven states in 2019: Colorado, Nebraska, New Mexico, Oklahoma, Texas, Utah, and Wyoming
➢ Check IRregs to determine if there is an impact to country-specific export requirements/ protocols

Veterinary Export Health Certification System (VEHCS)
➢ Online system for the electronic creation, issuance, and endorsement of U.S. export health certificates
  • Paper health certificates must accompany the shipment
➢ VEHCS is currently accepted by 33 countries - more to come!
➢ Check color banners on country-specific pages of the IRregs to determine a country’s acceptance

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➢ Online resources:
  • Information about VEHCS for USDA Accredited Veterinarians
Contagious Equine Metritis: Past, Present and Future
Katie Flynn, California Department of Food and Agriculture

The purpose of the Contagious Equine Metritis (CEM) Import Quarantine Program is to ensure horses imported from CEM affected countries are free of the disease when released into the United States. When followed, current protocols and procedures are scientifically proven to prevent disease introduction. As evidenced by previous incursions of CEM into the United States, failure to follow protocols leads to the introduction and spread of disease. Advances in the CEM Import Quarantine program have evolved as our understanding of the science and disease has expanded.

The first CEM Program review occurred in 1994. During this review it was determined that a sinusectomy on mares should be replaced with swabbing and flushing of the clitoral sinuses. At this time compliment fixation testing was discontinued for imported mares. Additionally, the treatment of stallions prior to culture/breeding was discontinued and the test requirements for test mares was modified to add the requirement of a compliment fixation test at day 15 post breeding and culture collections on days 3, 6, and 9.

In 2003, a CEM focus group was formed to review proposals and recommendations that the USDA had received from equine stakeholders. Following the review, the imported protocols were modified to add the collection of a distal cervix/uterine sample and re-established the collection of serum for compliment fixation testing. The imported stallion protocol was modified to add the distal urethra to the required sites to be sampled and the test mare protocol was modified to include three sets of swabs and a compliment fixation sample collected day 21 post breeding.

A 2007 CEM Review was conducted and the areas evaluated included pre-import testing; USDA approved import quarantine stations; state approved CEM facilities and procedures (minimum standards); regulations and policies; laboratory testing; training; Veterinary Services (VS) support and oversight; research/new ideas and communications. The USDA is recognized for increasing communications and training through hosting the monthly state CEM coordinators conference call and the USDA CEM training courses. USDA has developed a data reporting system for capturing and summarizing the CEM import testing data; however, this system is not searchable or accessible to the states. Although USDA has consulted with state coordinators, there has been a delay in the issuance of applicable revised VS Guidance documents. One of the important recommendations from the 2007 review is the request for USDA to evaluate the state infrastructure and CEM programs.

The USDA’s current method of assessing the infrastructure and relevance of approved state CEM programs remains unclear. Thus, the review team’s report recommends that the USDA’s CEM Coordinator devise a more coherent system of review of states approved for the CEM Import
Quarantine Program. To date, no reviews are reported to have been conducted by the USDA regarding state CEM programs. Furthermore, state CEM coordinators agree that in order to accurately identify CEM carrier stallions, it is crucial that all stallion breedings be observed by regulatory personnel. In order to intercept and prevent any additional deficits in the CEM program that could put the domestic equine populations at an increased risk of disease, it is imperative to implement a credible and measurable means of periodically ensuring that all facilities in approved states conform and remain compliant to the established standards.
The Equine Viral Arteritis (EVA) subcommittee has been working on several items pertaining to this disease over the past year. These items and a brief description are listed below:

   a. The subcommittee is working to update this version of the Uniform Methods and Rules (UM&R). The sections have been divided among the members to edit and provide the edits and comments back to the chairman. Edits will be compiled and sent to the entire committee for discussion.
   b. The updated UM&R will then be sent to USDA for consideration. The updated version will include new knowledge pertaining the testing for this disease, outbreak procedures, movement of stallions and semen.
   c. An EVA positive stallion compliance agreement will be added for use by SAHO’s, if desired.

   We believe the updated UM&R will be more informative and useful for veterinarians, SAHO’s and the equine industry.

2. Development of bullet points for use by breeders and veterinarians. There will be a separate document for each of these two groups.

3. Contact universities that offer equine breeding short courses about including information pertaining to EVA in the course curriculum. Texas A&M University and Colorado State University have been contacted and are willing to add this to their short course curriculum. The positive responses from these universities, hopefully, is an indicator that others will also be receptive.

4. Review of the USDA-APHIS Fact Sheet and provide feedback to USDA for any needed edits or updates.

5. Draft and submit to the Committee on Equine resolutions concerning both international importation of equine semen and interstate shipping of equine semen.

Committee Business:

The committee discussed five resolutions and one recommendation. Another resolution was tabled due to time constraints. Four resolutions and one recommendation were approved.

Recommendation:

The Committee on Equine requests the United States Animal Health Association (USAHA) Executive Committee co-host with the National Institute of Animal Agriculture an Equine Forum for equine industry stakeholders.
The recent closure of the USDA Miami Animal Import Center, in conjunction with previous disease outbreaks associated with imported horses, have raised concerns amongst animal health officials and the overall equine industry. As a result, the USAHA Committee on Equine has formed a working group tasked with identifying and evaluating disease risks and concerns and making recommendations surrounding international equine importation to the United States.

The working group split the objectives into two processes: document review and data review. During the document review process, the group extensively reviewed and made recommendations to The Standard Operating Procedures for USDA-APHIS, Veterinary Services (VS) Miami Animal Import Center (referred as the “Sick Horse Protocol”) and The Agreement Between Private Quarantine Facilities and USDA-APHIS-VS (referred to as the “Private Quarantine Agreement.”)

**USDA Sick Horse Protocol:**

The working group recommends changing the language of “sick horse” to “horses with abnormal health events,” and to further divide this group into “contagious,” “non-contagious,” and “other.” A contagious horse should be defined as an animal with a suspected infectious and/or communicable disease, while a non-contagious horse should be defined as an animal with a disease that is not known or suspected to be infectious. A horse classified as other should be infirm, but without any disease process, such as those with fractures, lacerations, lameness, corneal ulcers, etc. Additionally, when an animal is identified as a horse with abnormal health events, the group recommends timely consultation with an accredited veterinarian and, if considered infectious and/or contagious, notification to a State Animal Health Official (SAHO) in both the state of destination and the state in which the horse is currently located. If possible, any horse considered contagious and/or infectious should be moved to an isolation area immediately, and isolation protocols promptly implemented. Timely diagnostic testing, as outlined and determined by the internal USDA-APHIS-VS working group, any antimicrobial treatment, and referral to an approved equine hospital should be reported on the VS 17-30, as well as conveyed to the SAHO in both the state of destination and the state in which the horse is currently located. Finally, any potentially exposed cohorts should be identified and monitored for clinical signs of disease and the SAHO(s) should be notified before their release.

If a horse is referred to an approved equine hospital, the group recommends extending the time between qualifying rectal temperatures from three normal (>101.5F) temperatures in a 24-hour period to three normal temperatures in a 48-hour period. For all horses with abnormal health events, including but not limited to a rectal temperature greater than 101.5F and/or
the display of clinical signs of a potentially infectious disease as well as for all potentially exposed horses, the USDA Quarantine personnel should complete a “Report of Abnormal Health Event in a USDA Quarantine” form and/or complete a “Compliance Agreement for Potentially Exposed Imported Horses.” The compliance agreement form should be signed by the horse’s owner or agent, should accompany the horse upon release, and be sent to the SAHO in the state of destination.

**Private Quarantine Agreement:**

**Recommendations regarding the Facility Owner section of the agreement:**

The working group recommends quantifying “adequate personnel” to a person-per-number of horses who are responsible for the daily inspection and care while under quarantine. These personnel should maintain a minimal daily assessment log for each horse outlining the individual’s well-being and level of health. This log should include but not be limited to feed and water intake, fecal and urine output, overall attitude and comfort level, and pain assessments.

Prior to admission into the quarantine storage location, the group recommends inspecting all hay and feed for signs of spoilage, mold and/or tampering. A log of inspection dates and source of feed should be maintained and retained for a minimum of one year. Additionally, the group recommends a wastewater risk analysis with emphasis on the risk of pathogen release into the environment or community water systems.

Entry to the facility by unauthorized people or animals, as well as the unauthorized movement or escape of quarantined animals should be immediately reported to APHIS representatives, and infectious disease evaluation and necessary action should be implemented immediately. Conversely, in an acute, life-threatening emergency situation, if an accredited veterinarian should arrive before the APHIS representative can provide oversight, the accredited veterinarian should be granted special access to the quarantine facility in order to implement critical emergency treatment.

The working group recommends all private quarantine facilities have an approved emergency response plan in the event of natural disaster, major disease outbreak, or other unforeseen circumstances which could necessitate evacuation or lock down of the facility.

**Recommendations regarding the APHIS section of the agreement:**

The working group recommends that APHIS alert the state animal health official (SAHO) for all suspected communicable or infectious diseases (including necropsy findings) and retain horses with clinical signs and/or positive diagnostic testing consistent with such diseases until resolution of clinical signs or until the disease is effectively ruled out. In the event that the disease is reportable in the state of destination, the group recommends immediately notifying the SAHO and, if unable to remain at the facility, releasing the horses of concern to their destination under USDA seal with VS 1-27 documents, medical and treatment records, and diagnostic test results. Furthermore, all information such as name, owner, identifying markings/microchip number, and destination of all potential cohorts should
be provided to the SAHO before release.

To further safeguard the United States from the incursion of internal and external parasites, the working group recommends administering Ivermectin to all imported horses as well as broadening the term “spraying” of acaricide to equate “soaking the equine with acaricide by spraying to ensure adequate coverage.”

Data Review:

The working group recommends the USDA to collect, maintain, and distribute, as necessary, data for horses with abnormal health events to include but not limited to quarantine location, broker, arrival date, country origin, horse identification (ID) number or name, health observations, diagnostic testing with results, diagnosis, destination address, and result (release, euthanasia, death, etc.). The group also recommends that data for all cohorts or potentially exposed horses be maintained in the same manor.
Despite widely used vaccination, equine herpesvirus type 1 (EHV-1) continues to cause outbreaks in the United States. EHV-1 is an alphaherpesvirus and endemic in the U.S. horse population. The virus is transmitted by nose-to-nose contact of horses or by fomites [1, 2]. EHV-1 susceptible horses develop respiratory disease upon infection. In some horses, equine herpesvirus myeloencephalopathy (EHM) is a severe outcome of EHV-1 infection and can be lethal. In addition, EHV-1 infection during pregnancy can cause abortion [1-5]. Vaccination guidelines for EHV-1 and EHV-4 have been established [6]. Vaccines have been shown to decrease severity of respiratory disease and nasal shedding, and to reduce abortions storms [7-11]. However, abortions and neurological outbreaks still occur [1,2].

After clinical signs of disease resolve, EHV-1 establishes latency [12-16]. The prevalence of EHV-1 in the horse population is high with detection in 54-88% of horses post-mortem [13,17,18]. Horses with poor immunity against EHV-1 can reactivate the virus during periods of stress, such as rearranging horse groups, movement and transportation, or during events like horse sales, shows or races [1,16]. Once EHV-1 is confirmed by polymerase chain reaction (PCR) in the clinically affected horse, quarantine is established for all horses or equids on the premise [19-21]. EHV-1 quarantine has a considerable economic impact due to its effects on animal health including potential death of some horses, management, regulatory oversight and veterinary costs during the quarantine period, lost training and competition times, and overall restrictions on movement of horses involved in the outbreak.

**EHV-1 Pathogenesis of EHM and abortions**

The central event in the pathogenesis of EHV-1 causing severe disease outcomes such as abortions or equine herpesvirus myeloencephalopathy (EHM) is the spread of the virus from the peripheral blood to vascular endothelial cells, thereby infecting either the pregnant uterus or the central nervous system of the affected horse [22, 23]. Cell-associated viremia is the widely accepted pre-requisite for the spread of EHV-1 to vascular endothelial cells [1, 24, 25]. Immunity against EHV-1 is composed of local and systemic antibody and cellular immune responses [26]. Cytotoxic EHV-1-specific T-cells were associated with protection from cell-associated viremia and EHM [22, 27] while EHV-1 serum neutralization titers were considered poor correlates of protection [27]. Consequently, more recent EHV-1 vaccine development has targeted the improvement of adaptive cellular immunity. The goal was to increase cellular immunity that controls, targets and/or destroys the virus-infected cells during viremia and thus prevents EHM. This
has been shown to be a difficult task and a vaccine labelled for preventing against EHM is still unavailable today. However, do our current EHV vaccines really not prevent against EHM and what are the immune mechanisms which provide protection from EHV-1 infection at the viral entry side?

**Correlates of protection: local EHV-1-specific antibodies prevent from all disease outcomes**

We have recently performed several experimental studies with the goals to identify vaccine candidates providing better protection from severe disease. During these studies, we also thoroughly characterize protective immunity against EHV1. Some of the vaccine candidates had reduced virulence by still providing strong immunogenicity [28, 29]. One vaccine candidate also improved protection from infection when compared to the parent EHV-1 strain [30]. The even more exciting novel finding from this work was the characterization of local immunity in the upper respiratory tract and the identification of easily accessible correlates of immune protection against EHV-1. Intranasal host immune responses are composed of type I interferon and inflammatory marker secretion during the first few days post infection and the onset of solid local and systemic antibody responses after the first week [11, 28, 29]. In contrast, adaptive T-cell responses were overall low and delayed after EHV-1 infection with various EHV-1 strains [11, 28, 29].

Protective immunity against EHV-1 was analyzed in horses that were previously infected and then challenged with a neuropathogenic EHV-1 strain. Surprisingly, full protection from clinical disease, nasal virus shedding, and cell-associated viremia did not require high amounts of detectable peripheral EHV-1-specific cellular immunity. However, protection was highly correlated with pre-existing intranasal and systemic EHV-1-specific IgG4/7 antibodies [30, 31]. In fully protected horses, EHV-1 could not be isolated from nasal secretion or peripheral blood, type I interferons and inflammatory markers were not induced at the side of infection, and horses demonstrated a rapid influx of EHV-1-specific IgG4/7 antibodies to the upper respiratory tract [30, 31]. All together this shows that EHV-1-specific IgG4/7 antibodies rapidly neutralize EHV-1 in the upper respiratory tract, inhibit viral entry into respiratory epithelial cells, and thereby prevent virus replication and the development of cell-associated viremia.

In conclusion, EHV-1-specific IgG4/7 antibodies are powerful host immune tools to protect horses against EHV-1 infection. If sufficiently high, they capture EHV-1 right at the respiratory entry side and prevent viral shedding and cell-associated viremia. Thus, development of EHM is highly unlikely in horses with high EHV-1-specific IgG4/7 antibodies. These findings reversed our viewpoint on the protective potential of antibodies against EHV-1 infection and EHM. The studies also identified serum IgG4/7 antibodies against EHV-1 as strong correlates of protection from infection and disease.
The EHV-1 risk evaluation test: a novel diagnostic tool to evaluate the risk of EHV-1 infection and clinical disease

The finding that EHV-1-specific IgG4/7 antibody amounts correlate highly with protection from fever, clinical disease, virus shedding, and cell-associated viremia [30, 31] opened an opportunity for the development of a new diagnostic tool, the ‘EHV-1 risk evaluation’ test. This new test is now offered through the Animal Health Diagnostic Center at Cornell University [32]. The EHV-1 risk evaluation test can precisely determine for each horse if it is susceptible to infection and development of clinical disease if subsequently exposed to EHV-1. The test result serves as a measure of protection against respiratory disease and EHM by vaccine-induced or naturally acquired antibodies.

The EHV-1 risk evaluation test is performed on a serum or plasma sample and provides quantitative cut-off values for EHV-1-specific total Ig and IgG4/7 antibodies which are biomarkers for protection against EHV-1. The protective biomarker values then result in a risk evaluation for the individual horse which determines if a horse can be infected with EHV-1 or if it is immune and protected. The underlining principle of the new EHV-1 test is that the protective biomarkers in serum and in the upper respiratory tract highly correlate. Thus, serum biomarker values are indicative for local immunity at the viral entry side and for preventing infection with EHV-1 and clinical disease.

The EHV-1 risk evaluation assay offers a novel approach to protection against disease in individual horses or equids. It can be used as a tool for informed decision making about EHV vaccination and a possible alternative for repeated vaccination of already highly immune horses. By using this novel assay, vaccination of horses can be performed strategically to minimize the risk of EHV-1 reactivation and infection during periods of stress with the overall goal to reduce EHV-1 outbreaks in the United States. Additional details about the novel EHV-1 risk evaluation assay and its potential uses are listed below.

How can the new EHV-1 risk evaluation test be used?

Individual horse level:

Protective EHV-1 biomarker and risk evaluation testing can be used on an individual horse level to provide an informed measurement of protection against EHV-1 infection. Not all horses respond equally well to vaccination. The assay is able to identify low responders to EHV vaccination. For low responder horses, an individual vaccination strategy can be developed together with the veterinarian to improve EHV-1 immunity. This protects the low responder horse when traveling, showing or racing and reduces the risk from this horse of potentially reactivating EHV-1 during period of stress and infecting other susceptible horses.

In addition, horses with an appropriate or high response to vaccination can be identified and a recommendation on timing of the next vaccination can be made based on the current biomarker values. This is especially
applicable for horses with high responses that are showing side effects to frequent vaccination. In agreement with the required agencies or horse organization, a protective EHV-1 biomarker value could potentially replace a vaccine requirement to avoid over-vaccination of high responder horses.

Horse population level:
The EHV-1 risk evaluation test can/has been used to analyze EHV-1 biomarkers in various horse populations, e.g. random equids in the U.S., show horses, travelling horses, etc. Test results can provide data on EHV-1 immunity and the overall EHV-1 infection risk in a particular horse population to better evaluate the probability of EHV-1 outbreaks.

EHV-1 vaccination recommendations:
The assay can be used to provide data for informed decision making on EHV vaccination intervals. It can be utilized in field or experimental vaccination studies to obtain data on longevity of EHV-1 antibodies that lead to informed EHV vaccination recommendations providing maximal protection by simultaneously avoiding overly frequent vaccination. Biomarker results allow to improve protection in low responders and maintain protection against EHV-1 high responders. Thus, the overall protection status in the U.S. horse population and in those horses that are at risk of EHV-1 infection if exposed can be improved.

Sales, show or racing event requirements:
A high protective biomarker value in the EHV-1 risk evaluation test could be used as an alternative for a proof of EHV-1 vaccination to enter the event grounds. A horse with a high protective biomarker value does not expose a risk on other horses and also cannot be infected with EHV-1. A protective EHV-1 biomarker value is safer than a time to last EHV vaccination for ensuring protection from EHV-1 reactivation, infection, and clinical disease.

EHV-1 outbreaks:
The EHV-1 risk evaluation test can be used to obtain supportive information on a horse’s immune status against EHV-1 during EHV-1 outbreaks. During outbreaks, a second test evaluating the intranasal immune response is required to distinguish horses that were immune and protected from the beginning from those that are susceptible to EHV-1 infection or have been recently infected during the outbreak. This second assay is currently validated at the Animal Health Diagnostic Center at Cornell University. Together, these two assays have the potential to provide results allowing for the earlier release of immune and protected horses from EHV-1 quarantine based on informed data and diagnostic results in the near future.

Outlook
The EHV-1 risk evaluation test is a novel tool to evaluate the immune and protection status of horses against EHV-1. The high correlation of protective immune biomarkers in the EHV-1 risk evaluation test with the prevention of infection, viral shedding, cell-associated viremia and clinical disease makes this new assay the currently best diagnostic tool to confirm
that horses are at low risk of EHV-1 infection and development of EHM. The novel EHV-1 risk evaluation test can be used to confirm or improve EHV-1 immunity in an individual horse. If widely used it can improve immunity against EHV-1 in the US horse/equid population and thereby minimize the risk of EHV-1 outbreaks. It can further improve EHV vaccination recommendations and provides informed data on vaccination intervals. The test provides an immune marker tool and correlates of protection to evaluate new EHV-1 vaccines beyond previously available methods. The assay is currently validated for non-pregnant horses. It is available to obtain research data on pregnant mares for the purpose of improving protection against abortion in the future.

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21 http://www.equinediseapec.org/alerts/outbreaks


24 Vandekerckhove AP, Glorieux S, Gryspeerdt AC, et al. 2011. Equine alphaherpesviruses (EHV-1 and EHV-4) differ in their efficiency to infect


32 EHV-1 Risk Evaluation testing, Animal Health Diagnostic Center, Cornell University, https://ahdc-portal.vet.cornell.edu/#!/test_fee/details/EHV1PSP
Introduction

Widely acknowledged for many years, equine influenza virus (EIV) is one of the leading causes of infectious respiratory disease in equids. Because of its highly contagious nature and health-related significance, it is considered the single most economically important equine respiratory pathogen. The potential for the global spread of EIV through international movement of horses has never been greater than it is today. There have been multiple examples over the years, where the virus has been introduced into previously unexposed equine populations, in certain instances with unprecedented financial consequences. Moreover, there is published evidence to indicate that the risk of introduction of EIV is related to whether equids are imported for permanent (>90 days) versus temporary (<90 days) purposes.

Global distribution

While the global distribution of EIV is difficult to establish with complete certainty, it is reasonable to assume that with the exception of Australia, New Zealand and Iceland that are confirmed virus free, EIV can be found in equine populations in many countries. It is a well-established fact that equine influenza (EI) has been and continues to be endemic in many European countries and in North America. The status of particular countries/regions of the world remains uncertain however, because of an absence of or inadequate active surveillance for the disease.

Evolution/Characterization of EIV

Of the two original subtypes of EIV known to exist, namely influenza A/equine Prague/'56 (H7N7), and influenza A/equine Miami/'63 (H3N8), strains of only one (H3N8) have continued to circulate since its original isolation in 1963. There are no verifiable reports of H7N7 virus strains in circulation since 1979.

In the late 1980s, circulating strains of H3N8 continued to diverge to form two lineages, American and Eurasian. The American lineage further diverged into Argentina, Florida, and Kentucky sublineages. Strains of the Florida sublineage were subsequently classified as either clade 1 or clade 2 viruses. Based on isolation and characterisation of H3N8 viruses from outbreaks of EI in North and South America, Europe, and China over the past several years, it has become apparent that changes in lineages and sublineages have taken place. Recent surveillance studies have failed to demonstrate evidence of circulation not only of H7N7 strains but also H3N8 strains of the Eurasian lineage.
Up to 2018, viruses detected in Ireland and the United Kingdom (U.K.) were characterized as clade 2 viruses, and in the USA clade 1 viruses. This changed dramatically in 2018 and 2019 however, with all isolates of H3N8 virus from outbreaks in Argentina, Chile, China, France, Germany, Ireland, the Netherlands, Nigeria, Sweden, the U.K., Uruguay and the USA characterized as clade 1, Florida sublineage, American lineage. Virus strains were shown to be very similar to the majority of clade 1 viruses identified in the USA in 2017. On antigenic cartography analysis, they were closely antigenically related to the recommended clade 1 vaccine viruses represented by A/eq/South Africa/04/2003-like or A/eq/Ohio/2003-like strains of EIV.

Global Influenza Virus Activity 2018/2019

Influenza virus activity in 2018-2019 differed in several respects from what had been observed in previous years, both in terms of the global distribution of the virus and in the significantly increased incidence of the disease in various European countries. The disease was reported in Africa, Asia, Europe, North America and South America.

South America

Early in 2018, EI was diagnosed in Chile. In the spring and summer, the disease was confirmed in a stabling facility at an Andean crossing shared by trekking horses from Chile and Argentina. EI spread to racecourses, polo clubs and jumping clubs in Argentina. The disease was noted to be more severe than in a previous event in Argentina in 2012, with many older and vaccinated horses affected. Extensive outbreaks of EI were also reported in Colombia, Ecuador and Uruguay.

Africa

The initial indication of EI in Africa was an official report in early October of four known outbreaks of the disease in a region of Niger. Outbreaks were associated with high morbidity and variable mortality rates, most probably in donkeys although not stated.

An extensive outbreak of EI was confirmed in Nigeria in December 2018. The disease continued to spread into early 2019, causing widespread losses in donkeys, the primary species at risk. Although horses were also affected, there were very few fatalities.

Over the ensuing months, EI spread also to Ghana, Burkina Faso, Mali, Senegal, South Darfur in West Sudan and Chad. Reports of EI in all of these countries were essentially similar. Spread of the disease was uncontrolled and whereas both horses and donkeys were clinically affected, losses in the respective donkey populations were enormous, in certain instances estimated in the 100,000’s. Affected animals characteristically presented with sweating, panting, respiratory distress, nasal discharges and death supervening in 2-3 days. The principal changes seen on postmortem examination were consolidated, marbled lungs and in some cases, accompanied by pericarditis. Since donkeys are widely used for transport, agricultural and domestic purposes and as a means of livelihood, the social
structure and economy of affected countries was impacted greatly by the devastating losses attributable to EI.

**Europe**

Since late 2018, there has been a widespread increase in the incidence of EI across Europe. Following initial reports from France, multiple outbreaks were confirmed in Belgium, Denmark, Germany, the Netherlands, Ireland, Italy, Sweden and the U.K. Some countries such as the Netherlands experienced a surge in outbreak numbers that were considerably in excess of corresponding figures for previous years. The industry in the U.K. was particularly hard hit, with outbreaks of EI being confirmed every month from the beginning of 2019 until at least late July. Over 200 confirmed outbreaks were recorded compared with only two in 2018. With reference to the majority of outbreaks, failure to isolate horses upon initial introduction onto a premises, especially if not accompanied by a certificate/declaration of health, recent movements and mixing of horses particularly those that had not been vaccinated, were risk factors associated with the continued spread of EI. Unlike in previous years, all sectors of the horse industry were affected, including leisure horses, show jumpers, racehorses, trotters and breeding stock. While the majority of confirmed cases of EI have been in unvaccinated horses, the disease has also been observed in horses vaccinated in accordance with the current OIE recommendations. The nature and duration of the clinical response following exposure to EIV has been more severe in unvaccinated horses.

**North America**

EIV activity has been reported by a variable number of states both in 2018 and currently in 2019. Unlike the situation in various European countries, however, there has not been a significant increase in the frequency of confirmed outbreaks of the disease compared to what was reported in previous years. Similar to the experience in Europe, while the signs of EI were more clinically overt in non-vaccinated horses, less severe disease was noted in some outbreaks involving fully vaccinated horses.

**Asia**

Several outbreaks of EI were reported in People's Republic of China (P.R.) with the qualification that the disease was observed to be more prevalent in donkeys.

**Summary and Conclusions**

In 2018 and the first half of 2019 were witness to a surge in EIV activity in certain regions and countries of the world. While this was evident in a number of European countries, it was felt most keenly in parts of sub-Saharan Africa, in countries with large unvaccinated donkey populations that were totally vulnerable to the life-threatening effects of the virus. Although rough estimates of the losses attributable to EI varied by country, there is no doubt that they were highly significant overall. This has resulted in considerable hardship for the innumerable individuals whose livelihood is majorly dependent on this equid species.
Coincident with the unprecedented widespread occurrence of EI in sub-Saharan Africa, many European countries also experienced a significant increase in the frequency of outbreaks of the disease. It is reasonable to assume that this surge in EI can be attributed in major part to the fact that the virus strain(s) in circulation belonged to clade 1, Florida sublineage, that though endemic in the USA, had not been associated with significant disease in Europe since 2009/10.

The importance of vaccination against EI cannot be over-emphasized. Recent experience has shown that even though vaccination with a product containing a World Organisation for Animal Health (OIE) recommended strain of clade 1 virus, did not in every instance confer complete protection against the disease, signs of EI were usually of lesser clinical severity. Many of the outbreaks confirmed in 2019 were in unvaccinated horses or individuals with incomplete vaccination histories. Regrettably, many such occurrences were also associated with failure to observe and implement basic principles of good management and biosecurity by those involved; understandably, disregard for “the basics” of good management and biosecurity measures played a role in further dissemination of EIV and hindered efforts to bring EI under control within a shorter timeframe.

Failure to achieve a greater level of protection in horses that were vaccinated in accordance with OIE recommendations, upon exposure to strains of clade 1 virus circulating in 2019, merits further investigation. Although there is some evidence to indicate that more recent clade 1 viruses have gradually diverged genetically from the OIE recommended strains, there is no recommendation to update the strain content of current vaccines that should contain appropriate representatives of both clade 1 and clade 2 viruses.
COMMITTEE ON FARMED CERVIDAE
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The Committee met on October 29, 2019 at the Rhode Island Convention Center in Providence, Rhode Island, from 8:00 a.m. to 12:00 p.m. There were 33 members and 40 guests present.

Update on Epizootic Hemorrhagic Disease (EHD) Virus Vaccine Research Update
Samantha Wisely, University of Florida

Dr. Wisely discussed the latest research on EHDV. The University of Florida program has created an EHD hotline to collect diagnostics to understand which virus killed EHD suspect animals. They have had reported 75 cases since June 2019 but 35 were actually found to be EHDV. The University’s goal is to make available an effective vaccine for EHDV. Fourteen deer ranches in Florida with 700 animals enrolled in the EDHV-2 vaccine efficacy study. Dr. Wisely hopes there is at least one vaccine for deer farmers available in 2020.

Cervid Health Update - Status of Updated Chronic Wasting Disease (CWD) Standards, Tuberculosis (TB)/Brucellosis Rule, Overview of CWD Nationwide
Tracy Nichols, USDA-APHIS, Veterinary Services (VS)
Dr. Nichols provided an overview of the voluntary CWD Herd Certification Program. The revised CWD Standards was published in May 2019 and now in effect. There are 28 states participating in the Chronic Wasting Disease Herd Certification Program, which includes 2,100 enrolled cervid herds with over 1,700 currently certified. Seventeen new cervid herds were identified with CWD in FY2019. Dr. Nichols illustrated the distribution of CWD that has been discovered in farmed and wild cervid populations. Nichols said APHIS is working with Dr. Chris Seabury of Texas A&M University in genome research as it relates to CWD susceptibility and genetics. She noted they have been able to acquire more funding to take this research to the next level.

Dr. Nichols also provided an update on Dual Path Platform (DPP) and single cervical test (SCT) TB testing data by cervid species for FY2019.

**Novel Prion Strain in Chronic Wasting Disease (CWD)-Affected Elk with LL132 Prion Protein**  
Justin Greenlee, USDA-ARS

Dr. Greenlee discussed genotype differences in elk. He said research suggests there are at least two CWD strains. MM and LM elk have similar disease phenotype. LL elk have a different phenotype to MM and LM elk. Research is still attempting to answer the question is this because of the animal genotype or because of the prion agent.

**Assessment of Chronic Wasting Disease (CWD) Biosecurity on Minnesota Deer Farms**  
Scott Wells, University of Minnesota

Dr. Wells provided a detailed description assessing CWD risk levels to Minnesota deer ranches. Wells listed several factors in categories of three different risk levels: higher risk, lower or unknown and negligible. He cited 56% of CWD-positive farms experienced one or more known higher risk CWD exposures, 44% of CWD-positive farms did not have known higher-risk CWD exposures. The University sent a survey to Minnesota’s cervid producers. Forty percent of the owners responded, and Dr. Wells shared the results.

**Update on Genetic Research**  
Nicholas Haley, Midwestern University Department of Basic Sciences

Dr. Haley provided an overview on Chronic Wasting Disease (CWD) susceptibility and disease progression in whitetail deer, a USDA/ Canadian Food Inspection Agency (CFIA) study involving 2,200 farmed deer and the distribution of PRNP genotypes in farmed deer. His presentation includes attempts in predicting susceptibility in the laboratory using RT-QuIC. Several projects are planned to obtain more information on impacts and resistance.

**Committee Business:**

The Committee reviewed previous resolutions passed at the 2018
USAHA meeting in Kansas City, Missouri:

2018 Resolution 24: Chronic Wasting Disease strain evaluation
2018 Resolution 25: Investigation of the role of the prion protein gene in Chronic Wasting Disease resistance and transmission of disease
2018 Resolution 26: Investigate the Dual Path Platform as an individual test for interstate commerce of farmed cervidae

2018 Resolution 24, 25 and 26 have not had an official response from USDA-APHIS and/or Agricultural Research Service (ARS) at the time of this meeting. Due to the lack of response, a motion was made by Dick Winters, second by Shawn Schafer, to make a recommendation for the committee chairman to reemphasize the request for agencies to act on 2018 Resolution 24, 25 and 26. Discussion. Motion carries.

There were no resolutions presented by the membership for consideration.
Dr. Liska stated the Subcommittee on Brucellosis met on Monday, October 28, 2019, and received several informative presentations. There were 55 members and 20 guests present. The subcommittee received a presentation on brucellosis testing for farmed cervidae in response to a 2017 USAHA resolution that urged state animal health officials to eliminate brucellosis testing for farmed cervids. Since 2017, the cervid industry associations have worked with state animal health officials to amend their administrative rules and regulations to eliminate the testing requirement. As of October 2019, Colorado, Indiana, Minnesota, Oklahoma, South Dakota and Texas have dropped the import testing requirement with several other states in the process of amending the rule.

A motion to approve the subcommittee report was made by Dick Winters, seconded by Shawn Schafer. Motion carries.
Dr. Vanderklok stated the Subcommittee on Tuberculosis (TB) met on Sunday, October 27, 2019, and received several informative presentations. There were 68 members present and 22 guests.

There were no cases on bovine TB in farmed cervids in FY2019.

A motion to approve the working group report was made by Dick Winters, second by Shawn Schafer. Motion carries.
USAHA/AAVLD COMMITTEE ON FOOD AND FEED SAFETY
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The Committee met on October 27, 2019 at the Rhode Island Convention Center in Providence, Rhode Island, from 1:00 to 5:00 p.m. There were 15 members and 27 guests present. Dr. Sanders welcomed any members, guests, and students that were in attendance for the meeting and encouraged them to participate in the discussions during the afternoon; he briefly reviewed the afternoon’s agenda and reviewed the mission statement of the Food and Safety Committee.

Presentations and Reports

Vet-LIRN Update for AAVLD 10-27
Renate Reimschuessel, Food and Drug Administration (FDA)

Update on the Blinded method studies done this past year. This was followed with a correlation between Veterinary Laboratory Investigation and Response Network (Vet-LIRN) and National Animal Health Laboratory Network (NAHLN) including new items on food contamination and validation of tests for this coming year.

Perceived Risks of Transboundary Movement of African Swine Fever Virus (ASF) in Non-Animal Origin Feed Ingredients
Bruce Wagner, USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS)
Examination of how ASF could enter the USA through various feed components, carrying totes. Knowing that porcine epidemic diarrhea (PED) entered the U.S. through this fashion we should be proactive now to examine these methods to put prevention mechanisms in place if possible.

**The Buzz About Bees**
Karyn Bischoff, Cornell University

Bees are food animals. What toxicants are bees being exposed to, and how should veterinarians mitigate these exposures? What diseases are affecting bees and how can/should veterinarians be involved? The Veterinary Feed Directive (VFD) indicates veterinarians are involved in this food producing animal’s life. But do veterinarians recognize toxic substances affecting bee health and bee biology? A wonderful summary of opportunities to protect bees and for veterinarians to be involved with this food producing industry.

**Committee Business:**

The Committee reluctantly accepted the resignation of Dr. Tam Garland. The Committee also accepted that as past Chair she will continue to act in an advisory capacity.

The Committee made one motion to explore with the Committee on One Health and the Subcommittee on *Salmonella* the possibility of having a *Salmonella* Symposium on Saturday for maximum attendance. *Salmonella* touches us as disease affecting human beings, small animals, large animals, food producing animals, and feed itself for both animals and their diets.

Information regarding proposed seminar: because *Salmonella* affects so many aspects of the veterinarians’ life, and the many stories and cases related by committee members, it was decided these needed a broader audience and we would like to explore with the above committees the opportunity for a day or half day seminar.
The Committee met on October 28, 2019 at the Rhode Island Convention Center in Providence, Rhode Island, from 1:00 p.m. until 6:00 p.m. There were 54 members and 81 guests for a total sign-in of 135 participants.
The new chair, Linda Logan and vice chair Karyn Havas introduced themselves and welcomed the audience. Three previous resolutions from 2018 were reviewed.

**Presentations and Reports**

**Foreign Analytics and Operations (FAO) Global Response to African Swine Fever (ASF)**

Juan Lubroth, FAO

Dr. Lubroth gave an overview of the many factors that lead to the introduction of ASF into Georgia in 2007 and the subsequent spread throughout Russia and other neighboring countries. The European countries are fencing off their countries to prevent movement of wild boars and feral swine who are known to be carriers of the virus and pose risk of introduction of the virus. This effectiveness of the fences in preventing large boars from digging under fences or breaking through fences remains to be seen. The recent appearance last year of ASF in Belgium is a mystery but may be related to wild boar movement. Many focal populations of Chinese in large cities across the world demand food products from home and sometimes these products enter countries illegally. Case in point was the United Kingdom (U.K.) outbreak of foot and mouth disease (FMD) in 2001. The source of introduction of ASF into China is not known but may have been due to Chinese workers returning from Russia or Africa who brought back pork products. It is well known that ASF can remain viable for months in salt cured pork products. The virus can remain indefinitely in frozen infected pork products. The outbreaks in China have been extensive in all provinces and have led to an estimated depopulation or death of over 250 million swine. Environmental impact of disposal of this large number of swine is staggering. Furthermore, the survival of ASF in meat and carcasses poses a huge risk and if improperly buried could continue to be a source of virus for many months. FAO has in very recent years stood up new Emergency Centre for Transboundary Animal Disease (ECTAD) offices throughout the world thus giving FAO more of a presence on the ground for animal health assistance for countries needing assistance with TADs. The global turnover of chief veterinary officers is estimated to be up to thirty percent a year. Therefore, there is a constant need for capacity building in countries where TADs are an issue and where veterinary infrastructures are weak. FAO has developed a number of media materials available electronically and in hard copy on issues related to farm biosecurity, carcass disposal and approaches to surveillance and disease control. ASF has spread rapidly in Asia and is causing economic havoc. The pressure of the Asia outbreaks is leading to new ASF vaccines appearing on the market and new methods for diagnostics and targeted control. The vaccine efficacies are not yet known. Rapid point of care (penside) diagnostics are being developed and validated throughout the world. ASF has disrupted trade of pork products and live
animals and has caused devastating economic impact and soaring costs for meats especial for pork due to the shortages. Furthermore, pork products are being illegally exported from some countries that may be carrying ASF virus. The issue of swill feeding to swine is undoubtedly a continued high-risk practice that can lead to further outbreaks. Farm biosecurity practices and movement control are paramount to controlling the disease. The drop in the inventory number of swine is affecting food security in Asia.

**USDA-APHIS Inspection Service (IS) Report on Activities in South Asia Perspective**

Conrad Estrada, USDA-APHIS-IS

African swine fever (ASF) was reported in Vietnam in February 2019 and spread rapidly in Vietnam and in other countries in South East Asia, including Cambodia, Laos, Burma, Philippines, and East Timor. Vietnam has been severely affected by ASF. It’s estimated that five million pigs have died or been depopulated because of ASF, out of a pre-outbreak pig population of 28 million. Unregulated trade with China has been identified one of the mayor risk factors for ASF translocation. Limitations on enforcement of border controls, and pig and pig product movement between provinces makes the work of the animal health authorities very difficult. There’s little knowledge on how to manage ASF, there are challenges to have a national disease database, and there’s a fragmented animal health structure. APHIS has identified three areas of cooperation with Vietnam. Animal disease management, development of surveillance tools, and enhancement of diagnostic capabilities. This complements other existing regional and country specific efforts to bring U.S. expertise to South East Asia, and also find opportunities for the development of existing diseases control strategies in the U.S., including transmission studies, pathways analysis, diagnostic validation of new diagnostic and sampling techniques, and potentially vaccine field trials when a vaccine is available.

**Foreign Animal Disease Research Unit (FADRU) Foot and Mouth Disease (FMD) Research and African Swine Fever (ASF) Vaccine Candidates**

Luis Rodriguez, USDA, Agricultural Research Service (ARS), Plum Island Animal Disease Center (PIADC)

Dr. Rodriguez discussed FMD research conducted at FADRU and highlighted the virus-host interactions – persistence – transmission work conducted by J. Arzt and C. Stenfedt and their teams. He discussed the successes of the FMD-LL3B3D vaccine development conducted by E. Riedler and J. Hardham of Zoetis and that this would be the first FMD vaccine produced in the U.S.A. Dr. Rodriguez reviewed the research of M. Borca and D. Gladue on African swine fever and their efforts to identify vaccine candidates. They are exploring live attenuated viral vaccines and subunit vaccines with accompanying differentiating infected from vaccinated animals
(DIVA) diagnostic tests. They have licensed and are developing three vaccine candidates using different platforms. 

**Risk of African Swine Fever (ASF) Virus in Imported Feed Supplements**

Scott Dee, Pipestone Vet Service

Dr. Dee presented compelling evidence that imported ingredients for animal feed could be a source of inadvertent exotic virus importation. Retrospective studies and epidemiologic evidence suggest that porcine epidemic diarrhea virus (PEDV) may have been imported into the U.S. in this manner from a country that had PEDV. There is a growing body of evidence that soymeal is a good media for viral survival. Feed storage and manufacturing facilities could become contaminated with exotic viruses that subsequently could lead to the risk of disease outbreaks in U.S. livestock. Research shows that ASF could survive for 30 days in soy-based products. We know the U.S. imports soy products from infected countries such as China, Ukraine and Russia and these could pose risks. There is a growing body of experimental evidence suggesting that feed and feed ingredients (soy-based products in particular) may serve as vehicles for the transport and transmission of foreign animal diseases (FADs) such as ASFV. This ongoing work is the product of multiple research organizations over the past five years. The application of Responsible Imports across the swine industry is driving change in the management of this risk. A national (“Canadian Food Inspection Agency (CFIA)-like”) program, based on policy, is needed to unite these independent efforts. In summary soy-based feed ingredients may be a vehicle of transmission – multiple research institutions are looking at this issue. Commercial companies are adopting responsible imports to minimize this hole in our biosecurity program.

**Foreign Analytics and Operations (FAO) Update on Global Animal Health Programs for Transboundary Diseases**

Juan Lubroth, FAO

Dr. Lubroth explained the concept of the Global Framework for the Progressive Control of Transboundary Animal Disease. This was established as a result of the major outbreaks of foot and mouth disease (FMD) in the United Kingdom (U.K.), South America and was a partnership with the World Organisation for Animal Health (OIE) and now serves as an umbrella approach transboundary animal disease (TAD) threats. Further information on FMD was presented by the European Commission for the Control of Foot-and-Mouth Disease (EUFMD). Veterinarians are working in many international organizations. Dr. Lubroth gave a brief FAO- Global Early Warning System (GLEWS) updates on Rift Valley fever (RVF), African swine fever (ASF), avian influenza (AI), Middle East respiratory syndrome (MERS), and Ebola. He explained that now that Rinderpest was eradicated and the Rinderpest virus was being held in many laboratories across the world that there had been a major effort by FAO and African Union Inter-African Bureau for Animal Resources (AU-IBAR) to locate these laboratories and request all
governments to either destroy the virus or send them to several selected locations for safekeeping. In Africa, the location is Pan African Veterinary Center of the African Union (PANVAC) in Ethiopia. South Africa is the only known country to not have comply and continues to hold the virus in their veterinary research institute. The efforts to sequester the virus in safe locations have concentrated on Ministries of Agricultural holdings and it is not known about holdings of Ministries of Defense or Science and Technology. The recent FAO celebration of achievements listed the eradication of Rinderpest as the leading FAO achievement since its inception.

Asia has many priority diseases including ASF, FMD, peste des petits ruminants (PPR), hemorrhagic septicemia and highly pathogenic avian influenza (HPAI). There have been massive vaccination programs for H5NI but other H5 and H7 viral types of emerged and are impacting production and health. In Africa, recent issues with African horse sickness (AHS), equine influenza (EIV) and strangles continue to impact equid populations across north and sub-Saharan Africa. Classical swine fever (CSF) eradication continues in many South and Central American countries. Dr. Lubroth mentioned the status of several South American countries but confirmed that the disease was still endemic in Cuba, Dominica Republic and Haiti, two countries that are very close to our doorstep.

Sudan is experiencing a confirmed outbreak of Rift Valley Fever (RVF) in livestock and humans. The FAO, United Nations High Commissioner for Refugees (UNHCR) and World Health Organisation (WHO) are all assisting. Sadly, humans remain the sentinels since surveillance in ruminants is so poor. The recent rains and floods are impacting this part of East Africa.

Dr. Lubroth highlighted recent missions in Asia to assist with African swine fever awareness and control. He shared some links to educational materials on emergency management and risk assessment developed by the FAO and partners.

**Update on European Commission for the Control of Foot and Mouth Diseases (EUFMD)**

Fabrizio Rosso, FAO EuFMD

Foot-and-mouth disease (FMD) remains the first transboundary animal disease (TAD) threat to European livestock production. A single introduction usually has extremely serious, and frequently catastrophic, impacts. The EuFMD, under a framework of co-ordination with European Commission (Directorate-General for Health and Food Safety [DG-SANTE]), Food and Agriculture Organization of the United Nations (FAO) and World Organisation for Animal Health (OIE), plays a significant role in reducing the risk and ensuring better preparedness for the Member nations.

The EuFMD, one of FAO’s oldest Commissions, came into being in 1954, with the pledge of the six founding member nations to the principles of a coordinated and common action against FMD.

The EuFMD has established an internationally respected capacity for efficient delivery of training and in-country support to FMD Progressive Control
Programmes (PCP), and most recently, in modelling of FMD control measures to guide emergency planning.

At present EuFMD has 39 Member States with a workplan structured into three pillars:

- Pillar I: IMPROVE readiness for FMD crisis management by Members
- Pillar II: REDUCE risk to Members from the European neighbourhood through improved control in neighbouring regions
- Pillar III: SUSTAIN and support the GF-TADs Global Strategy against FMD

The EuFMD manages an innovative and over-expanding program of training courses (http://www.fao.org/eufmd/training/en/), which aim to build capacity in emergency preparedness for incursions of FMD into free countries. Furthermore, EuFMD training aims to equip veterinary services in countries not currently FMD-free with the skills needed for progressive control of the disease.

Real time training courses provide a unique opportunity to gain first-hand experience in the diagnosis and investigation of FMD outbreaks. Over 800 participants from more than 50 countries have benefitted from these courses since 2009. The Real Time courses play a vital role in developing a cadre of personnel who have seen field cases of FMD and have detailed knowledge of FMD diagnosis and outbreak investigation. Additionally, trainees play an important role in raising awareness of FMD through cascade training when they return to their home countries, promoting vital early detection of the disease.

The EuFMD has developed a new e-learning capacity (https://eufmdlearning.works/) which substantially increases the reach and depth of the training programme with several courses available for FMD free and endemic countries. These courses have also utilized new approaches to enhance access in areas of poor connectivity such as through establishing networks on Whatsapp for course delivery.

Specific assistance is provided to Member nations to improve emergency preparedness through the GET Prepared toolbox (tools to assess preparedness capacity and address gaps) and EuFMDiS (European Foot-and-Mouth Disease Spread Model). In addition, non-EU countries are supported to participate in the laboratory proficiency testing scheme (PTS) organized by the E.U. Reference Laboratory, to assess and prove their testing competences.

Under Pillar II, regular support is provided to European neighbouring countries in Middle East, North Africa and West Eurasia through workshops, training, diagnostic material and backstop support in order to assist their progression along the Progressive Control Pathway for FMD control and enhance early warning surveillance, notification and early response. A specific program is implemented to assist integrated disease surveillance focused on specific risk locations in order to provide updated risk information, optimize the
veterinary service resources and improve the effectiveness of control measures implemented.

Under Pillar III, a key feature of support to the GF-TADs FMD working group and global strategy is the development of a new system of PCP Support Officers (PSOs) who provide individual country support in PCP advancement. Improvements to surveillance in endemic countries are being promoted through increased use of lateral flow devices and environmental sampling and through the strengthened global surveillance support. A Public Private Sector Platform for vaccine security is being built to identify and promote solutions to improve security in access to effective vaccines.

Our program, HOLD-FAST, has been endorsed for the period 2019-2023. It keeps the focus on FMD risk reduction and extends the scope of the preparedness and risk reduction activities to other TADs which pose an immediate threat to the member nations. The strategy will utilize the successful EuFMD training platform to cover the specificities of other TADS, and applies existing generic tools (spread modelling, simulation exercise support, and risk-based surveillance) to improve preparedness for the additional threats. In the neighborhood, early warning of FAST diseases should be greatly enhanced by multi-pathogen surveillance programs in high risk hot-spots, and through support to greater networking between European and neighborhood experts and reference centers. At global level, the EuFMD will continue to underpin the OIE and FAO (GF-TADs) Global Strategy, using its expertise in delivery of world-class online training programs, and it is expected that these will catalyze development of training on peste des petits ruminants and other TADs by GF-TADs partners.

Christine C. Feehan, GAO

Since 2001, foot and mouth disease (FMD) outbreaks abroad have cost billions of dollars. A U.S. outbreak would likely halt exports of all livestock products, and could have serious economic consequences. GAO identified 11 areas of challenges that USDA would face in responding to an FMD outbreak, including surveillance, diagnostic capacity, depopulation, vaccination, and others. USDA has identified corrective actions to help address these challenges, through experience with outbreaks of other diseases, learning lessons from abroad, and conducting outbreak exercises. However, it has not followed its procedures for prioritizing the corrective actions and many remain incomplete. GAO recommended that USDA prioritize and monitor these corrective actions to track their completion.

Classical Swine Fever (CSF) in the Caribbean: A Risk to the Hemisphere
Wendy Gonzalez, General Directorate for Livestock (DIGEGA), Dominican Republic (DR)
The Caribbean region has a high risk of diseases occurrence due to factors such as the increase of movement (tourism), vulnerability to natural disasters such as hurricanes and storms, the diversity of livestock production (backyard and industrial). Similarly, the lack of surveillance data and limited diagnostic capacity makes diseases control difficult in the Caribbean a region. The CaribVET is a structured network conformed by 34 countries and collaborating organizations. Its objective is to coordinate the most important activities for disease surveillance in the Caribbean region. Within its structure is the Swine Disease Working Group (SDWG), this is responsible for coordinating actions for the surveillance and control of the CSF in the affected Caribbean countries, as well as providing links with experts and specialized institutions. CSF is affecting in three countries in the region, Cuba, Haiti and the DR. Affected countries are taking actions for their control and subsequent eradication. However, challenges such as the presentation of different clinical signs and the presence of persistently infected animals make this objective more difficult to achieve. The CaribVET has projects to support countries in the surveillance of the CSF. Likewise, it is working on the coordination of actions to be taken in the region in the face of the threat of emerging diseases such as African swine fever (ASF).

**Update on Virulent Newcastle Disease (VND) Outbreak**

Amy Delgado, Animal and Plant Health Inspection Service (APHIS), Inspection Service (IS) Center for Epidemiology and Animal Health (CEAH)

Virulent Newcastle Disease Virus has a long history in the U.S. First identified in 1944, the virus has caused several large outbreaks in Southern California with economic impacts ranging from 56 to 160 million dollars. In 2018, the virus was detected in backyard birds in Southern California leading to the implementation of vigorous control efforts including depopulation, quarantine, enhanced surveillance and epidemiologic trace backs, and significant efforts on education and outreach. To date, 471 cases of vNDV have been suspected or confirmed, which include 454 backyard exhibition bird premises primarily in Alameda, Los Angeles, San Bernardino, Riverside, and Ventura Counties, California. A total of ten positive premises are commercial and backyard non-commercial laying chicken premises. As of October 8, over 1.2 million birds have been depopulated, with over 200,000 premises visits conducted and over 9,000 laboratory submissions. As of October 21, 2019, the last depopulation of an infected premises occurred on August 31, 2019. A series of epidemiologic investigations and studies were undertaken collaboratively with bird owners, State and university agriculture personnel, and the USDA’s Agricultural Research Service (ARS). Results from these investigations are available online: https://www.aphis.usda.gov/animal_health/downloads/animal_diseases/ai/epi-analyses-vnd-in-backyard-birds-in-california-july.pdf

Genetic analysis supports a single introduction into California followed by secondary spread. Following introduction into California, divergence of the
FOREIGN AND EMERGING DISEASES

virus into two sub-groups appeared early on and, where epidemiologic data is available, has been useful to gain insights on virus spread. Although geospatial clustering of virus sub-groups has been observed, the presence of different virus sub-groups in each of the major affected areas indicates virus movement within, and between, affected areas. The affected counties in California have a high density of backyard flocks, but such flocks are not typically registered, and their exact locations are unknown. Using a Bayesian hierarchical model, previously identified socioeconomic and demographic variables found to be associated with urban poultry ownership were used to estimate the probability of backyard flocks in this area.

Further epidemiologic investigations were used to understand transmission within and between flocks in affected areas. Analyses of surveys conducted at case, control, and dangerous contact premises identified flock size, ownership of exhibition birds, high proportions of roosters in flocks, and the use of housing that allows contact with wild birds to be risk factors for vND in this population. An epidemiologic investigation into the ten vND infected commercial and backyard noncommercial laying chicken premises and 28 control premises found that some factors and management practices were shared across infected farms; however, the significance of these similarities was difficult to interpret given the small number of infected farms and the study design. All cases and controls reported vaccination of their flocks for vND.

To better understand the transmission dynamics of vND within flocks, experimental data available from peer-reviewed literature and unpublished data provided by the USDA, Agricultural Research Service (ARS), Southeast Poultry Research Laboratory (SEPRL) was used to estimate the mean latent period for this virus (0.40 days) and the mean infectious period (4.33 days) in unvaccinated birds. Based on these values, the estimated time to detect vND in an unvaccinated, 50-bird backyard flock based on observation of increased mortality (two or more dead birds within a 3-day period) is from four to seven days. Building on this work, a stochastic within-flock vND transmission model was developed to predict the prevalence of infectious birds and cumulative mortality over time for both vaccinated and unvaccinated flocks. In large, vaccinated flocks, it may take 14 to 22 days after the onset of infectiousness for the cumulative mortality to reach two percent of the starting flock size. In contrast, in an unvaccinated backyard flock, a fifty percent cumulative mortality may be seen within a week. This information was used to help guide on-farm surveillance and monitoring efforts.

Release of control areas was completed in October of 2019, and sampling to support risk-based surveillance for disease freedom is currently on-going, in combination with discussions for longer term outreach and public education efforts in this high risk area.
National Bio and Agro-Defense Update
Kim Dodd, USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), Plum Island Animal Disease Center (PIADC)

USDA-APHIS Foreign Animal Disease Diagnostic Laboratory (FADDL) is a national and international reference laboratory for foreign animal diseases including foot and mouth disease, African swine fever (ASF) and classical swine fever (CSF). FADDL is currently located on Plum Island; over the course of the next few years, it will transition to the new National Bio and Agro Defense Facility (NBAF). The new facility will support expansion of the FADDL mission to include emerging and zoonotic infectious diseases, including Biosafety Level 4 (BSL4) agents. Throughout the transition, FADDL remains focused on enhancing foreign animal disease preparedness, with a current focus on expanding African swine fever diagnostic capabilities.

USDA ARS Foreign Animal Disease Research Strategies
Roxanne Motroni, USDA, Agricultural Research Service (ARS)

Dr. Roxann Motroni, National Program Leader for Animal Health, USDA-ARS presented on workforce development efforts and workforce needs for the National Bio and Agro Defense Facility (NBAF) as well as for the ARS animal health program.

The USDA-ARS serves as the intramural research arm of USDA. It houses 690 projects within 16 national programs and employs close to 2,000 scientists. The Animal Health National Program (NP103) delivers scientific solutions for animal health concerns. It currently has 38 projects ranging over seven different research components and has an annual budget of $80.9M. There are currently 85 scientists within the Animal Health program and 99 students or post-docs currently in training within the national program. The NBAF program falls within the biodefense component of the ARS program along with the Southeast Poultry Research Laboratory (SEPRL), National Animal Disease Center (NADC), Arthropod-Borne Animal Disease Research Unit (ABADRU), Plum Island Animal Disease Center (PIADC) and the Animal Disease Research Unit (ADRU).

The ARS Animal Health science program aligns with the National Biodefense Strategy by ensuring a skilled workforce with expertise on emerging diseases as well as laboratory facilities capable of handling high containment pathogens, this is highlighted by the construction of the NBAF facility as well as the modernization of SEPRL.

Food and Agriculture Organization (FAO) Institute for Infectious Animal Diseases (IIAD) In-Service Applied Veterinary Epidemiology Training (ISAVET) Program for Targeted African Countries
Heather Engleking Simmons, Texas A&M University (TAMU), Institute for Infectious Animal Diseases (IIAD)
The ongoing challenge of Transboundary Animal Diseases (TADs), Zoonotic and Emerging Infectious Diseases (ZEIDs) has proven to be a stress test for veterinary epidemiology capacity, globally. More than half of the 108 OIE Member Countries surveyed have fewer than 35 public sector veterinarians per million inhabitants (Bonnet et al. 2011). Field veterinary epidemiologists equipped with animal health and veterinary epidemiology skills are needed across multiple livestock production systems and value chains.

The Frontline ISAVET Program develops transferable and critical thinking skills in the veterinary workforce to deal with TADs and ZEIDs in a One Health approach. The program targets eight core domains, 14 competencies and 51 skills to create animal-health specific frameworks for veterinary epidemiology capacity development. The program targets 14 Global Health Security Agenda (GHSA) countries in Africa: Burkina Faso, Cameroon, Cote d’Ivoire, Democratic Republic of Congo (DRC), Ethiopia, Ghana, Guinea, Kenya and Liberia.

Pilot trainings have been held in Uganda (English) and Senegal (French) for the 4-week course and 3-month in service training. In addition, pilots for the Training of Trainers (ToT) and Training of Mentors (ToM) will occur in Kenya (English) and Cameroon (French) in the 2019. Implementation and roll-out at the country level will occur in 2020 through 2021 to train over 800 veterinarians and veterinary paraprofessionals in Africa.

Resource materials developed include seven manuals (English and French) that provide input into the three components of the program: 1) trainee, 2) trainer, and 3) mentor. Monitoring and evaluation (M&E) has been conducted across all components of the program. The intent of the program is to reduce the impact of animal diseases (including zoonoses), assure consumer protection, increase efficiencies in animal production through reduction in losses and increase farmer income levels and promotion of safe trade.

Committee Business:

One resolution entitled African swine fever (ASF)/ Classical swine fever (CSF) surveillance program and tissues for official surveillance program and tissues for official ASF testing in National Animal Health Laboratory Network (NAHLN) laboratories was presented voted on and forwarded. We streamlined and focused the wording of the resolution.

Two other resolutions were shared by the USAHA Committee on Animal Emergency Management but the committee felt one resolution on chronic wasting disease (CWD) was not our Committee purview and the other resolution on poultry compartmentalization we referred to the Global Health and Trade committee. No formal action was taken.
COMMITTEE ON GLOBAL ANIMAL HEALTH AND TRADE
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Vice Chair: Elizabeth Parker, TX

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The Committee met on October 29, 2019 at the Rhode Island Convention Center in Providence, Rhode Island from 8:00 - 11:50 a.m. There were 38 members and 37 nonmembers present. Dr. Salman presented the mission of the Global Animal Health and Trade (GAHT) with the outline of the agenda for the entire morning. He emphasized to the audience the importance of participating in the business section of the agenda particularly when resolutions are presented.

Presentations and Reports

Summary of 2019 World Organisation for Animal Health (OIE) General Session
Michael David, USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS)

Dr. David presented a short scenario to demonstrate the importance of recognition of various strategies for prevention of diseases to enter premises or a country. He then offered a short background and the role of the World Organization for Animal Health (OIE) in global animal health and the engagement of USDA-APHIS-VS in the various functions of OIE. He also submitted a brief outcome from the 87th General Session of the OIE which was held May 20-24, 2019 in Paris, France. Using various maps, he also showed the current global animal health status for diseases with OIE classification. Current chapters that are under review as well as those planned for review in the next two years was also presented. The role of the USAHA committee members in reviewing modifications was emphasized when new chapters are shared through the various commissions of OIE with the U.S.A. Dr. Salman asked Dr. David to share with the committee the current drafts that required comments. Dr. David has already taken the action of sharing these drafts with the committee members which will be distributed to all committee members.

Experiences with Hands-on Foot and Mouth Disease (FMD) Training
Dustin Oedekoven, South Dakota Animal Industry Board and Justin Smith, Kansas Department of Agriculture

Drs. Oedekoven and Smith shared their field experience in observing FMD cases and outbreaks in Uganda as part of hands-on training sponsored
by European Union (EU-FMD) in conjunction with Texas A&M University (TAMU). The presentation was mainly demonstrations of the extensive involvement through this unique opportunity for state veterinarians to observe actual field cases of FMD, gain knowledge working an FMD response, performing risk assessment for a free farm in an endemic setting, identifying/aging lesions, learning sample collection, preparation and shipping procedures, etc. Dr. Smith expressed his appreciation to learn on the EU-FMD tool in estimating the exposure to the virus and infection. Dr. Oedekoven indicated the valuable experiences he gained even though the travel cost was relatively high. Both presenters expressed their appreciation to the sponsored agencies (EU-FMD and TAMU) for giving them this opportunity.

Panel: Rapid Risk Assessment for Animal Health Topics – Applying Global Lessons Learned to Better Inform U.S. Prevention and Response

Dr. Elizabeth Parker moderated a panel on rapid risk assessment for animal health topics – applying global lessons learned to better inform U.S. prevention and response. Dr. Salman gave a short description of the meaning of the tool of the Rapid Risk Assessment (RRA) with historical background in its use in animal health and nation building programs. He is also showed the similarities and contrasts of the conventional risk assessment process and RRA. All presenters included lessons learned in their presentations.

Dr. Francisco Reviriego, European Commission gave a short history of Europe’s experience in determining the risk of Lumpy Skin Disease spread to inform an implemented plan of action. He focused on the rapid process to get the approval of change in the mitigation among the European members (countries) to allow vaccination instead of stumping out. Dr. Reviriego shared with the audience the lessons learned from this task particularly in working with other agencies, broad communications, good planning with supportive evidence, and listening to scientists in their assessment.

Dr. Renate Reimschuessel, Veterinary Laboratory Investigation and Response Network (Vet-LIRN), Food and Drug Administration (FDA) presented the FDA’s insight of the U.S. 2007/2008 Melamine Risk Assessment. This effort was a One Health and multi-agency/Department effort. She described the physiological and pathological principles of melamine’s effect in mammals. She also gave a historical background of the melamine contamination event in the U.S.A. in 2007-2008 in pet food and subsequently in swine and poultry feeding system. Dr. Reimschuessel emphasized that through the rapid risk assessment (RRA) a conclusion was derived that there was less risk of pathological effect of melamine in consumption of pork or poultry meat due to the dilution factor. Significant numbers of cattle, swine and poultry who had been fed contaminated feed/pet food, had been held in quarantine pending the RRA results. She discussed the lessons gained through this adverse event specifically in
improving the diagnostic criteria and changes in the feed monitoring system. Later, Dr. Reimschuessel participated in supporting the Chinese health authorities in investigating and applying mitigation strategies when China suffered from a subsequent serious melamine contamination of baby formula for children.

Dr. Juan Lubroth, Food and Agriculture Organization of the United Nations showed the application of RRA using three events – H7N9 in China (2013), African swine fever (ASF) in China (2018), and Reston Ebola in the Philippines (2009). Dr. Lubroth emphasized the role of this tool and its important steps to support the final decision for mitigation and strategies in each of these disease outbreaks and lessons learned.

Dr. Paul Sundberg, Swine Health Information Center (SHIC) addressed the importance of RRA as a tool in the decision-making process and why this is important for the swine industry. Decisions must be made every day in industry at the speed of commerce, using the best information available. He addressed the need for such a tool when there is incomplete information - based on science utilizing the available data. The SHIC has maintained health hazard identification as an important role in their operation to determine priority and preparedness of adverse health events occurring globally. Dr. Salman commented on the need for synthesis between SHIC and USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) Centers for Epidemiology and Animal Health in the process of hazard identification through data mining and monitoring digital flow of information.

Dr. Rosemary Sifford, USDA-APHIS-VS presented the APHIS activities to determine risk pathways for priority foreign animal diseases. She emphasized the steps in conducting risk assessment process particularly related to hazard identification. Dr. Sifford also included a discussion of capacity and other needs, such as access to continuous, near real time data, data quality/data purpose and a need for additional subject matter expertise. VS relies on industry and academic experts for technical input. Dr. Salman suggested to initiate a daily communication pathway similar to the existing daily USAHA News Alerts with the potential to add some commentaries to verify the reliability of the daily presented information.

Dr. Fabrizio Rosso, European Commission for the Control of Foot and Mouth Disease (EuFMD) offered the Pragmatist tool for vaccine bank managers’ use in determining the optimal vaccines for their risk situation. The toll uses risk profiles of the existing vaccines using genome data in conjunction with epidemiologic factors. He demonstrated the added value of this tool in supporting the decision in choosing the appropriate vaccine for specific regions or countries. He also discussed the limitations of this software and the future directions to improve this tool. Dr. Rosso also discussed EUFMD’s risk information gathering efforts and capacity building for their Member countries.

Committee Business:
Dr. Salman explained that the previously shared proposed resolution with the committee members does not need to be presented as a resolution since the addressed issue was solved.

The meeting was adjourned at 11:50 a.m.
COMMITTEE ON GOVERNMENT RELATIONS
Chair: Charlie Hatcher, TN

John Adaska, CA; Keith Bailey, IL; Charlie Broaddus, VA; Michael Costin, IL; Barb Determan, IA; Francois Elvinger, NY; Joe Fisch, FL; Pat Halbur, IA; Kristin Haas, VT; Jamie Henningson, KS; Steve Hooser, IN; Linda Logan, TX; Dusty Oedekoven, SD; Kristy Pabalonia, CO; Lanny Pace, MS; Elizabeth Parker, TX; Boyd Parr, SC; Steve Rommereim, SD; Jerry Saliki, OK; Deep Tewari, PA; Melissa Yates, MD; Alan Young, SD; Marty Zaluski, MT; David Zeman, SD; Shuping Zhang, MO.

The USAHA Committee on Government Relations met on March 19-20, 2019 in Washington, D.C. The Committee meeting included several USAHA committee and district representatives, as well as leadership of the American Association of Veterinary Laboratory Diagnosticians (AAVLD).

Tuesday, March 19, 2019
Hosted at the American Veterinary Medical Association (AVMA) office

American Veterinary medical Association (AVMA)
Kent McClure, Alex Sands, Lauren Stump, Ashley Morgan, Mark Lutschaunig

Kent McClure welcomed the group and appreciation for the partnerships of our organizations. He made note of some highlights currently with AVMA.

1. Membership numbers at all time high (93,000), most veterinarians in U.S. are members.
2. Looking at returning to offering health insurance for members, starting in July 2019.
3. About to launch online digital continuing education platform – called Axon.
4. AVMA Convention will be in D.C. this summer, with many scheduled visits. There is a focus on advocacy and expanding their presence.

Alex Sands next reviewed the following areas:

1. Budgets – there is no normality to the process anymore, other than disfunction.
   a. Late start, just completed fiscal year (FY) 2019 in late February, now working on FY2020 (35-day government shutdown delayed budget).
   b. USDA budget down 15% in just released president’s proposed budget (1,300 pages).
   c. Statutory budget caps an issue – $50 billion below where spending would need to be.
2. Veterinary Medicine Loan Repayment Program (VMLRP) got slightly reduced, some programs axed/cut.
   a. AVMA is seeking increase in VMLRP funding from $8 to $9 million
   b. USDA announced veterinary 190 shortage areas in 44 states
c. In previous years, have made approximately 50 awards per year (75 awards made in 2018)
d. Working to introduce bill to eliminate tax burden on awards (end withholding tax to increase money available for the program)
e. September 30 end of fiscal year, October 1 next fiscal year
f. Application period now open for VMLRP

   a. Bright spot in president’s budget, has been getting funding in appropriations and for workforce, approximately $50 million in 2019 ($5 million for animal research)
   b. Cuts to Agricultural Research Service (ARS) budget to get money for NBAF
   c. Solidifies plan to transition to USDA management of NBAF

4. Higher Education Bill
   a. Has been supportive of Public Service Loan Forgiveness program, but that is still struggling.
   b. 127 national and state agencies signed on to letter
   c. $30K-40K is added on to graduate student loans in interest by removing interest free loan
   d. Suggestion to invite D.C. staffers to tour agricultural facilities and farms

Lauren Stump highlighted some recent accomplishments in D.C.:
1. Re-authorization of animal drug user fees, which comes up every five years. These funds are from drug companies and go towards supporting Food and Drug Administration (FDA) Center for Veterinary Medicine (CVM) approval process. FDA has looked for expansion of conditional approval process, which can now be used for major species as well as minor species. The hope is that this results in expansion of research in novel drugs.
2. Completion of legislative aspect of Farm Bill. USDA is now working on implementation, with listening sessions going on now. Cooperative agreements/block grants. There is a permanent baseline funding for animal disease. $150 million over five years for foreign animal disease preparedness. Doubled appropriations for National Animal Health Laboratory Network (NAHLN) from $15 to $30 million.
3. Legalization of Hemp – less than 0.3% Tetrahydrocannabinol (THC) content. FDA will regulate as they see fit, focus will be on product quality assurance.
4. Other conversations: opioids, animal biotech (genetically engineered salmon, etc.), Virulent Newcastle Disease

Ashley Morgan next described AVMA’s Role with State advocacy.
1. Serves as a resource and partner for state veterinary medical associations for state legislation.
a. Track 1,400 bills and 600 regulations across the country.
b. One of the most significant bills – antimicrobial (AMR) legislation in Maryland and Illinois: requires veterinarians to report veterinary feed directive (VFD) to state.

Mark Lutschauinig covered some other areas of interest for the group, including animal welfare, environmental aspects of veterinary medicine.

1. He anticipates a busy year for welfare legislation.
   a. Also focused on research – seeing bills that would prohibit various types of research in the name of animal welfare.
   b. Addressed horse euthanasia, mass depopulation guidelines.
      i. Mass depopulation guidelines are currently in editorial revisions. These will likely be published soon.

   ii.

   Food and Drug Administration (FDA) Center for Veterinary Medicine (CVM):

   Steve Solomon, Bill Flynn

   Steve Solomon reviewed some changes within FDA.

   1. Commissioner Scott Gottlieb resigning. Dr. Neal Sharpless is replacement. Both are strong public health advocates. FDA regulates 20% of U.S. economy. Dr. Solomon will be educating new Commissioner on One Health issues.

   2. Within CVM, some changes – Dr. Matt Luscha, Dr. Tim Schell are new leaders, in process of hiring others now at their office of research.

   3. In the past year, had three government shutdowns, which has proven very challenging.
      a. Drug user fee programs were able to continue.
      b. Animal health related to human health activities could be continued
         i. Anti-Deficiency Act
            1. Protection of human health
            2. Protection of government property
         ii. Other animal-related work cannot legally continue in shutdown.

      c. CVM created a list of everything that got delayed; it includes more than 300 items just in their division.

   4. Budget
      a. Operated in FY2019 under continuing resolutions until resolution finally passed.
         i. Received a positive budget. CVM got an increase of $1.5 million – mostly going into antimicrobial resistance programs and Veterinary Laboratory Investigation and Response Network (Vet-LIRN).

      b. 2020 budget
REPORT OF THE COMMITTEE

i. Back log in feed additive reviews
   1. Animal feed industry would like to get budget for more review of feed ingredients => want to invest in states for preventive controls for animal feeds
   2. Food Modernization Act: About 80% of animal feed inspections occur at state level – would like to get cooperative agreements to better support animal feed oversight infrastructure.
      a. Looking to increase comprehensiveness of animal feed inspections.
      b. Too much mortality associated with feed issues.
      c. Proposing $20 million to states to help improve inspections.
      d. Want to expand response activities.

ii. Continue to work on recalls.

5. Antimicrobial resistance (AMR) Activities
   a. Published 5-year plan fall 2018
   b. Reductions (43% between 2015 – 2018) in antibiotic sales data
   c. Things to focus on over next five years:
      i. Products – how to improve antibiotic products.
      ii. Expanding scope to all veterinary sectors (companion and food animals) => antibiotic stewardship
      iii. Data collection – antibiotic use and resistance data
   d. Effective January 1, 2019: shifted all in feed and water medically important antibiotics to the Veterinary Feed Directive (VFD)
      i. Will be moving over the counter (OTC) products to require prescription by end of 2019/2020
      ii. Need to update medically important list (originally published in 2003 - guidance document)

6. Participating in work group led by Animal and Plant Health Inspection Service (APHIS) to determine risk of introduction of diseases through feed ingredients (i.e., African swine fever [ASF])

7. Vet-LIRN
   a. Great progress
      i. 40 state laboratories participating, total investment of $2.8 million since 2016, average laboratory structure has been getting $46,000/year
ii. Indirect costs (overhead) have increased from 10% to 56%

iii. Increase of $1.4 million in 2019 Vet-LIRN funding
   1. Welcome letters of support from laboratories, stipulating the impact of FDA funding (i.e., indicating the value of Vet-LIRN and other funding), are very valuable in ensuring continued funding.
      a. Send letters to Renata (FDA)
      b. Helps when approaching congress for additional funding.
   b. AMR projects - $800K
   c. Residues - $400K

8. Hemp:
   a. FDA is planning a public meeting for human and animal health for use of hemp products.
      i. No consistency in products being sold and claims on packaging.
      ii. Will only pursue manufacturers who have gregarious products, but not enough resources to pursue them all.

Bill Flynn, reviewed progress in the antimicrobial resistance programs.
   1. Antimicrobial resistance – total quantity of antimicrobial sales is significantly down over past few years – 30-40% decrease over four years. They look at more than just sales, but that is a good indicator of progress. They do not continue to expect similar reduction in sales.
   2. 5-year plan – three main goals – product updates; stewardship - expand scope beyond just food animals to companion animals as well; enhancements to data collection.
   3. Shifted oversight of feed and water products to veterinary oversight as of January 1. There are a limited number of over the counter (OTC) products still available. Less than 5% of all antibiotics are non-food and water. By end of this FY, hope to have plan available for when remaining antibiotics will transition to veterinary oversight instead of OTC.
   4. Plan to update list (guidance document) of medically important vs. non-medically important antibiotics in next year or two.

Department of Homeland Security, including Office of Health Affairs, and Customs and Border Patrol
Tom McGinn, Office of Health Affairs (OHA), Romel Lapitan and John Sagle, Customs and Border Protection (CBP)
Rome Lapitan
   1. Agroterrorism and Bioterrorism:
a. Provide guidance for handling issues
b. Outreach programs
c. “Intentional” harm

2. Mission is to prevent terrorism, specifically agro bioterrorism, provides subject matter expertise, oversees 2,400 agriculture CBP agents

John Sagle
1. Focus more on unintentional introductions – safeguarding and prevention/ mitigation of the “unintentional”.
   a. Trade: movement of people and products

   a. Recent work in streamlining mission and information sharing.
      i. Combining people protecting our borders
         1. There are two groups – regular CBP agents (about 20,000), and agriculture/pest specialists (2,400).
         2. 23,400 workforce currently

3. Daily statistics
   a. Processed over 1.1 million passengers/day
   b. 7.7 million products inspected/day
   c. 1,100 people apprehended/day
   d. Seized 4,600 lbs. drugs/day
   e. Seized $300,000 undeclared currency/day

4. All 2,430 CBP agriculture specialists undergo extensive training.

5. Over 1,400 canine teams => 114 agri-specific teams (beagle brigade) – effective at interdicting fruits and vegetables, at 84 large international airports and at borders

6. 364 horse patrols

7. Internationally, in 52 countries

8. Assist 49 other government regulatory agencies with compliance of their requirements.

9. Border portion of authority was transferred to CBP from USDA

10. Work with homeland security and FBI (intelligence community)

11. All quarantine regulations must be addressed at “Arrival” at U.S. port
   a. Products cannot enter commerce until all entry/ quarantine requirements are met.
   b. Animal and plant quarantines are handled first at arrival.
      i. Documentation, testing, quarantine
      ii. APHIS- VS handles live animal imports
      iii. Do NOT test for animal diseases at border
         1. Just assume everything is infected and is destroyed

12. Targeting:
   a. Advanced information – cargo and aircraft manifest received 1-2 days in advance
b. Have algorithms to identify (ID) risk anomalies (i.e., country of origin, etc.)
c. Reviewed at local level and national office
d. Vessel tracking
e. Agriculture quarantine (staff of six) => work nationally
   i. ID shipments of cargo
   ii. Send data to local ports to hold identified shipments
13. Pork Seizure:
   a. Still ongoing
   b. 50 container shipment (Newark)
      i. Inspected 24 containers so far. Of those 24, have found four with deeply (intentionally) concealed pork products from countries with African swine fever (ASF). Products such as pork flavored noodles, shelf stable sausages, etc. Likely result of country with banned exports due to ASF, trying to sell product where they can.
      ii. Seized everything with shipment (about 14,000 kgs of swine products)
14. Also, 1,400 lb. seizure of pork products at Los Angeles International Airport (LAX)
15. Presume will be seizing a large amount of illegal pork products in near future.
   a. Countries and manufacturers desperate with trade restrictions will be attempting to dump product illegally.
16. Concerns with international passengers entering U.S. who may have or have been on farms positive for ASF.

Tom McGinn - Homeland Security Presidential Directive (HSPD) 9 says they are supposed to protect against agricultural catastrophic losses.
1. NBAF:
   a. DHS owns construction and development of facility.
   b. Will turn it over to USDA in 2021, APHIS and ARS involved in planning process now.
   c. USDA and ARS: FY2018 budget is $14 million, FY2019 budget is $42 million.
   d. Several working groups set-up within USDA-ARS.
2. Select agents program will be USDA program in 2021
3. DHS will continue to operate at Plum Island until target of 2023; will move through process to decommission and sell Plum Island at that time.
4. DHS is/has moved away from agriculture/animal/veterinary expertise and support.
5. Focus should be on reduction of risk
   a. Better evaluation of where risk exists, where are vulnerabilities
b. Use scientific evidence driven methods to determine effective risk reduction strategies
c. Where are areas of failure

6. Food and Agriculture Annex to national response plan will be coming out soon
   a. Delegation of authority to industry and county emergency management from state/federal

7. Plan to add 60 beagle brigade teams to CBP
   a. 12 additional teams/year over five years
   b. Only current CBP officers can apply to be handlers
   c. USDA procures rescue dogs, performs medical evaluation and DHS handles training.

National Institute of Food and Agriculture (NIFA)
Adele Turzillo, Michelle Colby, Matt Holland, Scott Angle

1. Proposal by Secretary of Agriculture to move NIFA headquarters out of D.C. and into the “heartland.”
   a. Location proposals have been received, and it is likely that they will be based somewhere else in the future.
   b. Goal to maintain a small office of approximately 20 people in D.C.

2. Objectives:
   a. Profitability for rural communities to lead to improvement of livability.

3. Veterinary Medicine Loan Repayment Program (VMLRP) update: Application period open now, ends April 12, 2019.
   a. Last year had 154 applicants, made 75 award offers – expect it to be about the same this year.

4. Veterinary Services Grant Program – broad types of activities could be supported, including education, support of agriculture supportive residencies, etc.

5. National Animal Health Laboratory Network (NAHLN) – NIFA stable funding

Agricultural Research Service (ARS)
Cyril Gay

1. Bacterial zoonotic disease department
   a. Brucellosis and tuberculosis (TB) research
      i. Loss of staff, but plan to rebuild research programs, as budget allows.
      ii. Small number (about one scientist for each) of staff focus on brucellosis and tuberculosis.

2. Biodefense
   a. All budget increases are due to National Bio and Agro-defense Facility (NBAF) funding (operational funding)
GOVERNMENT RELATIONS

i. Will be separate budget
b. $1.2 billion facility
c. ARS to take charge by 2020, be operational by 2023, plan is to go from nine (at Plum Island) to 20 scientists.
d. GAP alliance analysis report => Google “ASF Report”
i. Large volume of research on ASF
e. Plan to partner with Center for Disease Control and Prevention (CDC) to build BSL-4 program
f. U.S. currently has no capabilities to develop vaccines to foreign animal diseases (FADs)
g. NBAF should be positioned to work on any emerging disease, especially zoonotic
h. NBAF will NOT be a development/ production facility.

3. Select agent list – it is maintained by cooperation between APHIS and CDC. Support for delisting Brucellosis is noted, and ARS has done their best, but CDC appears to be resistant.

4. Currently biggest diseases they focus on are FMD and ASF. Four possible ASF vaccines in pipeline. Hopefully will involve coordination with private sector as vaccine is refined.

5. CWD
a. Received appropriation to work on chronic wasting disease (CWD)
b. Asked where should research be performed and what additional things should be studied:
   i. Diagnostics – ante and post-mortem
   ii. Transmission of CWD – environmental contamination

Blue Ribbon Study Panel
Ellen Carlin, Eco Health Alliance
1. Works on zoonotic diseases
2. Currently detailed to the Smithsonian Global Health Program
3. Associated with a panel made up of people with experience in legislation and policy

Animal Agriculture Coalition
Lauren Stump (co-chair); Chelsea Good, Scott Bennet
1. Farm Bill focus last year
2. Genome to phenome project
   a. Understanding gene function and how it translates to effective production.
3. Shift towards focus on USDA implementation of Farm Bill over the next five years.
4. Concern about 15% decrease to President’s USDA budget, but will wait to see what Congress does.
5. See one-pager entitled “Avian Disease Prevention and Management”.

Wednesday, March 20, 2019
Hosted at the National Cattleman’s Beef Association (NCBA) Office

Food Safety and Inspection Service (FSIS)
Hany Sidrak, Kis Robertson

1. Swine modernization procedures to address ASF concerns, but inclusive of all FAD.
2. State Programs (Comprehensive and Integrated Surveillance (CIS) program) – there has been conversation about state programs. As a reminder, there is a cooperative interstate shipment program, which was introduced in 2008.
   a. 45-46 large establishments interested in converting to CIS (Veterinary Services [VS] Memorandum of Understanding [MOU]). Currently four using it.
   b. Senator Rounds to introduce legislation on state inspection programs. If slaughterhouse is comfortable with state inspection, don’t need to convert to federal inspection program (CIS).
3. FSIS has been partnering in Foreign Animal Disease scenarios/tabletop exercises (i.e., foot and mouth disease [FMD])
   a. Have really tried to do more with APHIS, have done exercises with APHIS, and will continue.
   b. APHIS working group (WG) responsible for creating FAD exercises, FSIS increasingly involved.
4. Animal ID: required by regulation that slaughter establishments collect ID and have Directive to work with APHIS on program.
   a. Establishments also approach collection of ID as part of their Hazard Analysis Critical Control Point (HACCP) plan – tags are considered physical contaminants.
   b. Traceability – APHIS continues to work with FSIS through MOU to improve traceability.
   c. APHIS interface used in field.
5. Cell-based protein regulations:
   a. Working on the issue, including labeling- FSIS has a more rigorous approach to labeling than FDA (will be regulated by FSIS)
6. Companies are often placing their own standards above FSIS requirements.
   a. Religious exempted methods of slaughter do not require labeling of product with that method (i.e., kosher)
b. CO2 has been replacing electrocution as stunning method in swine and poultry (and maybe eventually cattle)
   c. Welfare concerns are central to this area.

7. Issues with slaughter plant veterinarians not being allowed to collect appropriate samples for neurological animals to submit samples for testing (may be state specific issues).

8. FSIS continues to offer internships for veterinary students, offer sign-on bonuses and have loan repayment programs.

9. Animal welfare – continues to be a focus, FSIS wants to be practical while being focused on welfare.

**CDC – One Health**
Casey Barton-Bahravesh, Megin Nichols, Diane Onone, Shelby Rhee, Carolyn Greene, James Kyle, Ben Beard, Maria Negron, Nadia Oussayef

Casey Barton-Bahravesh – One Health Office
   a. Being translated into six languages: Global reach
2. CDC has created a One Health Coordination Network – to share information on One Health activities across U.S. Federal Government – calls every other month.
3. Influence and Zoonotic education among youth in agriculture project:
   a. Educational materials targeting youth to prevent zoonoses
   b. Youth in Agriculture handout is available
4. CDC’s “Zohu” call – 12,000 people now subscribing to this call, 2:00 p.m. on Wednesdays, always welcome speakers/ideas.
   a. Have CE for variety of health professionals
5. CDC “Healthy People, Healthy Pets” website and handout developed.
6. Established top eight zoonotic diseases to focus on - zoonotic influenzas, Salmonella, rabies, Lyme, plague, West Nile Virus (WNV), emerging coronaviruses, brucellosis.
7. OIE has scientific and technical review: focus on One Health (coming out in April 2019)

**Vector-borne disease issues and updates (handout)**
Ben Beard (via phone)
1. Over 700,000 cases of vector borne disease reported to the CDC since 2017
   a. Most tick-borne (Lyme disease)
   b. Large number presumed unreported
   c. WNV (see outbreak/increase in cases every 5-7 years)
   d. Zika (2016)
   e. Causes => Suburban sprawl and climate change
2. Arboviral diseases continues to be a focus
3. Asian long horned tick:
   a. 2017: first recognized in New Jersey
b. Now been documented in 49 counties in multiple states, on 14 animal species and humans

c. No ticks have yet been found to be positive for a pathogen, but it can carry pathogens in many other countries

d. Important vector overseas for livestock, wildlife and human diseases
   i. Severe Fever with Thrombocytopenia virus, similar to Heartland virus
   ii. Theleria
   iii. Babesia
   iv. Bourbon virus and Ehrlichia

4. Currently developing pathogen-free colonies => will be able to test disease transmissibility and will perform studies on pesticide effectiveness

5. Call to action for a national strategy to address control of emerging vector-borne diseases
   a. Working with multiple federal partners currently, will eventually be sent to state partners

Maria Negron – Brucellosis

1. RB51 – Pennsylvania outbreak:
   b. Traced strains from New York and New Jersey infections back to the same cow (co-infected with both strains – different quarters infected)
      i. Cow had two different strains of RB51 bacteria – in one quarter, matched New York case, another quarter matched Pennsylvania case.
         1. Both are vaccination strains, thought to have mutated on own in the cow
         2. CDC purchased the cow and are studying it at the CDC
         3. Collaborating with NVSL on diagnostic testing and genetics
   c. All three RB51 outbreaks/cases have been traced to Jersey cows.

2. Want to have outreach to vets regarding vaccination of dairy heifers, will that cow be used for raw milk production.

3. Morbidity and Mortality Weekly Report (MMWR) published last month about these RB51 cases. Contains recommendations: people should not drink raw milk, possibly do not vaccinate cows producing raw milk, post warning on label.

4. Issue with classification of Brucellosis as select agent in conducting research
   a. Classified as select agent:
GOVERNMENT RELATIONS

i. Six-month incubation period
ii. Clinical signs relatively mild
iii. Low infective dose

Megin Nichols – food borne pathogens
1. Arizona Department of Agriculture: Romaine lettuce 0157
   a. Proximity of cattle fields to leafy green fields
2. Salmonellosis:
   a. Turkeys – multi-drug resistant outbreak of *Salmonella Redding*
   b. Raw- meat chicken products => multi-drug resistant *Salmonella*
   c. Ground beef => *Salmonella Newport* outbreak
3. Campylobacter outbreak strain associated with pet store puppies
   a. Continuing to see cases in humans
   b. Multi-drug resistance
4. Funded initiatives – Iowa state prevalence of Campylobacter in breeding dogs, Ohio State with antimicrobial use, University of Minnesota on education on antimicrobial stewardship (animal and human medical professions), others
5. Shift to focus on pre-harvest sampling surveillance and pre-harvest interventions
6. CDC no longer has sharing of diagnostic data from animals with National Veterinary Services Laboratories (NVSL)

Kendra Stafford – Canine Rabies
1. Definition of “Rabies Free” clarified => canine rabies virus free
2. Performed risk analysis for importation of live dogs
3. Changed risk status (Canada and Mexico)
4. Rescue dog from Egypt => positive for canine rabies
   a. Entered U.S. through Canada
   b. Fraudulent shipping documents
   c. Only 7/25 dogs in shipment had effective titers (samples tested at Kansas State)
5. There is a requirement for USDA-APHIS Animal Care (AC) to report to Congress on importation of live dogs into country. CDC will support USDA AC on report
6. Updating materials/ website to make more user friendly (coordinated with APHIS and Customs and Border Protection [CBP])

Carolyn Greene – provided handout on influenza updates at the animal-human interface

National Veterinary Services Laboratories (NVSL)/National Animal Health Laboratory Network (NAHLN)
Beth Lautner, Kristy Loicano, Sabrina Swenson, Lisa Murphy, Kim Dodd, Beth Harris, Byron Ripke (CVB)
1. Currently do not have an NVSL Director (there is an acting Director)
   – will be advertising soon
a. Currently 50 positions vacant at NVSL, ten at CVB.

2. Byron Ripke - Autogenous vaccines (inactivated products):
   a. Isolate from herd of origin, grow-up and re-inoculate same herd.
   b. New Platform Vaccines
      i. Different from other inactivated products, based on recombinant vaccine platform technology.
      ii. Only replicate gene sequence of interest
      iii. These must meet all requirements for a fully approved vaccine.
      iv. Once it is established and approved, new inserts can be easily used, all based on full approval of vaccine. This cuts down on production expenses.
      v. Inserting genes into well-established platform
      vi. Technology could potentially be used for foreign animal disease vaccine production.

3. Recently turned in list of 50 positions that need to be filled at NVSL (key vacancies – bovine, aquaculture and serology)

4. 83% of NVSL worked during federal shutdown – will be quicker in notifying stakeholders about service capabilities if another shutdown.

5. Equine Infectious Anemia (EIA), Contagious Equine Metritis (CEM) and Johnes working group => Fall 2019 proposed regulation on quality inspection meeting specific standards
   a. Will not cover scrapie, chronic wasting disease (CWD) => under NAHLN
   b. Not addressing NAHLN or National Poultry Improvement Plan (NPIP) disease testing
   c. Minimum quality assurance standards will be developed.
   d. Over 400 equine infectious anemia (EIA) laboratories in U.S.
   e. Minimum number of tests to remain proficient.
   f. Will not address unaccredited labs performing foreign animal disease (FAD) testing.
   g. Will include reporting requirements.

6. NBAF – hoping to hire/have 200 operational staff.
   a. Will set up dual testing program, so there will not be a suspension of testing abilities for FADs.

7. Hope to offer university FAD diagnostician courses in 2020 (Plum)

8. Working to standardize quality expectations for NAHLN laboratories

9. Now have 40 NAHLN laboratories certified to run African swine fever (ASF) polymerase chain reaction (PCR) test, 42 certified to run classical swine fever (CSF) PCR
   a. NAHLN is participating in ASF exercises this year (April 2019 tabletop)
   b. 38K PCR tests/ day (8-hour period)
GOVERNMENT RELATIONS

c. Added LNs to validate samples (in addition to whole blood, tonsils and spleen)
d. For FAD investigations => test for both CSF and ASF

10. Currently have 44 of 59 laboratories able to message results on at least one disease – encouraging laboratoriess to be able to message on all NAHLN certified diseases.
   a. Quarterly messaging competency proficiency tests

11. Virulent Newcastle Disease (VND) outbreak California
   a. Deploying people from other NAHLN laboratories to California for support in laboratories
   b. Opportunity for laboratory staff to be deployed to California to help with VND response.

12. AMR pilot
   a. Completed in December 2018
   b. Received over 200 isolates.
   c. Monitoring Salmonella only in large animals

13. Oral fluid (rope test) for ASF, CSF and FMD:
   a. Negative cohort study completed in 2018, currently working on positive cohort study.
   b. NVSL researcher just returned from Canada, where he did positive tests using banked positive oral fluid samples, and report is expected by end of April.
   c. Meeting with swine industry representatives (endemic countries) next week to discuss which countries could best provide positive oral fluid samples.
   d. NAHLN/NVSL would be able to validate quickly in the face of an outbreak.
      i. There are processes to quickly validate sample types.
      ii. How to validate new sample type with pre-existing assay.

14. Matrix- funding determination for NAHLN laboratories
   b. Where State laboratories are located (geographically) in relation to commodities in state
   c. Distribution of NAHLN laboratories is good, but certain high density livestock areas have gaps.
   d. Focusing on validating pooled samples to help with surge capacity.
   e. Laboratories ranked based on whether in top five for a specific commodity.
      i. Affects funding levels.
   f. Priority to re-evaluate laboratory determinations to update census.
g. Drawing geographic circles (regional versus state border approach) to better determine number of samples coming through laboratories.

h. It was noted that geographic distribution may not be accurate for determining distribution of testing => overnight shipping/ couriers

15. NAHLN Funding
   a. Vet diagnostics: $49.2 million 2020
      i. Reduction of NAHLN activities by $5 million
      ii. Current president’s proposal can change

16. Brucellosis:
   a. Inhaled vaccine for elk (CSU)
      i. First round completed.
      ii. Undergoing second round of testing
   b. No longer conducting research on Brucella directly
   c. Still providing isolates to other laboratories or researchers

USDA-APHIS-VS
Jack Shere, Rosemary Sifford, Sara Tomlinson, Alecia Naugle, Alan Huddleston, Burke Healey
1. African swine fever (ASF)/Classical swine fever (CSF) Surveillance Updates (Resolutions 4- 5- 6)
   o Working on validation on testing on oral fluids as Dr. Lautner described earlier.
   o Working on expanding ASF surge testing capacity – can do 38,000 samples per eight-hour shift
   o 40 laboratories certified for ASF tests, 42 for CSF
   o Talking frequently with Mexico and Canada regarding VND and ASF
   o Met multiple times with swine industry – do NOT want to perform ASF/ CSF active surveillance on feral hogs. Only sick hog testing.
   o Oral fluids test will be clearance test in event of an outbreak prior to movement
   o Trade with E.U. complicated due to differences in member states definition of “free status” and differences in how product moves
      ▪ Ex: One country was slaughtering both clean and infected herds in the same slaughterhouse.
   o There has been some feral hog surveillance for CSF.
   o Will be having joint conference between Canada, Mexico and U.S. to strategize keeping North America free of ASF.
      ▪ Good relationships
   o Mexico is performing Virulent Newcastle Disease (vND) testing and reporting to the U.S. (New)
Government Relations

- Mexico wants to have similar laboratory system to the U.S. and wants U.S. to train laboratory technicians.

2. Plans for exercises going forward – funding, contracts, part of Farm Bill.
   - VS envisions funding from Farm Bill as cooperative agreements rather than grants (competitive funding program).
   - Want to provide guidance and have universities, states and different state agencies apply for funding.
   - Low level of funding is mandatory, rest is more flexible, want to roll out money slower so that states can make better use of it.
   - Will probably include guidance documents with farm bill (instead of creating regulations). In order to move forward more quickly, APHIS wants to avoid rulemaking.
   - Goal of vaccine bank is to help us get over first 14 weeks of an outbreak.
     - Looking at different types and production of vaccines
     - Important for preparedness
   - Exercises – ARMAR cost over $1 million and took three years to plan. Conducting mini exercises for ASF now with swine states and Mexico.
     - It’s expensive and takes time to plan, demands a lot of resources.
     - Outbreak comes down to individual company/complex and state response plans.
     - VS just hired an executive director for field ops – Adis Dijab

3. Virulent Newcastle Disease (vND) Update
   - Outbreak very similar to what happened in 02-03 and 1970’s.
   - vND response - ensuring resources and funding, better communication with industry and state regulatory partners.
   - Focus in on preventing birds from moving – “easily” controlled if don’t move birds.
     - Educational and cultural challenge (more so than a traditional eradication effort)
   - USDA has spent $19 million so far, the effort is ongoing – have used all allocated low pathogenicity avian influenza (LPAI) money for 2019, as well as rollover high pathogenicity avian influenza (HPAI) money.
   - Got re-apportioned money left over from 2014-2015 avian influenza (AI) budget approximately $45 million.
     - Ramping up response, budgeting for response to continue at least through August (would need to go back to congress for additional funding).
Will hire 50 interns that will stay in California, with 100 additional staff (3-4 week ramp up period).

- USDA has not pushed vaccination – worried about hiding. Masking vND symptoms.
- Biggest effort in backyard birds. Risk is small owners in highly infected areas.
- Performing surveillance around layer facilities
- Confirmation from NVSL only for new areas/neighborhoods and any commercial complexes
- Even more people have chickens than 15 years ago
  - People have forgotten about biosecurity
  - Some people working in layer facilities own backyard chickens
- Indemnity based on market value – cap around $40
- Asking California to enforce local regulations, some limit number and species of animals that can have on property
  - Difficulties with differences between state and county regulations
- Focus on education and outreach

4. ADT/Traceability Progress –
   - Resolution 34 – “Two-Pronged approach”
     - Encouraged USDA to support 14 points, and recognize importance of voluntary value-added programs
     - Progressing toward adoption of regulatory requirements as outlined in 14 point statement
   - Resolution 32 – ultra high frequency (UHF) back tag Projects
     - Will be working to get out funding for this - $1 million – anticipate 3-4 projects – Kansas, Texas, Florida, Kentucky programs mentioned.
     - Develop request for proposal for comparing UHF back tag to other technologies
     - NCBA in support of RFID, want consensus on technology
   - Proposed timeline on phase-out of National Uniform Eartagging System (NUES)
     - National Assembly (NA) Working group headed by Dr. Frazier, discussing how to cost share tags.
     - Under-Secretary wants to pursue cost share program for tags
     - Proposed Timeline:
       - December 31, 2019 – USDA will no longer provide free metal NUES ear tags
       - January 1 – December 31, 2020 – official NUES metal tags can be purchased
GOVERNMENT RELATIONS

- January 1, 2021 – NUES metal tags (with U.S. shield) can no longer be purchased or applied
- 2021-2023 – transition period to all RFID by January 1, 2023
  - Cost share vision – third dollar each from USDA, state, producers
    - USDA can negotiate a reduced price, but producer will need to use voucher with code to get reimbursed for discount (complicated process)
  - Will NOT require a rule change to require use of RFID tags
  - Will only apply to cattle
  - Dairy industry very interested in LF (UHF is faster)
  - USDA can write standards for tags and readers
  - Some states don’t want to be in tag distribution business (if states negotiated tag prices)
  - Difficult for states to plan implementation without decision on technology
  - Dual readers would be the best option
  - Encouraging continued industry engagement => webinar based on traceability (FMD and TB)
    - Developing for states to educate value of traceability with industry
    - Hoping to debut at National Institute for Animal Agriculture (NIAA)
  - Website development to provide solution for how producers get a personal identification number (PIN)

5. Current traceability gaps in international imports of livestock and resolutions
- International import permit is still legal for interstate shipment as long as destination is accurate
- Contact Environmental Impact Statement (EIS) for any found violations
- Typically, problems are identified via complaint-driven mechanism; followed up by EIS
- Producers are usually innocent victims
- If states implemented interstate permit requirement, would help enforcement of violations and the deficit in language in 9-CFR
  - Would require a rule change to strengthen language in 9-CFR
- Could consider a federal order, but those are typically not supported by Office of Management and Budget (OMB)
6. Resolution 11 – Veterinary Services Process Streamlining (VSPS) improvements
   - Currently have a contract to fix long standing bugs, and appreciates the nicely organized desired improvements
   - Electronic Certificate of Veterinary Inspection (eCVI) improvements
   - USDA agrees with resolution

7. Resolution 31 – Brucella research – details on course of action
   - General request from USAHA for Agricultural Research Service (ARS), APHIS, and National Institute of Food and Agriculture (NIFA) to work together on Brucella research, including potential vaccines for wildlife species.
   - Prioritization for USDA to fund brucellosis research
   - VS is not a research institution, but can partner with other organizations
     - Hopefully can use farm bill money to fund projects
   - No vaccine/delivery method effective for vaccinating elk in Greater Yellowstone Area (GYA)
   - Can meet with/partner with ARS
   - Clarified that resolution was not aimed at USDA
   - Delisting of *Brucella* as select agent
     - DHS does not want it delisted
     - Didn’t have CDC support
     - USDA is supportive of this resolution

8. APHIS VS revision of brucellosis and tuberculosis (TB) uniform methods and rules (UMRs) and Code of Federal Regulations (CFRs) rulemaking process
   - National Assembly working groups (one for TB and one for brucellosis) – meeting regularly since USAHA
   - VS proposed a joint rule in 2015. Withdrawing domestic components of proposed rules, keeping international components
   - Moving forward with separate TB (expect sometime after brucellosis rule) and brucellosis rules (expect spring of 2020)
   - TB rule
     - Transmission less well understood, epidemiology different
     - Evaluation on different methods of determining status
   - Monthly call with cattle and cervid industry (discussing conversations from NA working group)
Go to government relations

- 2010 Federal Order: suspended current regulation that would require downgrading a state if they meet specified criteria, in lieu of testing epidemiology work
  - Don’t want states penalized for conducting epidemiology and finding additional positive herds
- Viability of TB indemnification fund
  - Not enough money to depopulate current positive herds
- Rules will NOT address indemnity for TB and brucellosis
- Continue to detect cases in larger and larger dairy herds/calf-raising facilities
- Limited funds, when $19 million exhausted, will only get $1 million per year after
  - Currently spend more than $1 million/year on test and remove work
- Brucellosis rule revision moving faster than TB but will not be out for comment by fall 2019 due to federal shutdown; rule has been pushed to a spring 2020 agenda
- TB rule promulgation process will take longer; different disease and less uniformity regarding viewpoints on the issue.
- VS intends to withdraw related Federal Order once they are close to having revised the rule structure for TB/brucellosis
- Each herd test costs $100K’s
  - Hurts producers to have traces to their herd

9. Marketing of primary breeder compartmentalization program and regionalization during outbreaks to international trading partners
- Support from USDA
- USDA is updating regulations for compartmentalization (just like regionalization)
- Draft of work plan in progress
- Will be jumping off point for marketing to other countries/trading partners
- Will provide internal auditing/evaluating mechanism
- Swine are interested in compartmentalization and regionalization
- Canada accepts zones (regionalization) in U.S.
- No current standard

10. Maintaining viability and risk analysis of controlled marketing process in Turkeys. (Viability in chickens)
- Strong support for this from USDA as a potential solution – will always be a viable process for Turkeys
- Controlled marketing was a very good option for turkey farms in 2015 HPAI
- Layers want option for controlled marketing
- Appendix D – Indemnity
Includes discussion/input regarding markets that are available for the product
  - Had meeting with renderers – currently don’t want negative public image of “sick birds”, USDA will need to help industry with perception
11. Increased consistency and communication from APHIS on LPAI and indemnity issues
  - LPAI meeting that was cancelled due to shutdown will be rescheduled
12. Ensuring continued funding of Cooperative Agreements with states and NAHLN system
  - Looking for 5% possible increase in ADT agreements
  - Will be re-evaluating
  - Will look to apply increase for infrastructure needs => tag readers
13. InterstateLivestock.com
  - VS will work with payment as states want, but clear that the funding will come out of cooperative agreement allocation. Ideal to have allocation identified prior to April 1.
14. Other Questions
  - Waiting for UHF to get International Organization for Standardization (ISO) standards (not as many high frequency companies)
  - NVSL has agreement with Federal Bureau of Investigation (FBI) for testing for suspected FADs
  - For agro-terrorism events. APHIS is lead agency, FBI is co-operative agency
  - Outreach to Swine Industry
  - Ask industry how USDA can better reach out to individual pork producers, will work with states.
Kimberly Abramo, MD; John Adaska, CA; Bruce Akey, TX; Victor Alzona, FL; Gary Anderson, KS; Marianne Ash, IN; Cat Barr, TX; Bill Barton, ID; Tim Baszler, WA; Tracy Baszler, CO; Lisa Becton, IA; Rob Bildfell, OR; Steven Bolin, MI; Y Reddy Bommineni, FL; Richard Breitmeyer, CA; Beverly Byrum, OH; Leticia Caldas-Montero-Linhares, IA; Craig Carter, KY; Robert Cobb, GA; Emily Cooper, OK; Estela Cornaglia, QC; Dustin Cox, NM; Beate Crossley, CA; Beate Crossley, CA; Marie Culhane, MN; Barbara Determan, IA; Sharon Dial, AZ; Edward Dubovi, NY; François Elvinger, NY; Kristy Farmer, AL; Allison Flinn, DC; Larry Forgey, MO; Richard Fredrickson, IL; Whitney Fritzinger, NE; Whitney Fritzinger, NE; Joseph Garvin, VA; Brenda Glidewell, GA; Patricia Godwin, KY; Stephen Goldsmith, DC; Patrick Halbur, IA; Steven Halstead, MI; Timothy Hanosh, NM; Beth Harris, IA; Jane Hennings, SD; Jamie Henningson, KS; Bob Hillman, ID; Stephen Hooser, IN; Pamela Hullinger, CA; Elizabeth Lautner, IA; John Lawrence, ME; Steve Lenz, IN; Randall Levings, IA; Mary Jane Lis, CT; Christina Loiacono, IA; Rodger Main, IA; David Marshall, NC; Thomas McKenna, MA; Beth Melton, MO; Doris Miller, GA; Richard Mock, NC; Dustin Oedekoven, SD; Kristy Pobilona, CO; Lanny Pace, MS; Elizabeth Parker, TX; Roger Parker, TX; Amar Patil, NJ; Allison Phibbs, DC; Robert Poppenga, CA; Barbara Powers, CO; Maryn Ptaschinski, TX; Lisa Quiroz, CA; Rachel Reams, MI; Debbie Reed, KY; Keith Roehr, CO; Jeremiah Saliki, GA; Renee See, WV; Kathryn Simmons, DC; Joan Smyth, CT; Kevin Snevik, WA; Harry Snelson, IA; Wendy Stensland, IA; Amy Swinford, TX; Manoel Tamassia, NJ; Deepanker Tewari, PA; Sarah Tomlinson, CO; Jerry Torrison, MN; Shuping Zhang, MO.

The Committee met on October 27, 2019 at the Rhode Island Convention Center in Providence, Rhode Island, from 12:00-3:00 p.m. There were 40 members and 44 guests present.

Presentations and Reports

NAHLN FY2020 Appropriations
Bruce Akey

The NAHLN received a total of $16.3 million (National Institute of Food and Agriculture [NIFA] and Animal and Plant Health Inspection Service [APHIS]) which is the same as last year. Unfortunately, the FY2020 Annual Budget has not actually passed yet and may not pass until early in 2020.

2018 Farm Bill
Christie Loiacono
USDA-APHIS-VS

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Loiacano

1. Awards from the competitive grants solicitation should be announced by December 31, 2019

2. $10m Split between National Animal Disease Preparedness and Response Program (NADPRP) and NAHLN
   a. NAHLN received 53 proposals totaling ~ $17.5 million, NADPRP received approximately 70 proposals

NAHLN and Related Reports
Christie Loiacano
USDA-APHIS-VS

NAHLN Coordinating Council

1. Need new representative for NIFA. AHPIS has appointed an interim representative.

2. Working to update NAHLN strategic plan. Priorities:
   a. Disease identification and surveillance
   b. Standardize data capture and electronic messaging
   c. Integrate animal health long-term goals
   d. Ensure a coordinated effort to meet resource needs for the NAHLN
   e. Continuation of codification efforts

3. NAHLN laboratory requirements
   a. No limit to the total number of laboratories in the NAHLN or the number of laboratories per NAHLN level.
   b. Established director qualifications
      i. Minimum: DVM degree plus Veterinary Diagnostic Laboratory work experience
      ii. Preferred: DVM plus a PhD with board certification and at least five years Veterinary Diagnostic Laboratory experience
      iii. Four NAHLN laboratories currently have non-DVM directors
   c. All NAHLN laboratories must be able to message for all approved diseases by September 30, 2021
      i. Currently all Level 1 laboratories meet this requirement

4. Dr. Loiacano described the Coordinating Council’s efforts to re-evaluate the laboratory assessment matrix

NAHLN African swine fever (ASF) capacity

1. Active ASF surveillance started June 1, 2019

2. Approved NAHLN laboratories
   a. 47 laboratories can conduct 40,000 tests/day
i. This number may go down. The laboratories didn’t account for the time necessary to prepare the extractions. The NAHLN is re-evaluating.

b. 10 laboratories provide active surveillance
c. 37 additional laboratories provide passive surveillance
d. Over 170 proficiency tested analysts

3. ASF laboratory response course on Plum
   a. Representatives from 32 laboratories participated
   b. Laboratory-focused training in Infection Control Services (ICS) 300 was offered
   c. The course included an ASF tabletop exercise which was also laboratory-focused
   d. Participants were also exposed to a clinical evaluation and necropsy demonstration of ASF-infected pigs

4. African Swine Fever Simulation Exercise (SFEAR) fully functional ASF exercise designed by USDA was conducted on September 23-26, 2019
   a. 14 states participated
   b. 16 NAHLN laboratories participated

5. NAHLN Annual Exercise also focused on ASF and was embedded in SFEAR
   a. 35 laboratories participated

NAHLN Quality Standards
1. Veterinary diagnostic laboratories are accredited to multiple standards and by multiple bodies including AAVLD.
2. The NAHLN is planning to accredit member laboratories in addition to other standards but notes that laboratories that already meet AAVLD or ISO standards should have no problem achieving the NAHLN accreditation.

Antimicrobial resistance (AMR) project
1. Year 1: 19 laboratories evaluating four pathogens
2. Year 2: 24 laboratories evaluating seven pathogens
3. Year 3 goals:
   a. Increase whole genome sequencing to at least 25% of laboratories providing WGS
   b. 75% of laboratories capable of electronic messaging of AMR data
   c. Develop interactive website

Methods Technical Working Group
1. Emergency test validation is in place encompassing two approaches:
   a. Standard operating procedure (SOP) already in the laboratory
   b. SOP does not already exist
   c. Results will only be used for positive cases, NOT to move animals or proof of negative testing

NAHLN exercises and drills Working Group (John Bare is lead)
REPORT OF THE COMMITTEE

1. Provides informational webinars, and
2. Conducts NAHLN exercises

NAHLN Information Technology (IT) Working Group
1. The group provides input on a wide range of activities and conducts trainings
2. 52 of the 61 NAHLN laboratories can message at least one disease

NBAF Update
Kimberly Dodd
1. Focuses on animal health, human health and food security
2. BSL-3 enhanced and BSL-4 will allow testing for zoonotic diseases
3. 400 personnel will staff National Bio and Agro-defense Facility (NBAF), most will be federal employees
   a. 160 scientific staff split between ARS and APHIS
4. Will begin transition in 2021 to get approval for foot and mouth disease (FMD) transition to the mainland. This process will take at least two years. During this time, USDA will have to maintain both facilities. Dr. Dodd was confident that adequate funding would be forthcoming to support the continued operation and scientific agendas during this transition period.
5. NBAF Scientist training program
   a. 10 universities, 15 students currently

Committee Business:
Four resolutions were brought before the committee. Three were approved by voice vote and one was not taken up due to a lack of a second. Topics of the three resolutions approved included:
- Providing adequate funding for the National Animal Vaccines and Veterinary Countermeasures Bank and the National Animal Health Laboratory Network
- ASF/CSF Surveillance Program and Tissues for Official ASF Testing in NAHLN Laboratories
- Inclusion of BSL3 Necropsy Space in the Process for NAHLN Laboratory Participation
COMMITTEE ON NOMINATIONS AND RESOLUTIONS  
Chair: Barb Determan

J Lee Alley, AL; Peter Belinsky, RI; Philip Bradshaw, IL; Richard Breitmeyer, CA; Tiffany Brigner, CO; Jones Bryan, SC; Stephen Crawford, NH; Barbara Determan, IA; Kristin Haas, VT; Thomas Hagerty, MN; Steven Halstead, MI; Bob Hillman, ID; Donald Hoenig, ME; Maxwell Lea, Jr., LA; James Leafstedt, SD; Donald Lein, NY; Laurent O’Gene Lollis, FL; Bret Marsh, IN; Michael Marshall, UT; David Marshall, NC; Richard McCapes, CA; David Meeker, VA; Lee Myers, GA; Boyd Parr, SC; John Ragan, VA; Glenn Rea, OR; David Schmitt, IA; Andy Schwartz, TX; Beth Thompson, MN; H. Wesley Towers, DE; Max Van Buskirk, PA; Richard Willer, HI; Larry Williams, NE; Ernest Zirkle, NJ.

NOMINATIONS

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PRESIDENT-ELECT.................................................Charles W. Hatcher, Nashville, TN
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DISTRICT DELEGATES

NORTEAST.................................................. Belinda Thompson, NY; Karen Lopez, DE
NORTH CENTRAL........................................ Steve Rommereim, SD; Paul Brennan, IN
SOUTH.............................................................. L. “Gene” Lollis, FL; Eric Jensen, AL
WEST............................................................. H. M. Richards, III, HI; Timothy Hanosh, NM

RESOLUTIONS

RESOLUTION NUMBER: 1  APPROVED
SOURCE: USAHA/AAVLD COMMITTEE ON AQUACULTURE
SUBJECT MATTER: AQUATIC ANIMAL DIAGNOSTIC WORKING GROUP
BACKGROUND INFORMATION:

The movement of aquatic animals is mired with varied and complex regulations. In the United States (US) the majority of states use the inspection and diagnostic guidance established in American Fisheries Society Fish Health Section’s “Suggested Procedures for the detection and identification of certain finfish and shellfish pathogens” (known as the Blue Book) to regulate domestic
movement. For international movement, the majority of countries either follow the guidance provided by the World Organization for Animal Health (OIE) or develop their own import health requirements. This has resulted in American aquaculture producers and exporters having to meet multiple standards and requirements to move their animals as well as having to pay for duplicative and meaningless testing. Currently, both guidance documents, the Blue Book and the OIE Manual of Diagnostic Tests for Aquatic Animals, reference outdated or otherwise inadequate sampling and diagnostic procedures.

The US commercial aquaculture industry needs better diagnostic assays and the ability to reduce testing through options like farm-level testing and the ability to pool specimens. Further, laboratories conducting aquatic animal health testing need a core subject matter expert group, which may make recommendations, as well as coordinate positive control material and share information.

RESOLUTION:

The United States Animal Health Association requests that the United States Department of Agriculture (USDA) form an aquatic animal health diagnostic working group with domestic subject matter experts in the field of fish, mollusks, and crustaceans. This working group will recommend standards and procedures for new assays to be developed and address issues with existing assays. Further, this group will identify gaps in knowledge and find ways to address these gaps, such as the impact of specimen pooling on assay sensitivity and specificity. This group should work closely with the American Fisheries Society Fish Health Section “Suggested Procedures for the detection and identification of certain finfish and shellfish pathogens” (known as the Blue Book) committees, USDA staff, and other federal and state partners to reduce duplicative, meaningless, and over-burdensome testing regulations for aquatic animal movement both domestically and internationally.

RESOLUTION NUMBER: 2 APPROVED
SOURCE: USAHA/AAVLD COMMITTEE ON AQUACULTURE
SUBJECT MATTER: COMMERCIAL AQUACULTURE HEALTH PROGRAM STANDARDS
BACKGROUND INFORMATION:

The Commercial Aquaculture Health Program Standards (CAHPS) were initiated by the National Aquaculture Association and developed with the United States Department of Agriculture (USDA) in 2014. The standards set forth a model framework for the health of commercially farm raised aquatic animals. CAHPS recognized and built upon current activities and existing guidelines for health of aquatic animals by establishing uniform standards for United States farmed aquatic animal health and movement.
The United States Animal Health Association applauds the efforts of the USDA, Animal and Plant Health Inspection Service for working with the National Aquaculture Association to develop the CAHPS. We believe that the program must further evolve to benefit all domestic commercial aquaculture, especially with regards to national and international trade. The effectiveness and success of the program requires the cooperation of not only industry but also state and federal entities.

RESOLUTION:

The United States Animal Health Association (USAHA) strongly encourages the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) to engage with states to identify how the Commercial Aquaculture Health Program Standards (CAHPS) may be utilized in conjunction with existing health inspections for animal movement. USAHA recommends that USDA, APHIS, VS engage with states having well established aquatic animal health policies, which could become a national model for the acceptance and integration of CAHPS to meet state regulatory requirements for aquatic animal health.

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RESOLUTION NUMBER: 3 APPROVED
SOURCE: USAHA/AAVLD COMMITTEE ON AQUACULTURE
SUBJECT MATTER: IMPORT HEALTH REQUIREMENTS FOR LIVE AQUATIC ANIMALS
BACKGROUND INFORMATION:

At present, there are only United States (US) federal import health requirements for the importation of live salmonid species and their gametes [United States Fish and Wildlife Service], as well as eight cyprinid species considered susceptible to Spring Viremia of Carp Virus [United States Department of Agriculture (USDA)]. All other live aquatic animals are entering the US with no US federal requirements with regard to animal health. In 2019, USDA responded to the first detection of Tilapia Lake Virus (TiLV), which was linked to infected fingerlings imported from Thailand. These fingerlings entered the US and the destination state legally with no mandatory health requirements, even though the country of origin was known to be positive for TiLV. Further, over the last several years, detections of World Organisation for Animal Health-listed pathogens and other emerging pathogens, such as Red Sea Bream Iridovirus, Infectious Hypodermal and Hematopoietic Necrosis Virus, and Ostrid Herpesvirus, have been linked to imports. The impact of these detections are felt by domestic industry because of animal loss, facility quarantines, export bans, and the need for enhanced surveillance. Import controls would not be intended to ban trade but to ensure that aquatic animals entering the US are healthy and do not pose risks to domestic aquaculture production or natural resources.
RESOLUTION:
The United States Animal Health Association requests that the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) immediately initiate a comprehensive pathways risk analysis for the introduction of World Organisation for Animal Health-listed pathogens from imported live fish, mollusks and crustaceans. Regarding prioritized pathogens, and with support of the domestic industry, USDA, APHIS, VS should implement appropriate import health requirements necessary to mitigate the risk of introduction.

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RESOLUTION NUMBER: 4, 9, 15, and 16 combined APPROVED AS AMENDED
SOURCE: COMMITTEE ON ANIMAL EMERGENCY MANAGEMENT
USHA/AAVLD COMMITTEE ON NAHLN
COMMITTEE ON EMERGING AND FOREIGN ANIMAL DISEASES
COMMITTEE ON SWINE
SUBJECT MATTER: AFRICAN SWINE FEVER (ASF)/CLASSICAL SWINE FEVER SURVEILLANCE PROGRAM AND TISSUES FOR OFFICIAL ASF TESTING IN NATIONAL ANIMAL HEALTH LABORATORY NETWORK LABORATORIES
BACKGROUND INFORMATION:
African and Classical swine fever (ASF and CSF) viruses are infectious diseases of pigs and spread readily in pig populations. Neither ASF or CSF are zoonotic diseases and do not affect people. The different ASF and CSF virus genotypes vary in virulence from highly pathogenic strains that cause near 100% mortality, to low virulence strains believed to cause carrier states that can be difficult to diagnose. Clinical signs of ASF and CSF viruses in infected swine are often indistinguishable from any number of other systemic diseases endemic to United States (US) swine.

The recent emergence and ongoing spread of ASF among wild, non-commercial, and commercial pig populations in a growing number of countries presents a substantial risk to swine health and pork production globally. CSF continues to infect pigs in the Caribbean and Japan, as well as several other countries. In the event of an introduction of ASF or CSF into the US, early detection would be paramount to an effective response and recovery effort. Effective and real-time surveillance strategies that utilize state of the art diagnostic technologies are critical components of Foreign Animal Disease (FAD) preparedness.

In recognition of the above, on June 1, 2019, the United States Department of Agriculture (USDA) implemented an active ASF Surveillance Program at USDA, National Animal Health Laboratory Network (NAHLN)
laboratories that supplemented an already existing CSF surveillance program. This program tests case-compatible diagnostic lab submissions for the presence/absence of ASF and CSF via a real-time polymerase chain reaction (PCR). This is a tremendous step forward in enhancing ASF and CSF surveillance efforts in US swine. Long-term sustainability and efficiency of this ASF/CSF Surveillance Program and the continuous improvement of all FAD diagnostic capabilities and surveillance efforts at the USDA, NAHLN laboratories is of utmost importance to US pork industry stakeholders.

Pooling tissue samples for real-time PCR testing is a common practice used in group, premises, or herd level diagnostic investigations of swine. Pooling of tissue samples (spleen, lymph node, or tonsil) enhances the cost effectiveness and sustainability of surveillance programs and increases the number of case-compatible submissions that can be tested with the finite amount of funding available.

Some swine facilities do not have a Premises Identification Number (PIN) (e.g., non-commercial or infrequent submitters to veterinary diagnostic laboratories). While the goal remains for all producers to have a PIN, removing the requirement for a PIN on laboratory accessions would expand the breadth and reach of this surveillance program to be more inclusive of case-compatible veterinary diagnostic laboratory submissions from all swine operations.

RESOLUTION:

The United States Animal Health Association urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS) to validate and approve the items listed below. Collectively, these efforts aim to enhance the cost-effectiveness, sustainability, and breadth of coverage provided by the African Swine Fever (ASF)/Classical Swine Fever (CSF) Surveillance Program.

The USDA, APHIS ASF/CSF Surveillance Program at USDA, National Animal Health Laboratory Network (NAHLN) laboratories shall:

• Validate methods and implement a provision for using pooled samples for ASF/CSF polymerase chain reaction testing from case-compatible diagnostic case submissions, and
• Revise the premises identification number requirement so as not to exclude cases from the ASF/CSF Surveillance Program, provided traceability of the sample is assured.

Foreign animal disease (FAD) diagnostic capabilities and capacities at USDA, NAHLN laboratories shall:

• Continue to expand the number of ante-mortem sample types (e.g., oral fluids, processing fluids, swabs, serum) approved for FAD diagnostic testing that are well suited for herd level detection and high-throughput test methods at veterinary diagnostic laboratories, and
• Expand the number of assays, testing methodologies (nucleic acid and antibody detection, and sequencing analysis) and reagent supplier
options approved for FAD diagnostic testing conducted at USDA, APHIS, NAHLN laboratories.

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RESOLUTION NUMBER: 5, 17, and 31 Combined APPROVED AS AMENDED
SOURCE: COMMITTEE ON ANIMAL EMERGENCY MANAGEMENT COMMITTEE ON SWINE COMMITTEE ON CATTLE AND BISON
SUBJECT MATTER: ADEQUATE FUNDING FOR NATIONAL ANIMAL VACCINE AND VETERINARY COUNTERMEASURES BANK
BACKGROUND INFORMATION:
The 2018 Farm Bill under section 12101 Animal Disease Prevention and Management:

1. Established the National Animal Disease Preparedness and Response Program (NADPRP), which allows the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service to enter into cooperative agreements with states, universities, industry, and other entities on projects and research to advance animal health.

2. Established the National Animal Vaccine and Veterinary Countermeasures Bank (NAVVCB) to maintain sufficient quantities of vaccine and other countermeasures to help to address an outbreak of foot-and-mouth disease (FMD) or other high consequence foreign animal disease.

3. Reauthorized the National Animal Health Laboratory Network (NAHLN) with authorized appropriations of $30 million per year. Funding for the first four years ($120 million) is provided up front as no-year money.

NADPRP (1 above) must receive a minimum of $5 million for the first four years (of the $120 million) and $18 million (of the $30 million) annually, thereafter ($38 million of the total $150 million).

Of the remaining $112 million in 2018 Farm Bill funding not required to be spent on NADPRP, monies may be dedicated to the NAVVCB (2 above) to provide a robust vaccine and countermeasures bank with priority given to FMD response capabilities and to support diagnostic capabilities through the NAHLN.

Response to a Foreign Animal Disease (FAD) often includes mass depopulation of animals, but the USDA FAD PReP plan for FMD is contingent on vaccination for all but the smallest, localized outbreak. The United States (US) currently does not have access to enough FMD vaccine to handle more than a very small, localized disease event. Worldwide vaccine production is limited, and there is no surge capacity to produce the millions of doses needed to address a large-scale outbreak in the US. The
cumulative impact of an outbreak on the beef and pork sectors over a 10-year period would be more than $128 billion. The annual jobs impact of such reduction in industry revenue is 58,066 in direct employment and 153,876 in total employment. Corn and soybean farmers would lose $44 billion and nearly $25 billion, respectively, making the impact on these four industries alone almost $200 billion. A workable FMD vaccine bank can minimize the impact on the US economy and reduce government costs of a catastrophic FMD outbreak in the US.

RESOLUTION:

The United States Animal Health Association (USAHA) urges the United States Department of Agriculture (USDA) and State Animal Health Authorities to support a total of $92 million for the National Animal Vaccine and Veterinary Countermeasures Bank (NAVVCB), with a minimum of $20 million for each of the first four years and $12 million in the fifth year, of the funding established in the 2018 Farm Bill to provide adequate number of doses of foot-and-mouth disease vaccine and surge capacity. This $92 million for NAVVCB is to include a reasonable stockpile of foreign animal disease testing kits/reagents needed for outbreak response.

Additionally, the 2018 Farm Bill prevention funding the National Animal Disease Preparedness and Response Program (NADPRP) should not be used to fund current USDA, Animal and Plant Health Inspection Service (APHIS) activities with the states nor should it inhibit full appropriation of the National Animal Health Laboratory Network laboratory authorization within USDA, National Institute of Food and Agriculture, Food and Agriculture Defense Initiative and APHIS budgets.

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RESOLUTION NUMBER: 6 APPROVED
SOURCE: COMMITTEE ON ANIMAL EMERGENCY MANAGEMENT
SUBJECT MATTER: AMERICAN VETERINARY MEDICAL ASSOCIATION VETERINARY RESPONDER CERTIFICATION PROGRAM
BACKGROUND INFORMATION:

Veterinary health care teams are uniquely positioned to be critical resources in animal disaster preparedness, response, and recovery. Unfortunately, veterinarians traditionally receive little to no awareness or training in disaster issues during their formal years of schooling. Veterinarians need to receive information on how they, and their health care teams, can be better local, state, and regional resources for animals affected by disasters.

There are several schools/colleges of veterinary medicine that have begun incorporating veterinary disaster training in their curriculum in some manner. Establishing nationally recognized core competencies for this student training will facilitate a credentialing process for graduating veterinarians. This will enable state and local response organizations to strengthen veterinary participation in local disaster planning and response.
A similar process should be developed for training graduate veterinarians who did not receive the core curriculum during their veterinary schooling.

RESOLUTION:
The United States Animal Health Association urges the American Veterinary Medical Association to develop a Veterinary Responder Certification Program in coordination with schools/colleges of veterinary medicine and other veterinary educational providers. The program should certify various levels of competency for veterinary medical emergency/disaster responders, and provide state and local response organizations a baseline for credentialing veterinary responders.

RESOLUTION NUMBER: 7 and 36 Combined APPROVED AS AMENDED

SOURCE: COMMITTEE ON ANIMAL EMERGENCY MANAGEMENT

SUBJECT MATTER: STRENGTHENING THE UNITED STATES ANIMAL DISEASE TRACEABILITY AND DISEASE PREVENTION INFRASTRUCTURE

BACKGROUND INFORMATION:
State Animal Health Officials (SAHO) and livestock industry members work collaboratively with the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) to protect the health of the nation’s livestock, and a comprehensive animal traceability system is critical to this collective mission. While many domestic components of the United States (US) traceability system are robust and successful, the current regulatory framework and practices applicable to livestock moving through US ports of entry allow animals from foreign countries to move throughout the US without traceability or the knowledge of state and federal animal health authorities. These traceability gaps may negatively impact trade and the health of domestic livestock by hampering state and federal animal health officials’ ability to effectively manage a domestic or foreign animal disease outbreak.

Language in Title 9 Code of Federal Regulations § 93.405, Health Certificate for Ruminants, only requires imported sheep and goats moving through US ports of entry to be accompanied by accurate certificates of veterinary inspection. Other livestock species are exempt from this requirement. Lack of minimum traceability standards for all imported species enables livestock to be diverted once in domestic markets without the knowledge of SAHOs. The lack of enforceable regulatory language has also impeded APHIS’ Investigative and Enforcement Services from being able to take action against persons who knowingly import livestock illegally when cases are referred by SAHOs.
Requiring accurate data on movement documents for imported livestock is critical, but appropriate information sharing between federal officials managing livestock movement through US border ports and SAHOs responsible for overseeing the domestic movement of imported livestock is also imperative to ensure comprehensive animal traceability. SAHOs are not always notified in a timely manner of international livestock movement into their states, and federal animal health officials do not consistently share movement paperwork with state offices. This hampers SAHOs’ ability to meet the expectation of federal partners to properly manage the domestic animal disease traceability program and to trace animals in instances of livestock diversion.

The United States Animal Health Association appreciates the work that USDA APHIS VS does to protect domestic livestock health and promote a robust animal traceability system. We are optimistic that USDA APHIS VS’ willingness to pursue timely and reasonable regulatory and practice changes at US border ports will further protect domestic livestock from the risks of imported diseases while minimizing regulatory burdens on trade.

RESOLUTION:
The United States Animal Health Association requests the United States Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services to 1) amend the language in Title 9 Code of Federal Regulations to require that every imported livestock animal travel with an official certificate of veterinary inspection containing comprehensive traceability information, including complete individual official animal identification and accurate consignor and consignee physical addresses; and 2) transmit a copy of the certificate of veterinary inspection to the state animal health official of the animal’s destination state within twenty-four hours of the import.

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RESOLUTION NUMBER: 8  APPROVED
SOURCE: USAHA/AAVLD COMMITTEE ON NAHLN
SUBJECT MATTER: INCLUSION OF BIOSAFETY LEVEL 3 NECROPSY SPACE IN THE PROCESS FOR NATIONAL ANIMAL HEALTH LABORATORY NETWORK LABORATORY PARTICIPATION
BACKGROUND INFORMATION:
The National Animal Health Laboratory Network (NAHLN) supports United States animal agriculture by developing and increasing the capabilities and capacities of a national veterinary diagnostic laboratory network for early detection, rapid response, and appropriate recovery from high-consequence animal diseases.

Beginning in 2016, all laboratories in the NAHLN were transitioned to a new structure with the designations of Levels 1, 2, 3, Affiliate, or Specialty laboratories, as described in the “NAHLN Concept Paper”
The NAHLN Concept Paper describes critical needs and capacities for the various laboratory levels. For example, some Level 1 laboratory responsibilities are:

- Maintain capacity to provide surge testing for disease agents of interest;
- Be fully accredited by the American Association of Veterinary Laboratory Diagnosticians, International Organization for Standardization (ISO) 17025, or by another accrediting body with equivalent standards;
- Have staff members trained in testing procedures and proficiency tested in diseases of interest;
- Have the capability to electronically send diagnostic test results to United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS) databases;
- As requested by the USDA, help other laboratories develop and implement Information Technology (IT) capabilities to permit them to communicate testing results with NAHLN;
- Provide and maintain biosafety level 3 laboratory (BSL3) space adequate for work performed;
- Accept samples that originate from other States affected by disease outbreaks, especially those from Level 2 laboratories;
- Have an acceptable periodic review conducted under the oversight of USDA.

The ongoing approval for state laboratories to participate in the NAHLN is described in the NAHLN document “General Process for NAHLN Approval” (Document # WI-NAHLN-0034.01). Processes include:

- Completion of a laboratory capability and capacity assessment (current capabilities, resources, commitment by State, and other relevant factors), in a standardized format, The “NAHLN Laboratory Matrix”, which is largely based upon the NAHLN needs described in the NAHLN Concept Paper.
- USDA, APHIS and USDA, National Institute of Food and Agriculture review and verify the information provided in the laboratory Self-Assessments, and other pertinent information.
  - The information from this assessment is used to establish NAHLN laboratory network level designation for the next fiscal year (Level 1, Level 2, Level 3, Affiliate, or Specialty).
  - Level 1, 2 and 3 laboratory categorizations are used to decide NAHLN funding levels for infrastructure support based on the laboratory level designation assigned.

In 2020, NAHLN proposes adding BSL3 necropsy capacity and capability to the NAHLN Laboratory Matrix as a new criterion for annual evaluation of
NAHLN laboratory level designation. This new addition does not enhance the mission of the NAHLN for the following reasons:

1. The primary mission of the NAHLN for early detection, rapid response, and appropriate recovery are not enhanced by BSL3 necropsy space in NAHLN laboratories.
   a. Early detection of foreign animal disease (FAD) from field samples of diagnostic unknowns does not require BSL3 necropsy capacity and capability because diagnostic unknowns sent to the laboratory as a potential index case carcass do not yet have laboratory confirmed FAD, therefore, do not require BSL3 necropsy capacity and capability.
   b. Effective and efficient rapid response to FAD does not require BSL3 necropsy capacity and capability, but rather is better accomplished by submitting samples collected in the field then shipped to NAHLN laboratories as samples, not carcasses. This optimizes biosecurity/biosafety of FAD response activities (samples safer to ship or transport to lab than carcasses) and reduces costs of FAD response activities (samples cheaper to ship to lab than carcasses). The practice of shipping samples to NAHLN labs during FAD response has been the normal procedure of the NAHLN since NAHLN inception.
   c. Appropriate recovery from FAD does not require BSL3 necropsy capacity and capability for the reasons state in “b” above and, more practically, because proof of negative testing does not generate carcasses from FAD mortalities.

2. The addition of BSL3 necropsy laboratory capacity and capability to the NAHLN evaluation laboratory matrix may disadvantage Level 2 laboratories from reaching Level 1 status, and may reduce the number of Level 1 laboratories needed for effective implementation of the NAHLN mission.

RESOLUTION:

The American Association of Veterinary Laboratory Diagnosticians and United States Animal Health Association urge the United States Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services and National Animal Health Laboratory Network (NAHLN) to remove Biosafety Level 3 necropsy capacity and capability from the annual NAHLN laboratory evaluation matrix used in the annual process for NAHLN laboratory approval and laboratory level designation.

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RESOLUTION NUMBER: 9 Combined with 4, 15, and 16
SOURCE: USAHA/AAVLD COMMITTEE ON NAHLN
SUBJECT MATTER: AFRICAN SWINE FEVER (ASF)/CLASSICAL SWINE
RESOLUTION NUMBER: 10 APPROVED AS AMENDED
SOURCE: USAHA/AAVLD COMMITTEE ON NAHLN
SUBJECT MATTER: ADEQUATE FUNDING FOR THE NATIONAL ANIMAL HEALTH LABORATORY NETWORK
BACKGROUND INFORMATION:
The 2018 Farm Bill under section 12101 Animal Disease Prevention and Management:
1. Established the National Animal Disease Preparedness and Response Program (NADPRP), which allows the United States Department of Agriculture, Animal and Plant Health Inspection Service to enter into cooperative agreements with states, universities, industry, and other entities on projects and research to advance animal health.
2. Established the National Animal Vaccine and Veterinary Countermeasures Bank (NAVVCB) to maintain sufficient quantities of vaccine and other countermeasures to help to address an outbreak of foot-and-mouth disease (FMD) or other high consequence foreign animal disease
3. Reauthorized the National Animal Health Laboratory Network (NAHLN) with appropriations authorization of $30 million per year. Funding for the first four years ($120 million) is provided up front as no-year money.
   NADPRP (1 above) must receive a minimum of $5 million for the first four years (of the $120 million) and $18 million (of the $30 million) annually, thereafter, ($38 million of the total $150 million).
   The $112 million in 2018 Farm Bill funding not required to be spent on NADPRP was intended to be used to provide additional support for the NAHLN (3 above) with the remainder dedicated to the NAVVCB (2 above) to provide a robust vaccine and countermeasures bank, with priority given to FMD response capabilities.
   The NAHLN is the frontline for detection of a disease event and provides critical support for disease monitoring during the outbreak and certification of a return to disease absence after the outbreak. The NAHLN has never been fully funded ($30 million per year) at the federal level. In addition, availability of adequate test kits/reagents for foreign animal disease (FAD) outbreak response testing has been identified as a critical concern in every FAD tabletop exercise conducted.
RESOLUTION:
The United States Animal Health Association (USAHA) and American Association of Veterinary Laboratory Diagnosticians (AAVLD) urge the United States Department of Agriculture (USDA) to provide at least $5 million from the funding in the 2018 Farm Bill each of the 5 years dedicated as additional support of National Animal Health Laboratory Network (NAHLN) infrastructure and improvements in testing capabilities and capacities.

Additionally, the USAHA and AAVLD urge the USDA to assure that the 2018 Farm Bill prevention funding not be used to replace current funding for USDA, Animal and Plant Health Inspection Service (APHIS) activities with the states nor should it inhibit full appropriation of the NAHLN laboratory authorization within USDA, National Institute of Food and Agriculture, Food and Agriculture Defense Initiative and USDA, APHIS budgets.

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RESOLUTION NUMBER: 11 APPROVED
SOURCE: COMMITTEE ON EQUINE
SUBJECT MATTER: ABNORMAL EQUINE HEALTH EVENTS AT INTERNATIONAL IMPORT QUARANTINE FACILITIES
BACKGROUND INFORMATION:
The recent closure of the United States Department of Agriculture’s (USDA) Miami Animal Import Center, in conjunction with previous disease outbreaks associated with imported equidae, has raised concerns amongst animal health officials and the industry overall. Notably, between November 2018 and April 2019, the USDA identified over 200 sick horses imported from the European Union. Management of imported equidae displaying signs of ill health at an Animal Import Quarantine facility is critical for protecting the health of the United States equine population.

RESOLUTION:
The United States Animal Health Association urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) to take the following actions at all International Animal Import Quarantine Facilities:

1) Develop standard operating procedures for import quarantine facility staff and veterinarians to identify, investigate, document, report, and track cases of abnormal equine health events.

2) Develop a standardized electronic system to consistently and uniformly record details of each abnormal health event which should minimally include vital signs, physical exam findings, and date and time of examination.

3) Identify abnormal health events/parameters in equines and conduct further assessment to classify such as contagious, non-contagious, or other.

4) Adopt a system to accurately evaluate each equine displaying clinical signs of disease, to clinically evaluate each case of a
REPORT OF THE COMMITTEE

potentially infectious disease, to identify the infectious agent, and to determine the possible risk of exposure to other imported equines. Protocols should include diagnostic testing at owner/agent’s expense, based on the syndromic clinical presentation.

5) Notify State Animal Health Officials in both the state of destination and the state in which the equine is currently located of any abnormal equine health events identified and classified as possibly infectious. The notification should include any potentially exposed cohorts with report prior to release from quarantine.

6) Modify VS 17-30 (Report of Animals, Poultry, or Eggs Offered for Importation) such that it documents the potential risk of exposure to infectious disease for any equines associated with the abnormal health event.

7) Develop and implement a compliance agreement between owners/agents and the USDA that includes recommended biosecurity measures for destination premises.

8) Track all abnormal health events for equines being imported into the United States and report such events to equine stakeholders if requested or applicable.

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RESOLUTION NUMBER: 12 APPROVED
SOURCE: COMMITTEE ON EQUINE
SUBJECT MATTER: CONTAGIOUS EQUINE METRITIS IMPORT QUARANTINE PROGRAM STATE REVIEWS
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. The resulting report included comments describing program deficiencies regarding regulatory oversight and accountability.

The USDA’s current method of assessing the infrastructure and relevance of approved state CEM programs remains unclear. Thus, the review team’s report recommended that the USDA’s CEM Coordinator devise a more coherent system of review of states approved for the CEM Import Quarantine Program. To date, no reports of reviews conducted by the USDA regarding current state CEM programs have been received. Furthermore, state CEM coordinators agree that in order to accurately identify CEM carrier stallions, it is crucial that all stallion breedings be observed by regulatory personnel. Deficits in the CEM program could put domestic equine populations at an increased risk of disease and affect the trade status of the United States equine industry; it is imperative to implement credible and measurable means of periodically ensuring that all facilities within approved states conform to and remain compliant with the established standards.
RESOLUTION:

The United States Animal Health Association (USAHA) urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) to conduct on-site visits and reviews of states approved for Contagious Equine Metritis (CEM) import quarantine. The review should include an assessment of the state’s regulatory procedures and processes, including but not limited to direct state or federal oversight of test-breeding of stallions and the standard operating procedures utilized by CEM import quarantine facilities. Furthermore, the USAHA requests that the USDA, APHIS, VS provide a report of state reviews at the annual USAHA Committee on Equine meeting and have this report available to all equine stakeholders.

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RESOLUTION NUMBER: 13 APPROVED
SOURCE: COMMITTEE ON EQUINE
SUBJECT MATTER: EQUINE VIRAL ARTERITIS INTERNATIONAL IMPORT REQUIREMENTS
BACKGROUND INFORMATION:

Equine Viral Arteritis (EVA) has significantly impacted international trade in equidae and equine semen. The import control policies of most countries currently deny entry to carrier stallions and Equine Arteritis Virus (EAV) infective semen because of the associated disease risks. Currently, the United States (US) is the only major equine-breeding country without an import control policy for EVA.

In a serosurvey conducted as part of the United States Department of Agriculture (USDA) National Animal Health Monitoring Systems Equine 1998 study there was a low seroprevalence of EAV infection in most United States equidae as they have never been exposed to the virus. Thus, the vast majority of the US equine population could be considered completely susceptible to natural infection. This was illustrated by the occurrence of a major outbreak of EVA in 2006, primarily in Quarter Horses. The virus spread widely based on shipment of infective semen and dispersal of mares and foals after completion of breeding of mares with infective semen.

The absence of any restrictions on the import of carrier stallions or EAV infective semen into the United States has greatly increased both the likelihood of the virus becoming more widely disseminated in the nation’s equine population and the risk of economically damaging outbreaks of EVA. Importations of EAV carrier stallions and infective semen not only augments the number of carrier stallions in the breeding population at large but also increases the potential for disease outbreaks through the introduction of more highly virulent strains of EAV, previously exotic to the country.
REPORT OF THE COMMITTEE

RESOLUTION:
The United States Animal Health Association urges the United States Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services to develop, implement, and enforce Equine Viral Arteritis import testing requirements pertaining to equine semen and stallions in accordance with the World Organisation for Animal Health (OIE) Code Chapter for Equine Arteritis Virus infection.

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RESOLUTION NUMBER: 14 APPROVED
SOURCE: COMMITTEE ON EQUINE
SUBJECT MATTER: VESICULAR STOMATITIS IMPORT REQUIREMENTS
BACKGROUND INFORMATION:
In light of the recent vesicular stomatitis disease outbreak, the inconsistency of interstate import requirements has been the topic of great interest. In order to protect the equine industry from the introduction of disease, it is essential for State Animal Health Officials (SAHOs) to establish and adhere to adequate and proven import regulations for interstate movement. These requirements should be based on science that considers the risk of disease incursion and the associated economic repercussions. In 2015, when the World Organisation for Animal Health (OIE) delisted Vesicular Stomatitis Virus (VSV), the United States Department of Agriculture utilized science to change VSV response policies. The revised 14-day quarantine reflects the scientific evidence that the virus is contained within the vesicle and does not persist beyond a few days post vesicle rupture. Import requirements including restrictions of equines within prescribed areas, such as a ten-mile radius and VSV testing requirements, have questionable foundations in the science of VSV epidemiology. Lastly, it is important to recognize that equine owners and venue managers can experience undue economic hardship from overly restrictive interstate import requirements that are not based on scientific risk. Furthermore, regulatory uniformity would benefit all concerned parties, including equine owners, accredited veterinarians, equine venue managers, and the United States as a whole.

RESOLUTION:
The United States Animal Health Association urges State Animal Health Officials to modify import requirements related to Vesicular Stomatitis Virus (VSV) to include the use of a timed Certificate of Veterinary Inspection (CVI) as illustrated below. For equine originating from VSV affected states, the CVI should be issued within seven (7) days prior to arrival to the destination. Furthermore, for the purposes of standardization, states are urged to require the following statement on the certificate:

“I have examined all equines identified on this certificate and found them to be free of clinical signs of Vesicular Stomatitis (VS). These equids
have not been exposed to a VS affected animal or VS quarantined premises within the last fourteen (14) days.”

RESOLUTION NUMBER: 15 Combined with 4, 9, and 16
SOURCE: COMMITTEE ON EMERGING AND FOREIGN ANIMAL DISEASES
SUBJECT MATTER: AFRICAN SWINE FEVER (ASF)/CLASSICAL SWINE FEVER SURVEILLANCE PROGRAM AND TISSUES FOR OFFICIAL ASF TESTING IN NATIONAL ANIMAL HEALTH LABORATORY NETWORK LABORATORIES

RESOLUTION NUMBER: 16 Combined with 4, 9, and 15
SOURCE: COMMITTEE ON EMERGING AND FOREIGN ANIMAL DISEASES
SUBJECT MATTER: AFRICAN SWINE FEVER (ASF)/CLASSICAL SWINE FEVER SURVEILLANCE PROGRAM AND TISSUES FOR OFFICIAL ASF TESTING IN NATIONAL ANIMAL HEALTH LABORATORY NETWORK LABORATORIES

RESOLUTION NUMBER: 17 Combined with 5 and 31
SOURCE: COMMITTEE ON TRANSMISSIBLE DISEASES OF SWINE
SUBJECT MATTER: ADEQUATE FUNDING FOR NATIONAL ANIMAL VACCINE AND VETERINARY COUNTERMEASURES BANK

RESOLUTION NUMBER: 18 APPROVED
SOURCE: COMMITTEE ON SWINE
SUBJECT MATTER: VALID SAMPLING METHODS AND PROTOCOLS FOR FEED AND FEED INPUTS

BACKGROUND INFORMATION:
The incursion of foot and mouth disease virus (FMDV), classical swine fever virus (CSFV), and African swine fever virus (ASFV) into the United States (US) would result in the immediate loss of export markets for live swine, pork, and pork products. A Center for Agricultural and Rural Development (CARD), Food and Agricultural Policy Research Institute (FAPRI) study led by Dr. Dermot Hayes, economist at Iowa State University, estimated that in the first year of an ASF outbreak in the United States
revenue loss by commodity would be $8 billion for pork, $4 billion for corn and $1.5 billion for soybeans.

Peer-reviewed research has demonstrated survival of ASFV and other swine diseases in animal feed ingredients and ASFV transmission in feed. To better understand and address the risk of pathogen introduction through feed, the US pork industry has helped convene a feed risk task force that includes industry stakeholders, the United States Department of Agriculture and the Food and Drug Administration. The task force has identified gaps in knowledge and subsequent research needs that include the development of diagnostic testing capability for feed and feed ingredients and the development of a response plan that will support feed ingredient monitoring for foreign animal disease contamination. Research to address these gaps has been funded by the Swine Health Information Center and the National Pork Board. It is expected that the research results will provide information that will help in the development of valid sampling methods and protocols for foreign feed and feed inputs.


RESOLUTION:

The United States Animal Health Association urges the Food and Drug Administration, Center for Veterinary Medicine and United States Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services to work with the United States (US) pork industry to develop valid sampling methods and protocols to detect pathogens in foreign feed and feed inputs that can be applied at the point of embarkation to the US or upon arrival at the port of entry.

RESOLUTION NUMBER: 19  APPROVED
SOURCE: COMMITTEE ON SWINE
SUBJECT MATTER: EFFICIENT DIAGNOSTIC SAMPLE VALIDATION AND APPROVAL FOR FOREIGN ANIMAL DISEASES OF SWINE
BACKGROUND INFORMATION:

Swine oral fluids have been used extensively for disease surveillance in swine populations1 and pen-based oral fluid samples improves detection over single-animal testing2. Since 2011, the Pork Checkoff has funded 9 research studies related to assay development, diagnostic performance, and validation of swine oral fluids for foreign animal diseases. The United States
Department of Agriculture (USDA), Animal and Plant Health Inspection Services, Veterinary Services has completed a series of swine oral fluid validation research projects and is currently working on a study looking at pen sensitivity. The Swine Health Information Center, through a USDA Foreign Agricultural Service grant, will fund research into field validation of swine oral fluids for African swine fever (ASF). Research into other aggregate samples types have been funded by the Pork Checkoff to validate meat juice for the detection of antigen and antibody for ASF. Swine processing fluids are gathering more interest as an aggregate sample collected during tail docking and castration to monitor for endemic diseases, and it is anticipated that research will be funded to evaluate this sample type for foreign animal disease (FAD) detection. It is important as the pork industry evolves and adopts aggregate sampling that these sample types are validated and approved by USDA for FAD surveillance prior to and after an FAD outbreak.


RESOLUTION:

The United States Animal Health Association urges the United States Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services to work with United States pork industry to validate and approve swine oral fluids, swine processing fluids, and meat juice for detection of antigen and antibody for classical swine fever, African swine fever and foot and mouth disease.

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RESOLUTION NUMBER: 20 APPROVED

SOURCE: COMMITTEE ON SWINE

SUBJECT MATTER: FOREIGN ANIMAL DISEASE PREVENTION

BACKGROUND INFORMATION:

The incursion of foot and mouth disease virus (FMDV), classical swine fever virus (CSFV), and African swine fever virus (ASFV) into the United States (US) would result in the immediate loss of export markets for live swine, pork, and pork products. A Center for Agricultural and Rural Development (CARD), Food and Agricultural Policy Research Institute (FAPRI) study led by Dr. Dermot Hayes, economist at Iowa State University,
estimated that in the first year of an African swine fever (ASF) outbreak in the US revenue loss by commodity would be $8 billion for pork, $4 billion for corn and $1.5 billion for soybeans. According to Dr. Hayes, it would take over 10 years after an ASF outbreak for these impacted commodities to approach pre-outbreak commodity prices. Based on the same study, estimates for revenue losses were similar for FMDV and CSFV.

The increase in global prevalence of ASFV elevates the current risk for introduction of a foreign animal disease (FAD) of swine through ports of entry into the US by international travelers and visitors returning from ASFV, or other FAD, positive regions who have had exposure to farms, livestock, wet markets, laboratories, or harvest facilities. This risk also includes travelers entering the US that are carrying non-US origin meat and meat products on their person, carry-on, and checked luggage or parcels. Screening of travelers and interdiction and destruction of meat and meat products is critical to protecting US animal agriculture. While the Department of Homeland Security (DHS), US Customs and Border Protection (CBP) works to address the risk, more could and should be done to understand risk, educate passengers, and screen travelers entering the US at all ports of entry.

RESOLUTION:

The United States Animal Health Association (USAHA) urges the Department of Homeland Security (DHS), United States Customs and Border Protection (CBP) to 1) on a quarterly basis, provide interdiction metrics to pork industry representatives, 2) work with the foot-and-mouth disease (FMD) Cross-Species Team to develop education designed to increase awareness for passengers that are in transit from foreign ports into the United States (US) on the importance of protecting agriculture and being truthful on the US Customs Declaration form, 3) work with the FMD Cross-Species Team to develop biosecurity education for travelers diverted for secondary screening after declaring they have been on a farm or in contact with animals in a foreign animal disease positive nation, and 4) modify the US Customs Declaration form to include language regarding a traveler’s proximity to packing and processing plants, live and/or wet markets, research facilities, laboratories, or any other location where there is a likelihood that cross-contamination could occur directly or indirectly between the traveler and animals, fresh animal products, or animal excretions.

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RESOLUTION NUMBER: 21 APPROVED
SOURCE: COMMITTEE ON SWINE
SUBJECT MATTER: EVALUATING AND RECOGNIZING COMPARTMENTS
BACKGROUND INFORMATION:
In April 2018 the United States Department of Agriculture’s (USDA), Animal and Plant Health and Inspection Service (APHIS) notified stakeholders that the agency is proposing criteria that will be used to evaluate and recognize livestock compartments in other countries. In this announcement APHIS proposes that the evaluation criteria for compartmentalization will be similar to what the agency already uses for regionalization requests with a few differences. The information gathered from the evaluation of the proposed criteria, combined with site visits from agency personnel, would allow “APHIS to determine whether the animals within the compartment are managed in a way that keeps them distinct and separate from other animal populations within the country”.

Prior to China’s report of African swine fever (ASF) in August 2018, the United States (US) pork industry had been heavily engaged in the development of the Secure Pork Supply (SPS) Plan, a business continuity plan for pork producers. The plan incorporates principles specific to compartmentalization and could serve as a mechanism for implementing compartmentalization plans for the pork industry in the event of an outbreak of a foreign animal disease. Since August 2018, the US pork industry has stood up multiple groups that are addressing ASF prevention, response and business continuity. Better understanding of compartmentalization has been a common theme among these groups. An open frank dialogue between industry and federal animal health officials regarding compartmentalization, the proposed criteria, and how compartments are evaluated and recognized would be beneficial.

RESOLUTION:

The United States Animal Health Association urges the United States Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services to host a meeting with the United States pork industry and State Animal Health Officials to discuss the proposed criteria that will be used to evaluate and recognize livestock/livestock products compartments domestically and internationally.

RESOLUTION NUMBER: 22  APPROVED
SOURCE: COMMITTEE ON SWINE
SUBJECT MATTER: STOP MOVEMENT – CRITERIA FOR IMPLEMENTING AND RELEASING
BACKGROUND INFORMATION:

In 2018 and 2019, at the request of the United States pork industry, the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) National Training and Exercise Program (NTEP) hosted a series of four exercises to improve preparedness and response to African swine fever (ASF). The pork industry appreciates USDA, APHIS, VS prioritizing these exercises which were
viewed by the industry as positive experiences that highlighted gaps to be addressed cooperatively by industry and state and federal animal health officials. One gap identified by these exercises is the need for specific criteria for implementing and releasing a national 72 hour stop movement ban. The United States pork industry is concerned that in the face of an ASF outbreak there is no agreed upon criteria for re-starting swine movements once a 72 hour movement ban is implemented. This lack of criteria will result in the extension of a national movement ban past 72 hours resulting in severe welfare and business ramifications over and above the impacts of the disease itself on production. For the swine industry that moves over a million pigs on any given day to harvest and for production purposes, it is important that industry, state and federal animal health officials undertake a cooperative approach to develop the criteria for releasing movement bans.

RESOLUTION:
The United States Animal Health Association urges the United States Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services to work with the United States pork industry and state animal health officials to develop criteria for implementing and releasing national movement standstills due to the occurrence of a trade and commerce limiting foreign animal disease of swine.

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RESOLUTION NUMBER: 23 POSTPONED INDEFINITELY
SOURCE: COMMITTEE ON SWINE
SUBJECT MATTER: GARBAGE FEEDING
BACKGROUND INFORMATION:
The increase in the prevalence of African swine fever (ASF) in the European Union and Asia, combined with the increase in travel between the United States (US) and ASF positive countries and the constant threat of unlawful entry and distribution of prohibited and non-compliant meat and meat products continues to put the US pork industry at risk for the introduction of ASF, especially through garbage feeding. The Swine Health Protection Act (SHPA) is essential to reducing the risk of disease introduction through garbage waste feeding by ensuring that premises that feed waste or garbage containing meat or meat products to swine are licensed, inspected, and tested as part of a high-risk stream for foreign animal disease surveillance. The SHPA is also critical for identifying unlicensed facilities which present a greater risk to the swine industry due to the lack of monitoring to assure disease mitigation.

According to a presentation given to the American Association of Swine Veterinarian’s Committee on Transboundary and Emerging Diseases in March 2019 by the United States Department of Agriculture, 28 states, along with Puerto Rico and the US Virgin Islands, permit garbage feeding of swine.
At the end of FY 2018, there were 1073 licensed garbage feeders. Two hundred forty-four of those feeders are located in the continental US with the balance located in Puerto Rico, US Virgin Islands, and Hawaii. The 244 herds represent 0.41% of the estimated 60,000 pork producers. During 2018, over 4,000 routine garbage feeding inspections occurred resulting in a total of 100 violations, 82 corrections, and 5 referrals to enforcement. In conjunction, a total of 3,500 searches identified 54 operations illegally feeding garbage with 23 new feeders being licensed.

In February 2019, the Pork Checkoff’s Swine Health Committee formed an African swine fever task force (ASF TF) made up of Checkoff-paying pork producers to focus on the prevention of ASF introduction to the US. One of the major concerns of the ASF TF is the role that garbage feeding has played in the spread of ASF in Asia and that the practice, while regulated, occurs in the US. Based on the risk factors listed above, combined with lack of compliance on risk mitigations required by the SHPA, it is the opinion of the ASF TF that garbage feeding is not an acceptable practice and should be banned in the US.

RESOLUTION: The United States Animal Health Association urges the United States Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services and the National Assembly of State Animal Health Officials to work cooperatively to prohibit the feeding of waste or garbage containing meat or meat products to swine in all United States’ states and Territories and continue to rigorously enforce the Swine Health Protection Act until such time the ban can be instituted.

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RESOLUTION: 24 APPROVED
SOURCE: COMMITTEE ON WILDLIFE
SUBJECT MATTER: CHRONIC WASTING DISEASE AMPLIFICATION ASSAY APPROVAL
BACKGROUND INFORMATION: There are currently two official tests approved by the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) for chronic wasting disease (CWD) diagnostics: immunohistochemistry (IHC) and enzyme-linked immunosorbent assay (ELISA).

Early detection of CWD is critical for wild, farmed, and captive cervid disease management. Tests that can detect prions earlier in the course of infection than those currently available would enhance intervention and could potentially lead to better outcomes. Additionally, tests that are more sensitive and could potentially be used with other tissues and biofluids, such as those from live or hunter-collected carcasses, would be extremely useful.
These tests, known as amplification assays, are used in human diagnostics at present. Several federal and university laboratories have been using real-time quaking induced conversion (RT-QuIC) and protein misfolding cyclic amplification (PMCA) for influential CWD research. These assays have advanced our knowledge of disease pathogenesis and prion shedding.

Despite their documented increased sensitivity, these assays have not been evaluated by the USDA, APHIS, VS, National Veterinary Services Laboratory or Agricultural Research Services for approval to be used by National Animal Health Laboratory Network and state veterinary diagnostic laboratories. A recent survey of diagnostic laboratories with current IHC or ELISA capabilities indicated an overwhelming willingness to use the RT-QuIC platform if it was approved by USDA.

RESOLUTION:

The United States Animal Health Association urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS) to evaluate the utility of real-time quaking induced conversion (RT-QuIC) as an official test for Chronic Wasting Disease (CWD). If this CWD test demonstrates acceptable sensitivity and specificity, we urge USDA to approve the assay to be used by the National Veterinary Services Laboratory and National Animal Health Laboratory Network approved veterinary diagnostic labs. We encourage USDA, APHIS to work with the United States Department of the Interior United States Geological Survey to determine an appropriate source of recombinant prion protein for use in RT-QuIC assays that will be provided to approved NAHLN labs at a minimum cost.

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RESOLUTION: 25 APPROVED
SOURCE: COMMITTEE ON WILDLIFE
SUBJECT MATTER: SUPPORT FOR UPDATING THE UNITED STATES GEOLOGICAL SURVEY NATIONAL WILDLIFE HEALTH CENTER LABORATORY FACILITIES
BACKGROUND INFORMATION:

The United States Geological Survey (USGS), National Wildlife Health Center (NWHC), located in Madison, Wisconsin, is the only federal Biological Safety Level-3 (BSL-3) facility dedicated exclusively to scientific investigation and research on wildlife diseases that may threaten human, animal, and environmental health. The NWHC is an affiliate National Animal Health Laboratory Network (NAHLN) laboratory and is a World Organisation for Animal Health (OIE) Collaborating Centre for Wildlife Health and Biodiversity. It is designated by the United States (US) Department of the Interior (DOI) as a USGS “mission essential” facility and is registered with and inspected by
the Centers for Disease Control and Prevention (CDC) and US Department of Agriculture (USDA) Federal Select Agent Program (FSAP). Built in approximately 1960, the NWHC is reaching the end of its usable life despite being well-maintained. The facility requires replacement and modernization to meet current standards for a modern high-level biocontainment facility working with high consequence pathogens and select agents (pathogens with potential to be weaponized against humans or livestock). If not replaced within the next 5-10 years, the laboratory and DOI may lose the ability to conduct nationally and internationally important work on detecting, characterizing, monitoring, preventing, and controlling wildlife diseases, many of which also involve livestock or humans.

The NWHC has conducted three master or concept plans and business case analyses to explore the most feasible, cost-effective and least disruptive option for modernization, including comparing renovation versus new construction, owned versus leased facilities, and options for relocation. All studies have indicated that new construction on the current site is the most cost-effective option that minimizes disruption to continuity of operations.

The NWHC supports the mission of the United States Animal Health Association and its members by conducting surveillance for high consequence pathogens in wildlife, many of which also infect domestic animals, or impact human or livestock health. The NWHC is a significant resource for wildlife agencies in the US and globally, supporting wildlife disease outbreak investigations and providing important tools and technology that assist with the management of diseases in wildlife populations. Recently, the NWHC has contributed to the understanding of diseases such as white nose syndrome, *Batrachochytrium salamandrivors* (Bsal), and snake fungal disease. With ever increasing concerns over emerging, reemerging, and transboundary diseases, the demands on the NWHC facility and staff can be expected to increase.

**RESOLUTION:**

The United States Animal Health Association urges the United States Department of the Interior to prioritize the identification of resources and methods to modernize the facilities at the United States Geological Survey, National Wildlife Health Center in order to protect wildlife, livestock, and public health.

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**RESOLUTION NUMBER: 26 APPROVED**

**SOURCE:** COMMITTEE ON SHEEP, GOATS AND CAMELIDS

**SUBJECT MATTER:** NEED FOR ONGOING SCRAPIE RESEARCH

**BACKGROUND INFORMATION:**

While the National Scrapie Eradication Program (NSEP) has been successful in decreasing the prevalence of scrapie in the United States, eradication of scrapie has not yet been achieved. With all disease eradication programs, as prevalence of the disease declines, the ability to identify the
remaining cases becomes an ever greater challenge. With the 2019 publication of the NSEP standards, continued discovery of unique features of goat scrapie, improved live animal diagnostics and understanding of nonclassical scrapie are needed to achieve scrapie eradication.

We appreciate that scrapie program leaders have incorporated scientific discovery into pilot projects and the evolution of eradication program standards. Scrapie research continues to be valuable in efforts toward scrapie eradication. Research on the genetics of scrapie susceptibility/resistance in sheep and goats, differences in clinical signs and incubation periods in sheep and goats and live animal diagnostics are of continued importance. Research on the identification, diagnosis and epidemiology of nonclassical scrapie is also vital to achieving eradication of classical scrapie in the United States. Given the long incubation period of the disease, scrapie research requires multi-year commitment to carry out research on the epidemiology and pathogenesis of scrapie infection.

RESOLUTION:

The United States Animal Health Association urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service, Veterinary Services and the USDA, Agricultural Research Service to work together to continue research into the pathogenesis, clinical signs, diagnosis and genetic resistance to disease of scrapie in sheep and goats, and validate and implement new approaches into the National Scrapie Eradication Program.

RESOLUTION NUMBER: 27  APPROVED
SOURCE: COMMITTEE ON SHEEP, GOATS AND CAMELIDS
SUBJECT MATTER: Q-FEVER (COXIELLA BURNETII) VACCINE
BACKGROUND INFORMATION:

Q-Fever is a zoonotic disease caused by the bacterium Coxiella burnetii. Coxiella infection is found in many species in many countries of the world, including the United States (US). 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 large-scale 2005-2011 Q-fever epidemic (human and goat) in the Netherlands.

Currently there is no vaccine available in the US to prevent Coxiella burnetii 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 burnetii in the US 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 burnetii*.

The United States Animal Health Association approved Resolutions on this matter in 2013 and 2014. Despite willingness of United States Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services, Center for Veterinary Biologics to work with companies to approve vaccines in the US, no companies have come forward requesting approval and challenges remain for approval of import of effective vaccines, especially given the select agent listing of this agent, which requires Biological Safety Level (BSL)-3 facilities for research. Continued work toward import of vaccines as well as development of strategies for domestic production of *Coxiella burnetii* vaccines which would prevent the disease as well as the shedding of the organism are vital to reducing the impact of Coxiella infections in animals and man through a One Health approach. There is a need for development of animal models of placental accumulation and shedding of *C. burnetii* to facilitate rapid screening and testing of vaccine candidates. Specifically, we recognize the need for the construction of a mouse model of placental accumulation utilizing BSL-2-approved Nine Mile phase II clone 4 (RSA 439) *C. burnetii* to facilitate rapid screening of vaccine and treatment candidates in low cost environment. These will support the development of a full virulence (phase I) model of *C. burnetii* placental accumulation and shedding to test vaccine and treatment candidates in preparation for efficacy testing in ruminant livestock.

**RESOLUTION:**

The United States Animal Health Association (USAHA) encourages the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service, Veterinary Services, Center for Veterinary Biologics to continue to work to facilitate the licensure or importation of a safe and effective Q-Fever (*Coxiella burnetii*) vaccine for sheep and goats.

In addition, USAHA urges the USDA, Agricultural Research Service (ARS) to continue development of research models that could lead to the development of vaccines in the United States; the development of tests for accumulation and shedding of *Coxiella burnetii*; and identification of genetic tools for improved control of Coxiella infections, including reduced shedding. USDA-ARS should pursue vaccine candidates that can be cost-effectively produced in a Biological Safety Level-2 facility.

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**RESOLUTION NUMBER: 28 APPROVED**

**SOURCE:** COMMITTEE ON SHEEP, GOATS AND CAMELIDS

**SUBJECT MATTER:** SCRAPIE ERADICATION PROGRAM–ANIMAL IDENTIFICATION
BACKGROUND INFORMATION:
The National Scrapie Eradication Program (NSEP) relies greatly on owner compliance to identify their animals as they leave the farm for exhibition or sales. No-cost official ear tags have greatly encouraged identification (ID) and thus encourage producer premises registration in the scrapie database and program compliance. There have been a multitude of problems noted with the use of official metal program tags such as infection, poor retention, difficulty in accurately recording the numbers, and safety hazards when shearing. With the publication of the interstate movement rule which requires the same ID requirements of goats as currently exist for sheep, the next few years are critical in encouraging goat and sheep producer compliance regarding ID and tagging. The industries feel strongly that, at a minimum, the provision of a limited number of no-cost official plastic tags will incentivize new goat and sheep producer compliance. In addition, the industries do not want to compromise the NSEP that has been built over the past 18 years at an expense of more than $260 million.

RESOLUTION:
The United States Animal Health Association (USAHA) urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS) to continue to provide, at a minimum, a limited number of no-cost official plastic tags to producers enrolling in the National Scrapie Eradication Program for the first time. USDA, APHIS would provide the no-cost ear tags, but producers would be responsible for acquiring an applicator. Further, USAHA urges USDA, APHIS to continue to provide no-cost tags to markets and dealers.

RESOLUTION NUMBER: 29 APPROVED
SOURCE: COMMITTEE ON POULTRY AND OTHER AVIAN SPECIES
SUBJECT MATTER: H5/H7 LOW PATHOGENIC AVIAN INFLUENZA RESPONSE

BACKGROUND INFORMATION:
The National Poultry Improvement Plan (NPIP) is the federal government’s poultry disease control program administered in cooperation with state animal health officials and poultry producers. The General Conference Committee (GCC) of the NPIP is the official federal advisory committee to the Unites States Secretary of Agriculture on matters pertaining to poultry health. Among other duties, the GCC is responsible for advising and making recommendations to the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) regarding adequate funding of NPIP. These funds are necessary for proper administration of NPIP provisions. The NPIP senior coordinator also advises USDA, APHIS with respect to administrative
NOMINATIONS AND RESOLUTIONS

procedures and interpretations of the NPIP Provisions as contained in Title 9
Code of Federal Regulations, and to serve as a direct liaison between the
NPIP and the United States Animal Health Association.

In 2002, H7N2 low pathogenic avian influenza (LPAI) was identified in
North Carolina, Virginia, and West Virginia, costing producers hundreds of
millions of dollars. A surveillance program was not in place to detect the
potential spread of avian influenza (AI). In response, the NPIP LPAI program
was created to provide an incentive for regular AI surveillance and to protect
poultry producers through indemnification and compensation should H5/H7
LPAI be found.

Avian influenza remains a concern for poultry producers in the United
States with the H5N2 highly pathogenic avian influenza (HPAI) outbreak in 23
states in 2014–2015; H7N8 HPAI/LPAI in Indiana in 2016, H5N2 LPAI in
Wisconsin in 2017, and H7N9 HPAI/LPAI in Tennessee, Alabama, Kentucky,
and Georgia in 2017, H7N3 LPAI in California in 2018, and H5N2 LPAI in
Minnesota in 2018. The NPIP is the only federal program responsible for
H5/H7 LPAI surveillance, response, and containment activities. HPAI flocks
are fully indemnified and compensated by USDA, APHIS, VS; however,
indemnity and compensation for H5/H7 LPAI flocks by VS is often not certain.
Disruption of indemnity and compensation for H5/H7 LPAI can result in loss of
confidence and trust, and could potentially create a harmful impact on future
responses to H5/H7 LPAI. This loss of confidence and trust discourages
poultry producers (commercial operations, independent growers, and small
cocks) from fully complying with NPIP testing programs and cooperating with
state and federal regulatory authorities, potentially risking the industry’s
significant international trade. Without dedicated funding for LPAI indemnity
and compensation, there is limited incentive for producers to participate in
the highly successful voluntary NPIP programs.

RESOLUTION:

The United States Animal Health Association requests that the 116th
United States Congress appropriate new, no-year, mandatory fiscal
appropriations dedicated for low pathogenic avian influenza (LPAI) indemnity
and compensation to ensure continued participation in National Poultry
Improvement Plan H5/H7 LPAI programs. This new appropriation will support
the United States Department of Agriculture, Animal and Plant Health
Inspection Service, Veterinary Services’ effort to provide a stable indemnity
and compensation program for H5/H7 LPAI flocks.

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RESOLUTION NUMBER: 30 APPROVED
SOURCE: COMMITTEE ON POULTRY AND OTHER AVIAN SPECIES
SUBJECT MATTER: NATIONAL POULTRY IMPROVEMENT PLAN
STAFFING
BACKGROUND INFORMATION:
The United States Department of Agriculture, Animal and Plant Health Inspection Service, National Poultry Improvement Plan (NPIP) is the federal government’s poultry disease control program administered in cooperation with state animal health officials and poultry producers. Currently, out of a national staff of five, there are three scientific positions in the NPIP and two of these are vacant. The NPIP Senior Coordinator position is filled, but the Compartmentalization Veterinary Medical Officer and the NPIP Authorized Laboratory Coordinator positions remain vacant.

Since its origins in 1935, the NPIP has grown tremendously due to its long history of success. The effectiveness of the program’s unique industry-driven structure has made it the home for controlling diseases far beyond what the program creators envisioned. As we saw following the Highly Pathogenic Avian Influenza outbreak in 2015-17, the multibillion-dollar United States poultry industry relies on the NPIP to monitor and respond to many of the most impactful diseases of poultry that negatively impact the poultry and product movement regionally and internationally. The role of these positions is vital.

Recently, the NPIP has expanded to include: shifting from oversight of hatchery and breeder monitoring to oversight of the entire commercial poultry industry for avian influenza; compartmentalization; expansion of laboratory workshops; and the newly mandated biosecurity audits. These programs along with the 2020 NPIP Biennial Conference magnify the impact of these vacancies. For the continued success of the program there is an urgent need to bring the NPIP office to full capacity.

RESOLUTION:

The United States Animal Health Association requests that the United States Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services expedite the process to hire the best qualified Compartmentalization Veterinary Medical Officer and the National Poultry Improvement Plan (NPIP) Authorized Laboratory Coordinator for the positions located at the NPIP office.

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RESOLUTION: 31 Combined with 5 and 17
SOURCE: COMMITTEE ON CATTLE AND BISON
SUBJECT MATTER: ADEQUATE FUNDING FOR NATIONAL ANIMAL VACCINE AND VETERINARY COUNTERMEASURES BANK

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RESOLUTION NUMBER: 32 APPROVED
SOURCE: COMMITTEE ON CATTLE AND BISON
SUBJECT MATTER: REMOVAL OF SELECT AGENT STATUS FOR
BRUCELLA SPECIES
BACKGROUND INFORMATION:

In order to protect the nation from terrorist attacks, select agent regulations restrict possession, transfer, and use of select agents and toxins. The restrictions have been highly effective in limiting access to dangerous agents and toxins by unauthorized individuals. Unfortunately, these same restrictions have limited opportunities for important research on Brucella spp., including *B. abortus*, *B. melitensis*, and *B. suis*. *B. abortus* is a disease endemic in Greater Yellowstone Area (GYA) wildlife, while *B. suis* is endemic in feral swine populations throughout the United States (US), and *B. melitensis* is a foreign animal disease that has successfully been kept out of domestic livestock and wildlife populations in the United States.

A recent paper published by Olsen et al. documents that *Brucella* spp. can be removed from the biological select agent and toxins list based on clinical, biological, and epidemiological properties of the bacteria. In particular, the paper highlights that *Brucella* spp. are readily available in endemic areas, thus easily attained by individuals or groups with nefarious intentions. Previous reports estimating human morbidity and mortality in the event of a *Brucella* bioweapons attack did not adequately consider the fact that brucellosis is the most common zoonotic infection reported in humans annually. Humans are considered dead end hosts for *Brucella* and are typically infected from exposure to animal reservoirs or animal products. Additionally, previous reports have listed the infectious dose for *Brucella* to be 10 to 100 bacteria, but research in closed environments indicate that aerosol exposure to a much higher concentration of bacteria is required to result in infection; thus, use of *Brucella* under natural conditions as a bioweapon would likely result in a limited to negligible rate of infection in humans or animals.

Costs associated with the effective eradication of swine and bovine brucellosis in the US between 1934 and 1998 are conservatively estimated to be over 3 billion dollars. The persistence of brucellosis in wildlife reservoirs with an expanding terrain both within the GYA and the greater US has resulted in potential incursions of the disease into the national domestic cattle and swine herds. A limitation on research due to the select agent status of *Brucella* spp. has reduced the capacity of research institutions to study *Brucella* under field conditions, a necessary step to develop effective vaccines and diagnostic tools. The continued expansion of wildlife reservoirs of *Brucella* spp. without efficient vaccines and sensitive, specific diagnostic tools will result in additional costs to producers, and state and federal governments for disease control programs.

RESOLUTION:

The United States Animal Health Association urges the United States Department of Homeland Security (DHS) to support the United States Department of Agriculture, Animal and Plant Health Inspection Service and the United States Department of Health and Human Services, Centers for
REPORT OF THE COMMITTEE

Disease Control and Prevention in the removal of *Brucella abortus*, *Brucella suis*, and *Brucella melitensis* from the biological select agent and toxins list, thereby enabling needed *Brucella* spp. research and diagnostics.

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RESOLUTION NUMBER: 33 APPROVED
SOURCE: COMMITTEE ON CATTLE AND BISON
SUBJECT MATTER: BACKUP IDENTIFICATION OF LIVESTOCK IN COMMERCE

BACKGROUND INFORMATION:

On March 11, 2013, the United States Department of Agriculture (USDA) Animal Disease Traceability rule became effective. Unless specifically exempted, livestock moving interstate must be officially identified and accompanied by an interstate certificate of veterinary inspection or other documentation, such as owner-shipper statements or brand certificates. Stocker/feeder cattle less than 18 months of age are exempted from the rule. States are allowed to issue official National Uniform Eartagging System (NUES) tags to producers to identify livestock.

We strongly support the implementation of the radio frequency identification (RFID) tag as the primary method of official identification. For cattle exporters, low frequency RFID tags have long been the international standard for cattle identification. We believe the transition to RFID tags as the primary official identification tag to be long overdue and an important step in protecting the health of our animals and the strength of our industry. The low frequency (LF) RFID tag allows us to better identify one specific animal at a time — an important ability when working in close systems, such as head locks/stanchions and necessary due to the particular nature of our work. We have been using LF RFID tags for years, specifically the 840 combo tag. We are right there, side by side, wand in hand, with our efficient USDA inspectors during export inspections and have been from the start.

We are, however, very concerned with the current plan to eliminate the old metal (NUES/Steel/Brite) tag for official usage, even as a backup identification (ID). Having only one form of official ID leaves us vulnerable to identification error, which can have far reaching disease and economic consequences. Despite the high retention of RFID tags, when dealing with thousands of animals, ID tags are frequently lost. Identifying the exact animal with a lost RFID in a small, closed herd, may not be a problem, however, when dealing with large combined groups assembled from multiple herds, we must rely on the implementation of an additional official ID for correct identification. Cattle exporters commonly use combo RFID tags — when that RFID is lost, so is the animal’s visual ID. If a metal tag is in place as a backup source of official ID, these cattle can still be identified or rectified.

Cattle exports undergo health testing at an approved laboratory associated with the official ID. If an animal loses their RFID while undergoing
final export inspection, and if the animal has lost the single RFID official ID, it is then impossible to demonstrate that the animal has undergone the necessary health testing. Because of this one tag loss, the whole shipment would be stopped, as there is now one animal with a different health status than the group. If that animal was tagged with both a RFID and a metal tag, and both are forms of official ID, the second is checked and the problem is solved, and the shipment continues. A solid unique backup is vital in the fight to protect our animal’s health and industry’s bottom-line. Because uniqueness is a vital requirement of an official ID, RFID tags cannot be manufactured with duplicate numbers. Double-tagging an animal with dual RFIDs is also problematic. Double RFIDs of the same frequency causes ID confusion. Double RFID tagging of a different frequency requires either multiple wands, a significant expense in hardware and software, or manual entry of bulky 15-digit RFID numbers, an obvious user/entry error issue and a significant time delay. In the face of all of these concerns and the presence of already implemented and tested system, we urge USDA/APHIS to keep the metal tag as a backup official ID.

We understand that this scenario was not envisioned with the transition to RFID as the official ID, and while we fully support RFID as official ID, it is also necessary to retain the NUES tags for backup, secondary official ID, to be purchased by the producer, and to only be used when RFID tags are already in place.

RESOLUTION:
The United States Animal Health Association urges the United States Department of Agriculture and State Animal Health Officials to work with livestock exporters to ensure a system is in place to allow for a backup identification system for animals being exported to account for loss of official identification.

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RESOLUTION NUMBER: 34 APPROVED AS AMENDED
SOURCE: COMMITTEE ON CATTLE AND BISON
SUBJECT MATTER: CONTINUATION OF PROPOSED ELECTRONIC IDENTIFICATION TRANSITION TIMELINE
BACKGROUND INFORMATION:
In April 2019, the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) announced a timeline to transition to the mandatory use of electronic identification (ID) tags for cattle covered under the 2013 Animal Disease Traceability (ADT) Rule. While not accompanying the announcement, this timeline was the product of over two years of due process during which time nine regional meetings were held nationally from April 2017 through July 2017, state and local meetings were held with feedback provided, and 462 written comments were received. A sixteen member state-federal working group was
formed; the working group held fifteen meetings over seven months, and contributed more than 500 hours of work, resulting in a comprehensive document which summarized the issues, needs, and options of the current ADT program and detailed 14 points as recommendations. Further discussion and feedback was generated through three public traceability summits, and Undersecretary Ibach produced a list of agency-specific objectives to enhance traceability. Finally, an additional state-federal working group was formed to specifically address one of the objectives: a plan to transition to electronic ID. This working group again received input from all sectors of industry before generating the proposed timeline which was adopted by the USDA.

While not unanimous, the transition timeline was met with significant positive responses and as outreach efforts continued, industry support grew as State Animal Health Officials, livestock market operators, industry organizations, and practicing veterinarians committed to engage in a successful transition.

The groups previously mentioned have invested considerable resources to ensure a smooth transition as defined by the timeline. Significant time and energy has been devoted to explaining the timeline to stakeholders and activities have already begun to accomplish the first step of the transition - ending free National Uniform Ear Tagging System (NUES) tag distribution by 12/31/19.

In late October 2019 it was announced that the timeline was being suspended until USDA could evaluate the method in which the timeline was proposed and determine what steps were necessary to ensure a transparent process was utilized to arrive at the timeline and to satisfy any legal challenges.

The withdrawal of the transition timeline creates confusion, doubt, and lack of trust amongst stakeholders and continues to leave unaddressed a major gap in the nation’s resilience to an incursion of a high consequence animal disease.

**RESOLUTION:**

The United States Animal Health Association urges the United States Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services, State Animal Health Officials, and livestock industries to move as quickly as possible to continue the momentum toward electronic identification and to work together to institute a modified transition timeline with the same end date of January 1, 2023 and the extension of National Uniform Ear Tagging System tag distribution being no more than 12 months or no later than December 31, 2020.

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**RESOLUTION NUMBER: 35 APPROVED**

**SOURCE:** COMMITTEE ON CATTLE AND BISON

**SUBJECT MATTER:** FUNDING FOR INFRASTRUCTURE AND RADIO FREQUENCY IDENTIFICATION (RFID) TAGS
BACKGROUND INFORMATION:

In April 2019, the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) announced a timeline to transition to the mandatory use of electronic identification (ID) tags for cattle covered under the 2013 Animal Disease Traceability (ADT) Rule. While not accompanying the announcement, this timeline was the product of over two years of due process, during which time nine regional meetings were held nationally from April 2017 through July 2017, state and local meetings were held with feedback provided, and 462 written comments were received. A sixteen member state-federal working group was formed; the working group held fifteen meetings over seven months, and contributed more than 500 hours of work, resulting in a comprehensive document which summarized the issues, needs, and options of the current ADT program and detailed 14 points as recommendations. Further discussion and feedback was generated through three public traceability summits, and Undersecretary Ibach produced a list of agency-specific objectives to enhance traceability. Finally, an additional state-federal working group was formed to specifically address one of the objectives: a plan to transition to electronic ID. This working group again received input from all sectors of industry before generating the proposed timeline which was adopted by the USDA.

While not unanimous, the transition timeline was met with significant positive responses and as outreach efforts continued, industry support grew as State Animal Health Officials, livestock market operators, industry organizations, and practicing veterinarians committed to engage in a successful transition.

The groups previously mentioned have invested considerable resources to ensure a smooth transition as defined by the timeline. Significant time and energy has been devoted to explaining the timeline to stakeholders and activities have already begun to accomplish the first step of the transition - ending free National Uniform Eartagging System (NUES) tag distribution by 12/31/19.

In late October 2019, it was announced that the timeline was being suspended until USDA could evaluate the method in which the timeline was proposed and determine what steps were necessary to ensure a transparent process was utilized to arrive at the timeline and to satisfy any legal challenges.

The withdrawal of the transition timeline creates confusion, doubt, and lack of trust amongst stakeholders and continues to leave unaddressed a major gap in the nation’s resilience to an incursion of a high consequence animal disease.

As a further point of confusion, plans to potentially provide “free” official calfhood vaccination (OCV) radio frequency identification (RFID) tags and making a “cost-share” available for non-OCV RFID tags were announced as options in addition to continuing provision of “free” NUDES tags. State Animal Health Officials and many industry stakeholders have repeatedly indicated that the industry wishes for infrastructure improvements rather than a short-term, complicated method of cost-share for RFIDs.
RESOLUTION:
The United States Animal Health Association (USAHA) strongly urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) to discontinue the distribution of National Uniform Eartagging System tags within twelve months or no later than December 31, 2020 and utilize available funding for infrastructure development and provide access for producers to obtain radio frequency identification tags. USAHA further urges USDA, APHIS, VS to avoid “voucher” programs which would create additional administrative challenges.

RESOLUTION NUMBER: 36 Combined with 7
SOURCE: COMMITTEE ON CATTLE AND BISON
SUBJECT MATTER: STRENGTHENING THE UNITED STATES ANIMAL DISEASE TRACEABILITY AND DISEASE PREVENTION INFRASTRUCTURE

RESOLUTION NUMBER: 37 APPROVED
SOURCE: COMMITTEE ON ONE HEALTH
SUBJECT MATTER: INCREASED FISCAL YEAR 2021 FUNDING FOR THE UNITED STATES DEPARTMENT OF AGRICULTURE, ANIMAL AND PLANT HEALTH INSPECTION SERVICE, WILDLIFE SERVICES NATIONAL RABIES MANAGEMENT PROGRAM
BACKGROUND INFORMATION:
The United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS), National Rabies Management Program (NRMP) has demonstrated that strategic implementation of cooperative oral rabies vaccination (ORV) programs targeting wildlife are cost-effective, while continuing to reduce rabies exposure and transmission among wildlife, livestock, pets and people. The World Organisation for Animal Health (OIE) determined that the most effective strategy to control terrestrial rabies targets the sources of infection (i.e., wildlife vector populations) with large-scale control efforts. ORV programs are designed to immunize target wildlife species by increasing the percentage of rabies-immune animals within vaccination zones, resulting in the reduction of rabies cases, prevention of viral spread (Phase 1 of the NRMP), and eventual raccoon rabies variant elimination (Phase 2 of the NRMP).

In early 2016, WS assembled federal, state, academic, and international experts to develop a comprehensive strategy to implement Phase 2 of the
NRMP, elimination of the raccoon rabies variant in the eastern United States (US). In 2019, the NRMP and cooperators distributed >9 million ORV baits, >8.2 million in the eastern US to combat raccoon rabies in 17 states and >1 million in Texas to prevent the reemergence of rabies in coyotes and grey foxes along the border with Mexico. The total area baited in 2019 was >63,740 square miles, an area slightly smaller than Wisconsin. In 2019, 20 miles of the ORV zone, equating to 2,324 square miles, was removed along the border with Canada in northern New York, Vermont and New Hampshire, and 2,541 square miles of ORV zone was created eastward from the ORV zones in Pennsylvania and West Virginia into the raccoon rabies enzootic area and classified as “new area under management”. To date, there was no new NRMP initiated contingency actions reported.

Successful ORV programs in Texas continue with rabies elimination in gray foxes and maintenance of an immune barrier along the Mexican border to keep the US free of coyote (canine) and gray fox rabies. The requested funding will allow USDA to:

- Continue the enhanced rabies surveillance program.
- Implement contingency actions in response to rabid animals in sensitive areas.
- Continue Phase 1 of the NRMP, to maintain existing ORV programs to control rabies and prevent spread in wildlife populations.
- Continue the evaluation of novel and US-licensed vaccines and baits.
- Continue studies related to rabies control in skunks, mongoose, and vampire bats.
- Initiate and enhance the operations of Phase 2 of the NRMP, to eliminate the raccoon rabies variant in the U.S.

RESOLUTION:

The United States Animal Health Association requests the 116th Congress to appropriate a minimum of $33 million for the United States Department of Agriculture, Animal Plant Inspection Service, Wildlife Services, National Rabies Management Program.

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RESOLUTION NUMBER: 38  APPROVED
SOURCE: COMMITTEE ON PARASITIC AND VECTOR-BORNE DISEASES
SUBJECT MATTER: EQUINE INFECTIOUS ANEMIA AND EQUINE PIROPLASMOSIS CONTROL STRATEGIES
BACKGROUND INFORMATION:
Over the past ten years, multiple states have investigated either Equine Piroplasmosis (EP) and/or Equine Infectious Anemia (EIA) in Quarter Horses involved in non-sanctioned race activities. All indications are that transmission and disease introduction is related to management practices,
including the use of blood and/or plasma products of non-domestic origin within the equine population, rather than natural transmission by vectors. Additionally, in recent years, an increasing number of illegally imported horses have been identified as positive for EP and/or EIA. The nature of non-sanctioned race events makes tracking infected and exposed horses difficult and serves as a significant barrier to effective epidemiological investigations.

During investigations and while horses are maintained under quarantine or hold order, state animal health officials have determined that in many cases, horses have continued to participate in race events and move interstate despite the quarantine or hold order. Additionally, horse substitutions and horse disappearances are complicating efforts to control these diseases. Failure to permanently identify all cohorts, multiple names for the same horse, alteration of tattoos, communication barriers, and inability to reliably determine ownership complicate the ability of animal health officials to conduct thorough epidemiological investigations.

Identification of horses involved in these disease investigations would be enhanced through the placement of International Organization for Standardization (ISO)-compliant microchips that are recorded in the United States Department of Agriculture, Animal Identification Management System (AIMS) and Emergency Management Response System (EMRS) databases. This permanent identification would serve both immediate and potentially future diseases investigations.

Given the increasing frequency at which disease investigations are being conducted for EP and/or EIA involving quarter horses in non-sanctioned racing, it is only a matter of time until these diseases impact larger equine populations involved in activities such as barrel racing, polo, and other pleasure events.

RESOLUTION:

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 strategies for the control of Equine Piroplasmosis (EP) and Equine Infectious Anemia (EIA). USDA, APHIS, VS should coordinate these strategies with State Animal Health Officials. USAHA further requests that the American Horse Council and other equine stakeholders seek funding to fully support these programs. Further we request USDA, APHIS, VS Animal Disease Traceability funds to maintain an inventory of International Organization for Standardization (ISO)-compliant microchips at the USDA Kansas warehouse to provide to state and federal animal health officials for use in EIA and EP disease investigations.

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COMMITTEE ON ONE HEALTH
Co-chair: Liz Wagstrom, IA
Co-chair: Joni Scheftel, MN

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The Committee met on October 30, 2019 at the Rhode Island Convention Center in Providence, Rhode Island, from 8:00 a.m. to 12:00 p.m. There were 65 members. A 2018 funding resolution was reviewed, and it was noted that there was no response to that resolution.

Presentations and Reports

Livestock Production Impacted by Climate Change
Melissa Rojas-Downing, Universidad de Costa Rica

Global demand for livestock products is expected to double by 2050, mainly due to improvement in the worldwide standard of living. Meanwhile, climate change is a threat to livestock production because of the impact on quality of feed crop and forage, water availability, animal and milk production, livestock diseases, animal reproduction, and biodiversity. This presentation reviewed the global impacts of climate change on livestock production, the contribution of livestock production to climate change, and specific climate change adaptation and mitigation strategies in the livestock sector.

Vectorborne Disease Concerns
Jenna Bjork, Minnesota Department of Health

Ticks and mosquitoes aren't just annoying pests. They can also spread disease, to both humans and animals. Vectorborne diseases are becoming more and more of a threat throughout the world due to factors such as land use changes, globalization, human migration, and climate change. Since these vectors are highly susceptible to environmental conditions, like temperature and humidity, disease risk is often focal and varies significantly across time and space. While it is difficult to accurately predict when and where vectorborne disease risk will occur in the future, lessons may be learned from many of the endemic and emerging vectorborne diseases we are dealing with today.

Effects of Harmful Algal Blooms (HABs)
Sherri Kasper, The Animal Hospital at Southwood

Dr. Kasper discussed harmful algal blooms (HABs), which are caused by phytoplankton found in both freshwater and marine waters. Phytoplankton, including cyanobacteria, diatoms, and dinoflagellates, are natural to our environment, but in large numbers they can cause illness and death in all animals that come in contact with them. In her presentation, Dr. Kasper covered the many factors associated with climate change that may affect the types and frequency of HABs.
Climate’s Role in Insect and Disease Populations
Kevin Harriger, Department of Homeland Security (DHS), Customs and Border Protection (CBP)

Climate (weather, temperature, wind patterns, severe events, etc.) has always played a pivotal role with insect and disease populations, including survival and spread. Although the direct impact of climatic variations on spread and/or transmission of insect/disease populations may be hard to quantify, it is widely believed to be a contributing factor. Several examples were provided that illustrated the impacts of changes in distribution of insects and diseases, some endemic and some invasive, that are attributed to climatic flux.

Climate Effects on Patterns of Disease Emergence
Gericke Cook, USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS)

VS monitors four major areas for indicators of emerging animal disease: new pathogens, new pathways, new geographic distributions, and unusual epidemiology. Changes in climate patterns affect disease emergence across all four areas. Drs. Gericke Cook and Dana Cole presented examples of climate effects on patterns of disease emergence and the importance of these diseases to the U.S.

Committee Business:

A resolution that originated in the Subcommittee on Rabies was discussed and passed onto the Committee on Resolutions.

An overview from the Subcommittees on Rabies, Pharmaceutical Issues and *Salmonella* were given orally by the subcommittee chairs and a written report was received and included at the end of this report.
The Subcommittee met on Tuesday, October 29, 2019 at the Rhode Island Convention Center in Providence, Rhode Island from 1:00 until 5:00 p.m. There were 16 members and 14 guests who signed the attendance sheets; there were 38 attendees in the session for the final panel. Full attendance will be reconciled with mobile check in data at a later date. No old business or resolutions were discussed from the previous year.

The Subcommittee agenda was built to provide a number of brief updates on existing federal programs and experiences from state-level legislation, and introductions to various industry and research initiatives. Attendees and speakers participated in wide ranging question and answer (Q&A) sessions after each section. In a rapidly evolving area of animal health, this offered interested subcommittee members a primer on a number subjects where they believe policy should be developed, improved, or advanced. Interested subcommittee members were encouraged to subsequently communicate directly with the speaker to look more deeply into areas of interest or concern to them or their constituents.

Presentations and Reports

FSIS Residue Updates
Kis Robertson-Hale, USDA, Food Safety Inspection Service (FSIS)

Dr. Hale covered the establishment, objectives, and operations of the FSIS National Residue Program. Residue classes included in surveillance have expanded greatly in recent years, from 51 in 2012 to 108 in 2019. Residue findings per 100 samples has remained relatively level from FY16 through FY19.

Antimicrobial Use and Stewardship Activities at Veterinary Services
Chelsey Shively, USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS)

Dr. Shively covered the basis for antimicrobial use studies, development of the 2020-2025 National Action Plan, the history of National Animal Health Monitoring System (NAHMS), and overviews of recent and ongoing use studies in various livestock sectors. Swine and feedlot sector studies are set to begin in 2020.

Supporting Antimicrobial Stewardship – FDA’s 5-Year Plan
Susan Bright-Ponte, Food and Drug Administration (FDA) Center for Veterinary Medicine

Dr. Bright-Ponte reviewed the current status and impacts of FDA Guidances 209 and 213, notably that sales have decreased. FDA’s 5-year
plan, Supporting Antimicrobial Stewardship in Veterinary Settings is currently in phase 1, 2019-2021. Among others, key projects include transition all over the counter (OTC) antimicrobial products to medical prescription (Rx), defining durations of use, updating list and ranking of medically important antimicrobials, and antimicrobial use data collection pilot projects. Hemp and CBD are developing areas of FDA involvement. FDA has received more than 4,000 comments following a May 2019 public meeting.

California’s Antibiotic Program: 2 years of progress
Marissa Silva, California Department of Food and Agriculture

Dr. Silva reviewed program history, including the legislative background and development of regulations. The program gathers a large volume of information and is able to produce reports that are beneficial to veterinarians, producers, legislators, and the public. The program goal is to use antimicrobials appropriately to optimize livestock health and minimize selection for antimicrobial resistance while reducing the need for antimicrobial drugs through infectious disease prevention.

Maryland Senate Bill 471
Jo Chapman, Maryland Department of Agriculture

Dr. Chapman reviewed the legislative background and development of regulations, including the issue of how to address prohibitions on prophylactic uses such intramammary dry cow therapies. A working group was convened to work on this specific issue. Updates from that group’s deliberations are included in the slide deck. Lessons learned from this process include, increase outreach to veterinarians and stakeholders on general antimicrobial use issues, consider mandatory veterinary continuing education regarding antimicrobial use, establish advisory groups sooner rather than later, funding is important to expand support of regulatory compliance to industry.

New Molecular Approaches to AMR Testing
Laura Goodman, Cornell University

Dr. Goodman reviewed various data relative to Antimicrobial Resistance (AMR) patterns and prevalence in domestic animal and wildlife species. This data and advances in molecular diagnostics may offer future guidance on stewardship decisions.

FFAR Update on ICASA Research
Tim Kurt, Foundation for Food and Agriculture Research (FFAR)

Dr. Kurt provided updates on the work of FFAR and ongoing research projects. FFAR has been able to develop public-private partnerships to support over $700M of research. The International Consortium for Antimicrobial Stewardship in Animal Agriculture is early in its various research initiatives and more updates will be forthcoming.
Antibiotic Stewardship in Animal Agriculture
Karin Hoelzer, Pew Charitable Trusts

Dr. Hoelzer discussed alternatives to antimicrobial use and how human behavior affects stewardship decisions. Vaccine improvement considerations include safety, efficacy, ease of administration, and cost of the vaccine. Pew is involved in research studying how to positively affect human behavior to advance judicious use decisions.

Pipestone Antibiotic Resistance Tracker (PART)
Gordon Spronk and Scott Dee, Pipestone Veterinary Services

Drs. Spronk and Dee discussed Pipestone’s efforts to address antibiotic use concerns and deliver useful information for producers to use in daily management decisions. PART encourages behavior change among producers by using a system of benchmarks for its producers.

One Health Certified Program Review
Don Ritter, Mountaire Farms, Inc.

Dr. Ritter discussed work to gauge public acceptance of a product label to offer an alternative to zero-use labels. Research shows public acceptance of the use of antibiotics in a judicious manner. One Health Certified labels have received Food Safety Inspection Service (FSIS) approval and producers will be audited by USDA Agricultural Marketing Service for compliance with program standards.

The AVMA’s Definitions of Antimicrobial Prevention, Control, and Treatment
David Smith, Mississippi State University College of Veterinary Medicine

Dr. Smith discussed American Veterinary Medical Association’s (AVMA) efforts to provide clarity for veterinarians regarding stewardship and judicious use. AVMA has defined prevention, control, and treatment within the framework of judicious use.

Subcommittee Business:

Members suggested that the subcommittee monitor Food and Drug Administration (FDA) Guidance 152 through the course of the year. The subcommittee may coordinate comments as appropriate before the next Annual Meeting.

Meeting adjourned at 4:55 p.m.
One Health

Report of the Subcommittee on Rabies
Chair: Tarrie Crnic, KS
Vice Chair: Ernest Oertli, TX

The Subcommittee met on Tuesday, October 29, 2019 at the Rhode Island Convention Center in Providence, Rhode Island, from 8:00 a.m. to 12:00 p.m. There were 24 members and seven guests present. The chair reviewed the subcommittee mission statement and the status of the 2018 resolution approved by the committee in Kansas City, Missouri. The resolution is still in pending status with no action over the last year. The chair reminded attendees that only approved members could vote, but everyone was welcome to participate in discussion and ask questions. After opening remarks were completed, the first presenter of the day was introduced.

Presentations and Reports

Vampire Bats: Preparing for Range Expansion into the U.S.
Michael Bodenchuk, Texas Cooperative Wildlife Services Program

The common vampire bat (Desmodus rotundus) is apparently expanding their range northwards in Mexico and appear poised to enter the U.S. Climate models predict suitable habitat in the U.S. in South Texas and parts of Southern Arizona. While range expansion isn’t unexpected, vampire bats host a specific strain of rabies which impacts livestock and people. Annual economic damages have been modeled between $7M and $9M and are largely associated with rabies deaths of livestock. Post-exposure prophylaxis is estimated to cost between $135,000 and $173,000 annually. To prepare for the emerging rabies issue, the Cooperative Texas Wildlife Services program has begun training employees to recognize symptoms and respond to bat presence, initiated surveillance of livestock at sale barns and on ranches and has conducted outreach on the issue, via one-on-one training and a digital versatile disc (DVD) handout to landowners along both sides of the border. The DVD has been placed in over 1,200 households in the U.S. and Mexico.

Overview of the National Rabies Management Program
Thomas Deliberto, USDA, Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS), National Wildlife Research Center (NWRC)

The USDA’s Wildlife Services, National Rabies Management Program (NRMP) works cooperatively with local, state, and federal partners to manage rabies across large landscapes to prevent the spread and ultimately eliminate specific terrestrial rabies virus variants in carnivores. Wildlife rabies control in the U.S. is primarily achieved through distribution of oral rabies vaccine baits, in combination with enhanced rabies surveillance, population monitoring activities, and applied research. During 2018, approximately 8.9 million vaccine baits were distributed in 16 eastern states to prevent the westward spread of raccoon rabies. In addition, >1 million oral rabies
vaccination (ORV) baits were distributed along the Texas-Mexico border to prevent reemergence of canine rabies variant into the U.S. Current management focus for ORV campaigns in the U.S. primarily occur in rural habitats. However, as the NRMP makes a programmatic shift towards the strategic goal of raccoon rabies elimination, it will be critical to address the unique challenges associated with controlling rabies in urban-suburban areas. Rabies management in developed habitats is complex as a result of increased population densities in target species, knowledge gaps in understanding their ecology, patchy distribution, anthropogenic food sources and non-target species bait competition. Lower seroconversion rates and persistence of rabies cases typically are observed in urban-suburban habitats compared to more rural environments. Additionally, it is more difficult logistically to adequately distribute vaccine baits in urban areas and typically there are more reports of bait contacts from the public.

Approximately eighty-five percent of all ORV baits distributed during 2018 were in rural areas by fixed wing aircraft, followed by eight percent of baits distributed by helicopter in suburban areas, six percent by ground (vehicle) methods, and one percent by bait stations in urban-suburban environments where aerial operations in fragmented and highly developed habitats is often not feasible. However, refining and improving ORV bait distribution in these strategically important habitats targeting raccoon (*Procyon lotor*) and striped skunk (*Mephitis mephitis*) populations is essential for working towards the goal of raccoon rabies elimination in the eastern U.S. Innovative approaches to improve vaccination effectiveness and efficiency in areas traditionally ground baited are required to achieve success. Recent innovations include using Point-of-Interest (POI) GPS spatial technology to refine ground baiting approaches; a comprehensive, multi-year research project documenting home range, movement and habitat use by raccoons, striped skunks and Virginia opossums (*Didelphis virginiana*) in Burlington, Vermont relative to ORV; and evaluation of bait station methods compared to ground methods. Based on preliminary evaluation of POI data collected from defined ground baited areas during 2017 in New England, Ohio and West Virginia, ground baiting grids were reconfigured for 2018 operations into standard, 1-kilometer squared cells within grid boundaries with a goal to better disperse baits along roadsides more evenly throughout each grid.

The use of bait stations for distribution of oral rabies vaccine baits in urban-suburban habitats has historically been limited to experimental work conducted in Pinellas County, Florida from 2009-2014 and an innovative but
small-scale operational program currently established in Cape Cod, Massachusetts. In order to better evaluate the scale, scope and logistics required to implement a comprehensive operational bait station program in larger urban-suburban landscapes, a bait station study was initiated in October 2018 in Birmingham, Alabama.

The two primary program metrics used to evaluate and monitor wildlife rabies management are serology (i.e., virus neutralizing antibodies as an index to population immunity) and enhanced rabies surveillance (i.e., virus antigen detection; absence of cases as a mark of success). The NRMP collects an average of 5,600 blood sera samples and 7,200 brainstem samples each year. From 2005-2017, >110,000 enhanced rabies surveillance (ERS) samples were collected by USDA WS and cooperators in addition to standard public health surveillance. Approximately eighty two percent of ERS samples were tested using the direct, rapid immunohistochemistry test, direct rapid immunohistochemical test (DRIT), and >1,600 rabies were confirmed by the DRIT that likely would not otherwise have been detected through public health testing. Beginning in 2015, the NRMP developed a new ERS initiative to better standardize practices and approaches associated with sample collection, and to re-energize and expand the cooperative coalition. The key components of the initiative included development and maintenance of an ERS network of cooperators, sample prioritization, laboratory support and improved data management practices. By establishing and refining a series of best management practices, the NRMP developed a sample categorization system and stratified point values to place emphasis on the highest priority specimens. Samples were classified into the following categories, from highest to lowest priority: 1= strange acting; 2= found dead (not road kill); 3= road kill; 4= surveillance trapped; 5= Nuisance Wildlife Control Operator (NWCO)/other; and 6= unknown. After two full years of implementation of the ERS Initiative and associated categorical point system during 2016-2017, the NRMP observed a twenty-five percent increase in samples collected overall, and a thirty percent increase in the proportion of highest priority samples collected relative to all sample categories.

Contingency action risk assessments are initiated after rabies is documented in areas that threaten the integrity of oral rabies vaccination zones. Subsequent management activities may include intensifying and expanding ERS, trap-vaccinate-release, or expanding ORV zones. During 2017 and 2018, the NRMP implemented contingency responses to rabies cases that occurred west of the ORV barrier in Stark (five miles) and Tuscarawas (17 miles) Counties, Ohio, respectively. During both contingency actions, the ORV zone was expanded and the experimental use of the oral rabies vaccine ONRAB was assessed in real time emergency response efforts. Also, in 2017, a contingency baiting area was established in Wise County, Virginia in response to rabies cases that were detected nine miles west of the historic RABORAL V-RG® zone. Contingency ORV zones in both
states will be heavily monitored and maintained for a minimum of three years.

Applied research has focused on a series of ONRAB field trials conducted from 2011-2017 in five states (New York, New Hampshire, Ohio, Vermont and West Virginia). Formal field trials addressed questions regarding vaccine effectiveness at multiple bait densities, in rural and urban-suburban habitats, and targeting both raccoons and skunks.

A number of the initial field trials were concluded during 2017 and analysis of study results is currently underway for publication. At present, field evaluation of ONRAB continues to further assess trends in vaccine effectiveness relative to various bait distribution strategies and as part of contingency actions.

The NRMP has also worked with several USDA WS state programs to develop a vampire bat surveillance project. Ecological niche modeling suggests that vampire bats may recolonize in south Texas or Florida over the next ten years or less. Rabies transmitted by vampire bats could pose a considerable rabies risk to livestock in recolonized areas. In Texas, Arizona, New Mexico and Florida, USDA began conducting cattle sales barn, dairy farm and feedlot surveys during 2016 to examine livestock for evidence of vampire bat bites. Additionally, an informational DVD was developed and distributed to ranchers and other livestock owners and cooperating agency officials. Since 2016, >740 cattle surveys have been conducted involving almost 195,000 cattle and >1,000 DVDs have been distributed. No vampire bat bites have been identified to date.

USDA WS has been cooperating with the Puerto Rico Departments of Health and Natural and Environmental Resources since 1999 on rabies issues related to the small Indian mongoose (*Herpestes auropunctatus*). Formal research led by the USDA NWRC has been ongoing since 2011, including basic ecologic studies to evaluate population density and ORV bait flavor preferences. Four oral rabies vaccine placebo bait field trials have been conducted since October 2016. Placebo baits were distributed at 200 baits/km² and 100 baits/km². The NRMP is working with NWRC, the Alabama WS Program, the vaccine manufacturer, and key cooperators in Puerto Rico in pursuit of a live vaccine trial targeted for the spring of 2020.

Several key rabies management accomplishments have been achieved in the U.S. through the implementation of ORV cooperative programs, including declaration of the U.S. as canine rabies free in 2007 (with the last reported case of canine rabies in 2004). Near elimination of the Texas Gray Fox variant of rabies has been achieved, with the last reported case in 2013. There has been no appreciable spread of raccoon rabies to the west of its current extent, and the NRMP has completed broad scale ONRAB field trials in five states. Wildlife rabies management programs in the U.S. represent the largest coordinated wildlife disease management program undertaken in North America.
Rabies Detection in Canine Imported from Egypt
Sara McReynolds, Kansas Department of Agriculture

In January of 2019, 26 dogs were imported to Kansas by a licensed shelter from Egypt. All dogs presented with international health certificates and documentation of rabies vaccination. Upon arrival the shelter disbursed the dogs to foster homes in Kansas and Missouri. On February 21, 2019 a three-year-old mixed breed female, that had been imported from Egypt in January, bit a technician at a Missouri veterinary hospital and developed neurological signs. The dog was euthanized and confirmed positive for rabies as Kansas State Veterinary Diagnostic Laboratory. Following the confirmation, all dogs on the shipment and those with known exposure to the rabid dog had to be located for quarantine. In total, 27 dogs were quarantined at a licensed shelter for up to six months. Over 20 people received Rabies Postexposure Prophylaxis (PEP). An investigation was done on the documentation of the international import of the dogs and it concluded that the rabies vaccination certificates and rabies titers were all falsified documents. Titters indicated only seven of the 26 dogs had previously been vaccinated. According to the Center for Disease Control and Prevention (CDC) regarding the number of dogs imported into the U.S., an estimated 1.06 million dogs are entering the U.S. each year and 107,100 from a country with canine rabies virus variant. The CDC also published the cost of these investigations as it relates to past imported rabid dogs. They estimate the cost per each imported rabid dog is around $213,000.

Update from Rabies in the Americas
Joanne Maki, Boehringer-Ingelheim

Dr. Maki gave a brief update on presentations and hot topics from the Rabies in the Americas (RITA) conference that was concurrently being held in Kansas City, Missouri. Numerous topics were highlighted including bat rabies, bat rabies vaccine developments, wildlife rabies, and epidemiology and surveillance updates.

Panel Discussion: Rabies Education and Outreach

Rabies Education and Outreach in Texas
Tom Sidwa, Texas Department of State Health Services

Texas is a rabies-endemic state with both terrestrial and bat variants. The Texas Department of State Health Services (DSHS), Zoonosis Control Branch and the Zoonosis Control Programs serving each of the eight DSHS Public Health Regions are tasked with administering the Rabies Control Act. The DSHS partners with local health departments and other stakeholders to mitigate the risk posed to Texans and their animals by rabies. Inherent in the DSHS goal of reducing infectious disease burden is the need to educate the population concerning infectious diseases, including disease avoidance. Many tools and modes of communication are employed by the DSHS to educate people about rabies, an infectious disease with a case fatality rate
approaching 100%. This presentation provided information on the DSHS’ educational outreach to heighten awareness of rabies.

Rabies Outreach: 2019 Delaware State Fair
Karen Lopez, Delaware Department of Agriculture

In 2018, Delaware reported its first confirmed human rabies case since 1941. Subjectively, state agency personnel with regular direct communications with constituents regarding rabies issues also noted deficiencies in the public’s knowledge about the risk of rabies. To address this issue, a multi-agency committee including representation from the Delaware Departments of Agriculture, Natural Resources and Environmental Conservation/Division of Fish and Wildlife, Health and Social Services/Division of Public Health and Public Health Laboratory was formed to provide educational outreach. The Delaware State Fair was selected as the outreach venue due to the large number of lay constituents that could be targeted in only a few days, and the dates of the fair, which allowed for adequate time to prepare educational activities and materials.

An exhibition booth was set up for five days (half the duration of the fair) in the Agricultural Commodities building, which houses a variety of displays and demonstrations for the public. The objective of the outreach was to communicate two key messages to constituents: “vaccinate your pets against rabies” and “enjoy wildlife from a distance.” The booth was manned eight hours a day by two agency volunteers per four-hour shift. Constituents were invited to play two games to win prizes. In the first game, they could spin a colored game wheel to answer an age-appropriate rabies-related question corresponding to the image that they landed on. They could also play a mock rabies test game where an individual would select and read a scenario about a domestic or wild animal, and then secretly be directed to a “positive” or “negative” test by staff depending on whether the animal was likely to test positive or negative for rabies based on the scenario. The mock rabies test consisted of the constituent pipetting vinegar into a test tube prefilled with either a small amount of plain baking soda (negative) or baking soda colored pink with powdered iced tea mix (positive). A variety of rabies awareness-themed prizes printed with contact information for rabies exposure reporting were available for constituents: temporary tattoos; animal silhouette pens; activity books and crayons; fox, brain, and pawprint stress relief squeeze balls. Informational pamphlets were also available. Materials were paid for with funding from the Centers for Disease Control and Prevention’s (CDC) Epidemiology and Laboratory Capacity (ELC) for Prevention and Control of Emerging Infectious Diseases cooperative agreement.

Lessons learned from this outreach project included the following:

- Recruiting additional volunteers would allow staff to be relieved for breaks, especially on very busy shifts during Kids Day at the fair, and potentially run the educational booth for the entire ten days of the fair. Staff also need to be better educated on rabies...
to handle questions from the public (some volunteers hold non-
technical roles within the agencies).

- The colored game wheel was very popular and easy to run, but
  the mock rabies test game was time-consuming and held up the
  line of people wanting to visit the booth. The committee plans on
  replacing the latter with a different simple game next year.
- The committee would like to explore the ability to project an
  educational video for constituents visiting the booth.
- Applying temporary tattoos at the booth assured that parents of
  tattooed children had to look at the rabies messages for days.
  Several children requested bat tattoos, which were not one of the
  available designs, so the committee plans on acquiring some for
  next year. Stress balls and animal silhouette pens were very
  popular giveaways. The committee also think that dog toys with
  rabies messaging printed on them would be popular and
  effective educational tools.

Members of the public visiting the rabies booth were prone to trying to
take giveaways without participating in the educational activities. Persistent
volunteers are needed to limit access to prizes to those constituents that
receive education while visiting the booth.

Rabies Education in Maine
Don Hoenig, One Health Veterinary Consulting

Dr. Hoenig started with a brief presentation on the history of rabies in
Maine. Maine has maintained records on rabies cases since the 1930’s. Dr.
Hoenig provided a background on the introduction of raccoon variant rabies
into Maine and how this affected rabies education efforts. Partnerships
between the state agencies for agriculture, public health, and wildlife were
formed to increase rabies education and outreach to the public. These
partnerships have continued and are essential to the ongoing education
efforts.

Rabies Education and Outreach in Minnesota
Joni Schefelt, Minnesota Department of Health

Reaching the public and other audiences with rabies messaging is
universally difficult. Dr. Schefelt presented a variety of Minnesota Department
of Health rabies outreach projects and materials. These included their “How
to catch a bat” video, “Rabies for Law Enforcement” and other specialized
training, and rabies business cards with directions for handling animal bites.

Subcommittee Business:
The business meeting was opened by Dr. Crnic at 9:40 a.m. and the
presence of a quorum was established.

One resolution was brought forward for consideration. The committee
approved this resolution to be moved forward for consideration by the
Committee on One Health. An important issue moving forward for the committee includes continued work with USDA, Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS) to push forward the rabies free by 2053 effort to eliminate racoon variant rabies from the east coast. This will involve close collaboration to understand the resource needs for each phase of the project and what assistance the committee can provide to help ensure these needs are met. Another important issue moving forward appears to be the risk of rabies in animals imported into the U.S. from high-risk countries.

At the close of the meeting the chair brought forward the possibility of one or two conference calls to discuss resolutions for consideration at the 2020 committee meeting in Nashville, Tennessee relating to the issues identified at the 2019 meeting. The business portion of the meeting was concluded at 10:00 a.m.
The Subcommittee met on October 28, 2019 at the Rhode Island Convention Center in Providence, Rhode Island, from 1:00 to 4:45 p.m. There were 25 members and 30 guests present. Chair Donna Kelly presided and welcomed the Subcommittee. There were no Resolutions from the 2018 meeting to review.

National Poultry Improvement Plan (NPIP) Salmonella Update Report
Elena Benke, USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), National Poultry Improvement Plan (NPIP)

Pullorum-Typhoid Status: There were no isolations of *Salmonella* pullorum in commercial poultry in FY2015, FY2016, FY2017, FY2018 or FY2019. There were no isolations of *Salmonella* pullorum in backyard birds in FY2016, FY2017, FY2018 or FY2019. There have been no isolations of *Salmonella gallinarum* since 1987 in any type poultry in the U.S.

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<th>Hatchery Participation in the National Poultry Improvement Plan Testing Year FY2019</th>
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<td>Egg and Meat-Type Chickens: Participating</td>
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<td>Turkeys: Participating</td>
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<td>Waterfowl, Exhibition Poultry and Game Birds: Participating</td>
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<td>U.S. Pullorum-Typhoid Clean Flocks</td>
</tr>
<tr>
<td>Birds in Flocks</td>
</tr>
<tr>
<td>Birds Tested</td>
</tr>
</tbody>
</table>
Turkey Breeding Flocks in the National Poultry Improvement Plan Participation and Testing Summary
Testing Year FY2019

| U.S. Pullorum-Typhoid Clean Flocks: | 381 |
| Birds in Flocks                  | 3,674,096 |
| Birds Tested                     | 21,034 |

Waterfowl, Exhibition Poultry, and Game Birds Breeding Flocks in the National Poultry Improvement Plan Participation and Testing Summary
Testing Year FY2019

| U. S. Pullorum-Typhoid Clean Flocks | 7,170 |
| Birds in Flocks                  | 2,554,380 |
| Birds Tested                     | 392,431 |

Meat Type Waterfowl Breeding Flocks in the National Poultry Improvement Plan Participation and Testing Summary
Testing Year FY2019

| U. S. Pullorum-Typhoid Clean Flocks | 130 |
| Birds in Flocks                  | 350,564 |
| Birds Tested                     | 10,731 |

**U.S. *Salmonella enteritidis*** Clean Egg-Type Breeding Chickens
No. of flocks and birds in flocks by State with *Salmonella enteritidis* isolates, 1990-2019

<table>
<thead>
<tr>
<th>Arkansas</th>
<th>Environmental</th>
<th>Dead Germ</th>
<th>Birds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flocks</td>
<td>1</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Birds in Flocks</td>
<td>6,000</td>
<td></td>
<td>15,000</td>
</tr>
<tr>
<td>Georgia</td>
<td>7</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Flocks</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Birds in Flocks</td>
<td>110,400</td>
<td>46000</td>
<td>10,000</td>
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<tr>
<td>Illinois</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Flocks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Birds in Flocks</td>
<td>3,900</td>
<td>3700</td>
<td>1200</td>
</tr>
</tbody>
</table>

-continued-
**U.S. *Salmonella enteritidis* Clean Egg-Type Breeding Chickens**  
No. of flocks and birds in flocks by State with *Salmonella enteritidis* isolates, 1990-2019

<table>
<thead>
<tr>
<th>State</th>
<th>Flocks</th>
<th>Birds in Flocks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indiana</td>
<td>15</td>
<td>158,345</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>27,479</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>15,092</td>
</tr>
<tr>
<td>Kentucky</td>
<td>1</td>
<td>6,625</td>
</tr>
<tr>
<td>Ohio</td>
<td>17</td>
<td>192,700</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>91,600</td>
</tr>
<tr>
<td>Oregon</td>
<td>2</td>
<td>19,516</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>16</td>
<td>166,385</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>78,450</td>
</tr>
<tr>
<td>Texas</td>
<td>1</td>
<td>10,000</td>
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</table>

<table>
<thead>
<tr>
<th>Phage Type 13</th>
<th>Environmental</th>
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<tbody>
<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>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Phage type 13A</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Flocks</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Phage type</td>
<td>Flocks</td>
<td>Birds in Flocks</td>
</tr>
<tr>
<td>------------</td>
<td>--------</td>
<td>----------------</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>28,900</td>
</tr>
<tr>
<td>23</td>
<td>21</td>
<td>16,000</td>
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<tr>
<td>28</td>
<td>2</td>
<td>15,000</td>
</tr>
<tr>
<td>28</td>
<td>2</td>
<td>15,000</td>
</tr>
<tr>
<td>34</td>
<td>2</td>
<td>12,500</td>
</tr>
<tr>
<td>RNDC</td>
<td>1</td>
<td>7,000</td>
</tr>
<tr>
<td>- Untypable</td>
<td>2</td>
<td>24,000</td>
</tr>
<tr>
<td>8</td>
<td>21</td>
<td>237,701</td>
</tr>
</tbody>
</table>
### Egg-type Chicken breeding flocks with isolates of *Salmonella Enteritidis* by phage type and by year 1989-2019

<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>
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<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>
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<tr>
<td>2001</td>
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<td>13</td>
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<td>2002</td>
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<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>
<tr>
<td>2011</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td>0</td>
<td></td>
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<tr>
<td>2016</td>
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<tr>
<td>2017</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>2018</td>
<td>3</td>
<td>NA</td>
</tr>
<tr>
<td>2019</td>
<td>1</td>
<td>NA</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, 1990-2019

<table>
<thead>
<tr>
<th></th>
<th>Environmental</th>
<th>Dead Germ</th>
<th>Bird</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flocks</td>
<td>75</td>
<td>6</td>
<td>20</td>
</tr>
<tr>
<td>Birds in flocks</td>
<td>786871</td>
<td>77,179</td>
<td>211,342</td>
</tr>
</tbody>
</table>
Outbreak of Multidrug-Resistant Salmonella Infections Linked to Contact with Pig Ear Dog Treats

Megin Nichols, Center for Disease Control and Prevention (CDC)

- Investigation findings linked the illnesses in this outbreak to contact with pig ear dog treats.
  - 154 people infected with the outbreak strains of *Salmonella* were from 34 states.
    - Of 133 ill people with available information, 35 (26%) were hospitalized. No deaths were reported.
    - 27 illnesses (19%) were among children younger than five years.
  - Epidemiologic, laboratory, and traceback evidence indicated that contact with pig ear dog treats from many different suppliers was the likely source of this outbreak.
    - Testing of pig ears identified the outbreak strains of *Salmonella* in 135 samples. Some of the pig ears were imported from Argentina, Brazil, and Colombia. Some product labels indicated that the pig ears were irradiated and this process should kill any *Salmonella* present on the pig ears. *Salmonella* identified in products labeled as irradiated indicate they may not have been irradiated or there was another issue that led to *Salmonella* contamination. FDA is continuing to investigate the manufacturing process and has posted information for manufacturers regarding the control of *Salmonella* in these products. Several firms recalled pig ears during the investigation because they were contaminated with *Salmonella*. No single supplier, distributor, or common brand of pig ear treats was identified.

Multi-State Salmonella Outbreak Investigations

Laura Gieraltowski, Center for Disease Control and Prevention (CDC) and Sheryl Shaw, USDA, Food Safety and Inspection Service (FSIS)

During 2018 and 2019 CDC, FSIS and state public health partners investigated persistent or recurring foodborne illness outbreaks due to three different *Salmonella* found in poultry.

Illnesses due to *Salmonella* Reading and linked to turkey exposure included 358 cases from 42 states. A variety of exposures to turkeys and turkey products were included, and no single brand or single establishment was identified as the cause of all illnesses. Two recalls of turkey and two pet...
food recalls resulted from the outbreak. Illnesses due to Multi Drug Resistant *Salmonella* Infantis and linked to chicken exposure included 129 cases from 32 states. A variety of exposures to chicken products were included, and no single brand or single establishment was identified as the cause of all illnesses. Illnesses due to *Salmonella* Blockley and linked to chicken exposure included 51 cases from ten states in 2018 and 94 cases from six states in 2019. A variety of exposures to chicken products were included, and no single brand or single establishment was identified as the cause of all illnesses.

FSIS continues to monitor isolates collected from poultry products and shares this information with CDC, USDA, Animal and Plant Health Inspection Service (APHIS) and representatives of the poultry industry to better inform hypotheses regarding detection of potential sources and for prevention of future outbreaks. CDC, FSIS and APHIS met with the National Turkey Federation, National Chicken Council, National Poultry Improvement Plan general council and industry representatives to share findings of the outbreaks.

These investigations required close collaboration between states, CDC, USDA (FSIS and APHIS), and Food and Drug Administration (FDA), Center for Veterinary Medicine (CVM). Evidence indicates that the outbreak strains are present in multiple locations and not limited to a single establishment. These strains appear to have spread within the poultry industry and may be persisting in chicken or turkey populations, their environments, or feed. Further investigations and interventions may lead to the mitigation of these strains prior to presentation at slaughter facilities, thus preventing further outbreaks in humans.

**Salmonella** Outbreak Lessons Learned

Sheryl Shaw, USDA, Food Safety Inspection Service (FSIS)

FSIS is the public health regulatory agency in the United States Department of Agriculture responsible for ensuring that meat, poultry, and processed egg products are safe, wholesome, and accurately labeled. Through a series of Acts, Congress empowers FSIS to inspect all meat, poultry, and processed egg products in interstate commerce. These include the Federal Meat Inspection Act (FMIA) in 1906; the Agricultural Marketing Act (AMA) in 1946; the Poultry Products Inspection Act (PPIA) in 1957; the Humane Methods of Slaughter Act (HMSA) in 1958; and the Egg Products Inspection Act (EPIA) in 1970. The Office of Public Health Science is located under the Office of the Deputy Administrator for Food Safety and includes the Applied Epidemiology Staff (AES).

The Applied Epidemiology Staff uses data from public health partners and throughout FSIS to inform decision making when investigating foodborne illness outbreaks potentially attributed to FSIS regulated products. AES uses epidemiological information, traceback of food consumed, laboratory evidence, and environmental health assessments to investigate potential sources of illness. Early communication and collaboration within FSIS and
with partners are essential in determining potential sources of illness. Understanding consumer behaviors, interpreting laboratory results such as whole genome sequencing, and use of routine and investigative sampling all contribute to the success of outbreak investigations.

FSIS AES conducts After Action Reviews to identify what went well and opportunities for improvement in future investigations. Examples discussed include investigations of Salmonella Typhimurium in chicken salad which led to a recall; investigation into Salmonella in not-ready-to-eat stuffed chicken which led to improved labeling; and an investigation into Multi Drug Resistant Salmonella Infantis in chicken which led to increased industry engagement to identify upstream sources of Salmonella in chicken. An investigation into illnesses caused by Salmonella Newport in ground beef led to a large recall. Shopper cards proved useful in identifying the source of ground beef purchased by consumers.

While some outbreaks lead to recalls, public communication, and policy changes, others, such as Salmonella Reading and Infantis led to increased communication with industry to identify potential preharvest mitigations for Salmonella. FSIS recognizes that communication and collaboration with industry are essential to protect and improve public health.

**Salmonella Serotypes Isolated from Animals and Related Sources, January 1-December 31, 2018**

B. Morningstar-Shaw, T. Mackie, A. Ludvik, D. Ludwick, E. Palmer, National Veterinary Services Laboratories (NVSL), USDA

The Bacterial Identification section within the Diagnostic Bacteriology and Pathobiology Laboratory of the NVSL routinely performs serotyping of 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 received at the NVSL from January 1 through December 31, 2018.

In 2018, 13,037 submissions were received for Salmonella serotyping. There were 258 serotypes identified from 48 states, Belize and Barbados. Salmonella isolates were divided by clinical isolates (5,334), non-clinical isolates (5,511), and research (2,192). Isolates were identified as clinical samples based on clinical or sub-clinical signs of salmonellosis from primary or secondary infection or as non-clinical samples when derived from herd and flock monitoring programs, environmental sources, food or other testing. Serotyping data from samples submitted for research purposes are not included in this summary. Table 1 provides information on the source of submissions to the NVSL.

Isolates were divided into the following animal source categories for analysis based on information provided by the submitter: bovine, chicken, equine, swine, turkey and all other. Table 1 lists the source of submissions for both clinical and non-clinical isolates for calendar year 2018. The ten most commonly identified serotypes from clinical and non-clinical isolates from all animal sources are shown in Table 2. These ten serotypes account
for 58% of the total isolates submitted from clinical and 64% of non-clinical sources in 2018. The most common serotypes observed in chicken, turkey, bovine, equine and swine isolates are listed in Tables 3-7.

*Salmonella* serotyping at the NVSL is an ISO 17025 accredited test. Salmonellae are typed via classical serotyping using polyvalent and single factor antisera to determine the O and H antigens and/or via molecular typing using the xMAP *Salmonella* serotyping assay. Approximately 60% of the sera used at the NVSL is produced in-house as previously described (Ewing, 1986). 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, 2007). The subspecies designation precedes the antigenic formula for those serotypes other than subspecies I.

The NVSL provided a *Salmonella* Group D proficiency test to 98 individuals from 85 different laboratories. The purpose of the PT was to assess the ability of laboratories to detect or isolate *Salmonella* Group D and/or *Salmonella* Enteritidis from simulated environmental samples. The test consisted of ten lyophilized cultures containing various combinations of *Salmonella* and common contaminants typically found in environmental swabs. The 2018 test included *Salmonella* serotypes Enteritidis, Heidelberg, Javiana, and Oranienburg. Contaminant bacteria included *Citrobacter sedlakii* or *rodentium, Citrobacter freundii, Enterobacter cloacae, Klebsiellae pneumoniae* and *Pseudomonas aeruginosa*. Laboratories were instructed to test the samples according to the procedures used in their laboratories. The NVSL randomly retained approximately 10% of the test kits for quality assurance (QA) purposes. All were tested blindly with no discrepancies. The results of the proficiency test are shown in Table 8.

### Table 1: Sources of submissions to the NVSL for *Salmonella* serotyping in 2018

<table>
<thead>
<tr>
<th>Source</th>
<th>No. Clinical Submissions</th>
<th>No. Non-Clinical Submissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bovine</td>
<td>1,672</td>
<td>184</td>
</tr>
<tr>
<td>Chicken</td>
<td>317</td>
<td>4,425</td>
</tr>
<tr>
<td>Equine</td>
<td>674</td>
<td>60</td>
</tr>
<tr>
<td>Swine</td>
<td>1,710</td>
<td>23</td>
</tr>
<tr>
<td>Turkey</td>
<td>340</td>
<td>534</td>
</tr>
<tr>
<td>All others</td>
<td>621</td>
<td>285</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>5,334</strong></td>
<td><strong>5,511</strong></td>
</tr>
</tbody>
</table>
Table 2: Most common serotypes in 2018: 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>690</td>
<td>Kentucky</td>
<td>916</td>
</tr>
<tr>
<td>I 4,[5],12:i:-</td>
<td>664</td>
<td>Senftenberg</td>
<td>564</td>
</tr>
<tr>
<td>Dublin</td>
<td>484</td>
<td>Montevideo</td>
<td>461</td>
</tr>
<tr>
<td>Cerro</td>
<td>233</td>
<td>Mbandaka</td>
<td>387</td>
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<tr>
<td>Montevideo</td>
<td>184</td>
<td>Enteritidis</td>
<td>331</td>
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<tr>
<td>Newport</td>
<td>172</td>
<td>Typhimurium</td>
<td>195</td>
</tr>
<tr>
<td>Anatum</td>
<td>171</td>
<td>Worthington</td>
<td>183</td>
</tr>
<tr>
<td>Derby</td>
<td>168</td>
<td>Agona</td>
<td>178</td>
</tr>
<tr>
<td>Infantis</td>
<td>166</td>
<td>Cerro</td>
<td>161</td>
</tr>
<tr>
<td>Agona</td>
<td>151</td>
<td>Newport</td>
<td>157</td>
</tr>
<tr>
<td>All others</td>
<td>2,251</td>
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<td>1,978</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>5,334</strong></td>
<td><strong>Total</strong></td>
<td><strong>5,511</strong></td>
</tr>
</tbody>
</table>

Table 3: Most common serotypes in 2018: 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>109</td>
<td>Kentucky</td>
<td>881</td>
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<tr>
<td>Typhimurium</td>
<td>58</td>
<td>Senftenberg</td>
<td>444</td>
</tr>
<tr>
<td>Kentucky</td>
<td>33</td>
<td>Montevideo</td>
<td>428</td>
</tr>
<tr>
<td>Infantis</td>
<td>29</td>
<td>Mbandaka</td>
<td>347</td>
</tr>
<tr>
<td>Braenderup</td>
<td>14</td>
<td>Enteritidis</td>
<td>309</td>
</tr>
<tr>
<td>All others</td>
<td>74</td>
<td>All others</td>
<td>2,061</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>317</strong></td>
<td><strong>Total</strong></td>
<td><strong>4,425</strong></td>
</tr>
</tbody>
</table>

Table 4: Most common serotypes in 2018: Turkey

<table>
<thead>
<tr>
<th>Serotype</th>
<th>No. Isolates</th>
<th>Serotype</th>
<th>No. Isolates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albany</td>
<td>41</td>
<td>Senftenberg</td>
<td>100</td>
</tr>
<tr>
<td>Reading</td>
<td>39</td>
<td>London</td>
<td>96</td>
</tr>
<tr>
<td>Senftenberg</td>
<td>33</td>
<td>Bredeney</td>
<td>74</td>
</tr>
<tr>
<td>Uganda</td>
<td>31</td>
<td>Schwarzengrund</td>
<td>43</td>
</tr>
<tr>
<td>Anatum</td>
<td>28</td>
<td>Agona</td>
<td>29</td>
</tr>
<tr>
<td>All others</td>
<td>168</td>
<td>All others</td>
<td>192</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>340</strong></td>
<td><strong>Total</strong></td>
<td><strong>534</strong></td>
</tr>
</tbody>
</table>
### Table 5: Most common serotypes in 2018: Bovine

<table>
<thead>
<tr>
<th>Serotype</th>
<th>No. Isolates</th>
<th>Serotype</th>
<th>No. Isolates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dublin</td>
<td>467</td>
<td>Typhimurium</td>
<td>38</td>
</tr>
<tr>
<td>Cerro</td>
<td>211</td>
<td>Dublin</td>
<td>35</td>
</tr>
<tr>
<td>Montevideo</td>
<td>151</td>
<td>Montevideo</td>
<td>12</td>
</tr>
<tr>
<td>Typhimurium</td>
<td>140</td>
<td>Cerro</td>
<td>11</td>
</tr>
<tr>
<td>Heidelberg</td>
<td>78</td>
<td>All others</td>
<td>88</td>
</tr>
<tr>
<td>All others</td>
<td>625</td>
<td>Total</td>
<td>184</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,672</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table 6: Most common serotypes in 2018: Equine

<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>156</td>
<td>Newport</td>
<td>26</td>
</tr>
<tr>
<td>Newport</td>
<td>76</td>
<td>Mbandaka</td>
<td>16</td>
</tr>
<tr>
<td>Anatum</td>
<td>41</td>
<td>Typhimurium</td>
<td>8</td>
</tr>
<tr>
<td>Mbandaka</td>
<td>36</td>
<td>Javiana</td>
<td>3</td>
</tr>
<tr>
<td>Muenchen</td>
<td>29</td>
<td>Infantis</td>
<td>2</td>
</tr>
<tr>
<td>All others</td>
<td>336</td>
<td>All others</td>
<td>5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>674</strong></td>
<td><strong>Total</strong></td>
<td><strong>60</strong></td>
</tr>
</tbody>
</table>

### Table 7: Most common serotypes in 2018: Swine

<table>
<thead>
<tr>
<th>Serotype</th>
<th>No. Isolates</th>
</tr>
</thead>
<tbody>
<tr>
<td>4,[5],12:i:-</td>
<td>528</td>
</tr>
<tr>
<td>Typhimurium</td>
<td>242</td>
</tr>
<tr>
<td>Derby</td>
<td>153</td>
</tr>
<tr>
<td>Agona</td>
<td>90</td>
</tr>
<tr>
<td>Choleraesuis v. Kunzendorf</td>
<td>83</td>
</tr>
<tr>
<td>All others</td>
<td>614</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,710</strong></td>
</tr>
</tbody>
</table>

### Table 8: Summary of NVSL Salmonella Group D proficiency test

<table>
<thead>
<tr>
<th>Year</th>
<th>Participants</th>
<th>Mean Score</th>
<th>Below Passing</th>
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<tbody>
<tr>
<td>2013</td>
<td>61</td>
<td>94%</td>
<td>4</td>
</tr>
<tr>
<td>2014</td>
<td>80</td>
<td>98%</td>
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</tr>
<tr>
<td>2015</td>
<td>94</td>
<td>98%</td>
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</tr>
<tr>
<td>2016</td>
<td>98</td>
<td>97%</td>
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</tr>
<tr>
<td>2017</td>
<td>101</td>
<td>95%</td>
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</tr>
<tr>
<td>2018</td>
<td>98</td>
<td>98%</td>
<td>3</td>
</tr>
</tbody>
</table>

Vet-LIRN Salmonella Investigations for 2019
Renate Reimschuessel, Food and Drug Administration (FDA)

During 2019, FDA’s Veterinary Laboratory Investigation and Response Network (Vet-LIRN) investigated multiple consumer reports related to pig ear treats and raw pet food products. Salmonella was isolated from animal diagnostic samples (feces) and from products samples. Whole genome sequence analysis showed relatedness of some of the bacterial isolates from products to those isolated from the animals, and in one case to a human isolate in the National Center for Biotechnology Information (NCBI) database. Sequencing of case related material is proving a valuable tool for investigating consumer complaints regarding animal food. Vet-LIRN is also continuing its Antimicrobial Resistance Monitoring Program, which was initiated in 2017. Our 2017 dataset will be incorporated into the online National Antimicrobial Monitoring System (NARMS) integrated report. The 2018 dataset from Vet-LIRN’s program and the 2018 data collected by USDA’s NAHLEN network will be combined and also reported via the NARMS reporting website. These data will facilitate tracking veterinary pathogen susceptibility and provide a way to identify emerging issues.

Deciphering Salmonella Serovar Diversity in Food Animals
Nikki Shariat, University of Georgia

Salmonella is a leading bacterial cause of foodborne illness in the United States. It is a remarkably diverse species that can be separated into over 2,500 serovars, many which exhibit different phenotypes, including virulence, antimicrobial resistance, host restriction, and association with human illness. Food animals such as poultry and cattle are major Salmonella reservoirs, and current culture-based detection methodology limits the ability to assess the extent of mixed-serovar populations in these reservoirs.

The CRISPR arrays in Salmonella are highly conserved, and CRISPR spacer content and organization are well correlated with serovar identity. CRISPR-SeroSeq is an amplicon-based next-generation sequencing tool that exploits this characteristic to map frequencies of Salmonella serovars within a single population. This allows direct assessment of dynamic serovar changes in mixed populations and has been successfully used in poultry and cattle samples. CRISPR-SeroSeq detected serovars comprising as low as 0.003% of the total Salmonella population. CRISPR-SeroSeq can also distinguish between polyphyletic lineages of individual serovars, such as ser. Kentucky and Newport. In poultry and cattle, mixed serovar populations occurred in the majority of cases: in broiler house environments (98% of samples consisted of at least two serovars), in processing plants, pre-chiller (67%), and in feedlot cattle (59%).

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In a study examining the effect of antibiotic treatment on *Salmonella* populations we identified low populations of a serovar associated with antibiotic resistance in untreated cattle fecal samples, and high levels in treated cattle with cognate reduction in serovar diversity. CRISPR-SeroSeq was also used to investigate the effect of different *Salmonella* selective enrichment broths (tetrathionate and Rappaport-Vassiliadis) on serovar populations in broiler carcasses at processing. Broth-specific trends were identified, including a bias for ser. Enteritidis selection in tetrathionate and ser. Schwarzengrund in Rappaport Vassiliadis).

Improvements to the CRISPR-SeroSeq technology include amplification and sequencing of additional targets to reveal differences between distinct clades of a serovar. Amplicon-based next-generation sequencing approaches allow development of high-resolution diagnostics and investigation of *Salmonella* population dynamics in different agricultural systems. An ability to assess serovar diversity at the population level improves surveillance, and allows prioritization of serovar-specific mitigation strategies in food animals.

**Subcommittee Business:**

There were no Recommendations nor Resolutions for the Subcommittee to consider.

The Subcommittee meeting adjourned at 4:45 p.m. on October 28, 2019.
Robert Cobb, GA; Anita Edmondson, CA; Dee Ellis, TX; Katie Flynn, CA; Colin Gillin, OR; Thomas Hairgrove, TX; Rod Hall, OK; Hallie Hasel, TX; Burke L. Healey, CO; Carl Heckendorf, CO; Janemarie Hennebelle, GA; Terry Hensley, TX; Siddra Hines, WA; Dennis Hughes, NE; Anne Justice-Allen, AZ; Diane Kitchen, FL; Charlotte Krugler, SC; T.R. Lansford, TX; Randall Levings, IA; Eric Liska, MT; Thomas McKenna, MA; Sara McReynolds, KS; Peter Mundschenk, AZ; Alecia Naugle, MD; Dustin Oedekoven, SD; Elizabeth Parker, TX; Boyd Parr, SC; Angela Pelzel-McCluskey, CO; Mark Ruder, GA; Larry Samples, PA; Shawn Schafer, OH; Andy Schwartz, TX; Laurie Seale, WI; Michael Short, FL; Kathryn Simmons, DC; Ben Smith, WA; Diane Stacy, LA; Tracy Tomascik, TX; Alex Turner, CO; Jessica Watson, DC.

The Committee met on October 30, 2019 at the Rhode Island Convention Center in Providence, Rhode Island, from 8:00 a.m. to 12:07 p.m. There were 40 members and 35 guests present.

Dr. Diane Kitchen, Committee Chair, called the meeting to order and began the Committee meeting by introducing herself and Vice Chair T.R. Lansford, followed by a presentation of the Committee mission. Dr. Kitchen asked attendees to sign-in, reviewed the Committee agenda, and provided instruction regarding adherence to Robert’s Rules of Order during the business meeting. She also reminded attendees that only Committee members are eligible to vote on business items. Lastly, Dr. Kitchen announced that the Committee would be considering one resolution during the business meeting.

Presentations and Reports

Asian Longhorned Tick 2019
Thomas McKenna, USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS)

The Asian longhorned tick (ALHT) had no known established populations in the United States before finding it in New Jersey in 2017. It is a serious pest of livestock in the Australasian and Western Pacific Regions where it occurs. It is an aggressive biter and frequently builds intense infestations on domestic hosts causing great stress, reduced growth and production, and severe blood loss.

Since last year at this time, there is an increase from nine to twelve states reporting ALHT infestations.

In 2019, are the first reports in the U.S. of probable livestock death from this tick feeding in mass. More hosts have been recorded (including chickens), and pathogen testing and transmission experiments are ongoing, but no pathogens have been detected in U.S. ALHT to date. CDC
transmission experiments show they don’t transmit Borrelia burgdorferi (AKA Lyme disease).

Research Update - The Arthropod-Borne Animal Diseases Research Unit (October 2019)
Leela Noronha, Steve Behan, Lee Cohnstaedt, Barbara Drolet, Dana Mitzel, Dana Nayduch, William Wilson, USDA, Agricultural Research Service (ARS), Arthropod-Borne Animal Diseases Research Unit (ABADRU), Center for Grain and Animal Health Research (CGAHR)

The research mission of the ABADRU is to solve major endemic, emerging, and exotic arthropod-borne disease problems in livestock. The Unit is located at the CGAHR in Manhattan, Kansas. ABADRU research falls under ARS National Research Programs NP103: Animal Health and NP104: Veterinary, Medical, and Urban Entomology. The multidisciplinary team of nine senior scientists (two vacant) lead research ranging from vector biology to virus-vector-host interactions. Significant updates in ABADRU’s major research programs are highlighted below.

Adult house flies frequent microbe-rich sites such as dumpsters and animal manure for feeding and reproductive purposes. Flies become contaminated with and ingest a wide variety of bacteria which can be disseminated to other locations, including human habitation. We investigated total culturable bacteria and coliform abundance in male and female house flies collected from two environments: urban (restaurant dumpsters) and agricultural (dairy farm). We hypothesized that female flies would harbor more bacteria due to their increased association with substrates for oviposition, and that coliform abundance would be greater in agricultural flies where abundant manure is accessible. Overall, female flies harbored more bacteria than males and there was a sex by site interaction with sex effects present at the urban location. Coliform abundance did not differ by sex, site, or by sex within site. House flies carried antimicrobial resistant (AMR) strains of bacteria: 37/39 isolates were resistant to one or more antimicrobials and 65% of AMR strains were resistant to four or more antimicrobials.

Rift Valley fever (RVF) virus (RVFV) is an exotic zoonotic pathogen which poses a significant arthropod-borne animal disease threat to U.S. livestock if introduced. The rate which RVFV exchanges gene segments (reassorts) was investigated in cell-culture and sheep - a target host species. Methods to detect reassortants were developed including a reverse transcriptase-polymerase chain reaction (RT-PCR) with melt curve analysis assay to distinguish between distinct viral lineages. Plaque purified reassortants were then confirmed by sequence analysis. An additional method was developed to detect low copy genetic targets. Development and evaluation of improved diagnostic tools for RVF have also continued. A multiplex pathogen detection assay using the fluorescence microsphere immunoassay (FMIA) was evaluated in an RVFV-endemic country, Kenya, for use in diagnostics and surveillance. The RVF competitive Enzyme Linked
Immunosorbent Assay (cELISA) developed through a three-way collaboration (ARS, Kansas State University, and Texas A&M) has demonstrated reliable sensitivity and specificity and has been packaged commercially. Improvements in pathological tools for RVFV were made including the establishment of methods to detect RVF viral ribonucleic acid (RNA) and proteins in fixed tissues. In terms of RVF countermeasures, there are currently no antiviral treatments for RVFV; however, we have identified two potential candidates. Work is ongoing to understand the mechanisms of the candidate antiviral effects and to identify other potential small molecules RVFV antivirals.

Japanese encephalitis virus (JEV) is one of the most important etiologic agents for encephalitis worldwide. The virus is maintained in a cycle between culicine mosquitoes and vertebrate hosts. Work with wild-type JEV is strictly controlled and is limited to a Biosafety level-3 containment environment which is used for pathogens that can cause serious or lethal disease. The vaccine strain of JEV can be studied in lower containment laboratory environments which are common throughout the United States. The vaccine strain is known to grow in mosquito cells. However, the cell line that is typically used is not representative of the mosquito genus associated with most JEV vectors. The JEV vaccine strain was utilized to infect two cell lines derived from culicine mosquitoes. One cell line was derived from Culex quinquefasciatus which are known to be competent vectors for the virus in areas of Asia. The second cell line was derived from a species in the United States that has been shown to be a competent vector in a laboratory setting. Replication studies demonstrated that the virus produced peak titers after 2-3 days of infection and that the virus did not cause cytopathic effects to the cells. These data suggest that this system could be used as a surrogate for the more virulent viruses in studies examining the molecular mechanisms of the virus-vector interaction important for replication and maintenance in the culicine mosquitoes.

Female Culicoides sonorensis biting midges are vectors of epizootic hemorrhagic disease virus (EHDV), which causes morbidity and mortality in wild and domesticated ruminants. Key changes in female midge transcriptome profiles occurring during early infection with EHDV-2 were identified. In midges fed bloodmeals containing EHDV-2, 2,401 unigenes were differentially expressed compared to midges were fed negative control bloodmeals; approximately 60% were downregulated in response to the virus (953 up; 1,448 down). Downstream Gene Ontology enrichment, Kyoto Encyclopedia of Genes and Genomes (KEGG) pathway mapping, and manual analyses were used to identify the effect of virus ingestion at both the gene and pathway levels. Downregulated unigenes were predominantly assigned to pathways related to cell/tissue structure and integrity (actin cytoskeleton, adherens junction, focal adhesion, hippo signaling), calcium signaling, eye morphogenesis and axon guidance. Unigenes attributed to sensory functions (especially vision), behavior, learning and memory were
largely downregulated. Upregulated unigenes included those coding for innate immune processes, olfaction and photoreceptor pigments. The results of this project suggested that midges respond to virus infection as soon as 36 h post-ingestion, and that EHDV-2 may have a significant phenotypic effect on sensory and neural tissues.

In 2012, a major EHDV outbreak occurred in the U.S. following a summer of severe drought and abnormally high temperatures. In addition to large losses of white-tailed deer, the Midwest and northern Plains saw a significant amount of clinical disease in cattle. Although EHDV-1, -2 and -6 were isolated, EHDV-2 was the predominant virus serotype detected. Phylogenetic analyses and sequence comparisons of newly sequenced whole genomes of 2012 EHDV-2 cattle isolates demonstrated that eight of ten EHDV-2 genomic segments showed no genetic changes that separate the cattle outbreak sequences from other EHDV-2 isolates. Two segments, VP2 and VP6, did show several unique genetic changes specific to the 2012 cattle outbreak isolates, although the impact of the genetic changes on viral fitness is unknown. The placement of isolates from 2007 and 2011 as sister group to the outbreak isolates, and the similarity between cattle and deer isolates, point to environmental variables as having a greater influence on the severity of the 2012 EHDV outbreak than viral genetic changes.

Bluetongue virus (BTV) is transmitted by biting midges (Culicoides) and causes disease in domestic and wild ruminants. Transmission of viruses by insects is a complex mechanism. Insects must obtain virus from an infected animal during blood feeding. The virus then must replicate itself and disseminate within the insect so that it reaches the salivary glands to be excreted into another animal when the insect feeds again. In collaboration with researchers in The Netherlands, we used genetic approaches to show that small changes in one specific protein of the virus, the NS3 protein, significantly affected its ability to replicate in insects to a point where they would not be transmitted. Such large effects from such small genetic changes helps explain why virus strains that are very similar, may not be transmitted similarly.

Vesicular stomatitis (VS) is a veterinary viral disease of cattle, horses, and swine. In the U.S., VS produces devastating economic losses, particularly in the southwestern states where the outbreaks display an occurrence pattern of 7-10-year intervals. To date, the mechanisms of geographic spread and maintenance cycles during outbreaks remain unclear. This is due, in part, to the fact that VS epidemiology has a complex of variables to consider, including a broad range of vertebrate hosts, multiple routes of transmission, and an extensive diversity of suspected vector species acting as both, mechanical and biological vectors. Infection and viral progression within vector species are highly influenced by virus serotype, as well as environmental factors including temperature and seasonality; however, the mechanisms of viral transmission, including non-conventional pathways, are yet to be fully studied. In collaboration with researchers at
Kansas State University, ABADRU wrote a comprehensive review of VS transmission mechanisms, with comparisons of transmission evidence for the four most incriminated hematophagous insects: Aedes mosquitoes, Lutzomyia sand flies, Simulium black flies, and Culicoides biting midges. This provides a single, comprehensive source for livestock owners to evaluate and understand the current knowledge of VS epidemiology and insect transmission, and thereby better understand their risk of this animal disease based on vector populations present on their premises.

Currently, biting midge population management using pesticides is the best method to reduce contact between the bluetongue, VS, and EHD disease vector biting midges and domesticated animals. ABADRU has used the USDA biting midge colony in pesticide assays to determine which pesticides are the most efficacious for killing biting midges. The Centers for Disease Control (CDC) bottle bioassay was used to evaluate various pyrethroids, organophosphates, and carbamates to determine the best pesticides for areal application. All the products tested worked well, although pyrethroids had the fastest knockdown. The insects did show surprising resilience to recover or regain movement 24 hours post exposure to pesticides, suggesting an ability to metabolize the active ingredients. These assays will also be used to detect pesticide resistance. A shift in the mortality curves (a loss of product efficacy) will indicate the evolution of resistance to that active ingredient. Furthermore, larval habitat treatments were tested to determine which products reduced adult emergence. Insect growth regulators worked the best and at the lowest concentrations for larval habitat treatments.

Orbivirus Activities at National Veterinary Services Laboratories (NVSL)
Albert van Geelen, USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), NVSL

Dr. van Geelen provided a report to cover the testing summary for 2018 at NVSL for bluetongue virus (BTV) with a discussion of the options for polymerase chain reaction (PCR) and follow-up typing. NVSL does not perform typing of BTV unless specifically requested and cycle threshold (CT) values over 30 may require that vulture is performed prior to typing.
## Parasitic and Vector-Borne Diseases

### BTV Identifications at NVSL during 2018

<table>
<thead>
<tr>
<th>State</th>
<th>Serotype</th>
<th>Species</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>AZ</td>
<td>BTV-13</td>
<td>Mule deer</td>
<td>3</td>
</tr>
<tr>
<td>AZ</td>
<td>BTV-17</td>
<td>Mule deer</td>
<td>1</td>
</tr>
<tr>
<td>CA</td>
<td>BTV-17</td>
<td>Mule deer</td>
<td>1</td>
</tr>
<tr>
<td>CA</td>
<td>BTV-17</td>
<td>Cattle</td>
<td>2</td>
</tr>
<tr>
<td>CA</td>
<td>BTV-17</td>
<td>Sheep</td>
<td>1</td>
</tr>
<tr>
<td>CA</td>
<td>BTV-17</td>
<td>Pronghorn</td>
<td>1</td>
</tr>
<tr>
<td>NE</td>
<td>BTV-17</td>
<td>Bighorn sheep</td>
<td>1</td>
</tr>
<tr>
<td>NV</td>
<td>BTV-17</td>
<td>Pronghorn</td>
<td>2</td>
</tr>
<tr>
<td>NV</td>
<td>BTV-17</td>
<td>Elk</td>
<td>1</td>
</tr>
<tr>
<td>OR</td>
<td>BTV-17</td>
<td>Cattle</td>
<td>3</td>
</tr>
<tr>
<td>OR</td>
<td>BTV-17</td>
<td>Goat</td>
<td>1</td>
</tr>
<tr>
<td>OR</td>
<td>BTV-17</td>
<td>Sheep</td>
<td>5</td>
</tr>
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<td>BTV-17</td>
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</tr>
<tr>
<td>WY</td>
<td>BTV-13</td>
<td>Cattle</td>
<td>1</td>
</tr>
<tr>
<td>WY</td>
<td>BTV-17</td>
<td>White-tailed deer</td>
<td>1</td>
</tr>
</tbody>
</table>

1) All 3 animals were co-infected with EHDV-2.
2) Co-infected with BTV-13 and BTV-17.
3) Co-infected with EHDV-2.
4) First detection of BTV-13 in WY although it is known from neighboring states.
5) Isolated and submitted by Dr. Stallknecht from UGA.

### 2018 EHDV Identifications at NVSL

<table>
<thead>
<tr>
<th>State</th>
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<th>Species</th>
<th>Number</th>
</tr>
</thead>
<tbody>
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<td>EHDV-1 + EHDV-6</td>
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</tr>
<tr>
<td>AZ</td>
<td>EHDV-1</td>
<td>Mule deer</td>
<td>5</td>
</tr>
<tr>
<td>AZ</td>
<td>EHDV-2</td>
<td>White-tailed deer</td>
<td>1</td>
</tr>
<tr>
<td>IA</td>
<td>EHDV-2</td>
<td>White-tailed deer</td>
<td>4</td>
</tr>
<tr>
<td>IA</td>
<td>EHDV-2</td>
<td>Elk</td>
<td>2</td>
</tr>
<tr>
<td>MN</td>
<td>EHDV-2</td>
<td>White-tailed deer</td>
<td>1</td>
</tr>
<tr>
<td>NV</td>
<td>EHDV-2</td>
<td>Pronghorn</td>
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</tr>
<tr>
<td>NV</td>
<td>EHDV-2</td>
<td>Elk</td>
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</tr>
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<td>OR</td>
<td>EHDV-2</td>
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<tr>
<td>UT</td>
<td>EHDV-2</td>
<td>Cattle</td>
<td>2</td>
</tr>
<tr>
<td>WY</td>
<td>EHDV-2</td>
<td>White-tailed deer</td>
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</tr>
<tr>
<td>WY</td>
<td>EHDV-2</td>
<td>Mule deer</td>
<td>1</td>
</tr>
</tbody>
</table>

1) Four of the animals were co-infected with BTV.
2) First identification of EHDV-1 in AZ although it was repeatedly detected in neighboring states.
3) A part of a larger outbreak in cervids with typing of randomly-selected samples.
4) First identification of EHDV-2 in NV although present in neighboring states.
5) First identification of EHDV-2 in OR although present in neighboring states.
6) First identification of EHDV-2 in UT although it is present in neighboring states.
7) Co-infected with BTV-17.

### BTV Identifications (Jan-Sept 2019) at NVSL

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<thead>
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<th>Serotype</th>
<th>Species</th>
<th>Number</th>
</tr>
</thead>
<tbody>
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<td>BTV-17</td>
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<td>1</td>
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<tr>
<td>CA</td>
<td>BTV-17</td>
<td>White-tailed deer</td>
<td>1</td>
</tr>
<tr>
<td>CA</td>
<td>BTV-13</td>
<td>Cattle</td>
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</tr>
<tr>
<td>FL</td>
<td>BTV-18</td>
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</tr>
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<td>FL</td>
<td>BTV-18</td>
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</tr>
<tr>
<td>FL</td>
<td>BTV-19</td>
<td>Cattle</td>
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</tr>
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</tr>
<tr>
<td>FL</td>
<td>BTV-6</td>
<td>Goat</td>
<td>1</td>
</tr>
<tr>
<td>IA</td>
<td>BTV-11</td>
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</tr>
</tbody>
</table>

1) Isolated and submitted by Dr. Stallknecht from UGA.
REPOR

REPORT OF THE COMMITTEE

EHDV Identifications at NVSL: Jan – Sept 2019

<table>
<thead>
<tr>
<th>State</th>
<th>Serotype</th>
<th>Species</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA</td>
<td>EHDV-2</td>
<td>Cattle</td>
<td>1</td>
</tr>
<tr>
<td>IA</td>
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<td>IA</td>
<td>EHDV-6</td>
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<tr>
<td>MN</td>
<td>EHDV-2</td>
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<td>12</td>
</tr>
</tbody>
</table>

Equine Infectious Anemia (EIA)/ Equine Piroplasmosis (EP) – Updates and Illegal Movements
Angela Pelzel-McCluskey, USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS)

More than 22,000 U.S. horses have been tested for EP so far during the 2019 calendar year with 65 T. equi-positive horses found in six states. All 65 EP-positives are Quarter Horse racehorses with iatrogenic transmission of the disease either suspected or confirmed. Thirteen (13) of these horses were found to be dually infected with both EP and EIA. Many of the 65 EP-positives were confirmed to be participating either currently or previously in unsanctioned racing which remains a key risk factor for exposure to the disease. Several of these horses also had a history of illegal movement from Mexico. The horses that were co-infected with both EP and EIA have been euthanized and many of the remaining EP-positive horses have been enrolled in the USDA-APHIS EP Treatment Program. All EP-positive horses will remain quarantined until permanent clearance of T. equi through high-dose imidocarb dipropionate treatment is achieved and the horse maintains T. equi-negative status on all diagnostic testing. To date, there have been 323 horses treated in the U.S. for EP with 276 horses having met the clearance and test negative criteria for quarantine release.

While total test numbers for EIA testing in 2019 have not yet been compiled, they are expected to be comparable to the total tests conducted in 2018 in which more than 1.2 million U.S. horses were EIA tested. So far in 2019, there have been 86 horses confirmed as EIA positive in 17 states. At least 70 of the 86 EIA-positive horses are Quarter Horse racehorses with iatrogenic transmission of the disease either suspected or confirmed. Many of the EIA-positive horses were found to be participating in unsanctioned racing. One of the 86 EIA-positive horses was a Thoroughbred racehorse from Florida participating in sanctioned racing and is suspected to have acquired the infection during a period of injury layup in which an unidentified platelet-rich plasma (PRP) product was administered to the horse by a foreign veterinarian not licensed in the U.S. It is suspected that the PRP product may have been illegally brought into the U.S. from another country. The same unlicensed foreign veterinarian is also linked to PRP treatment of a Thoroughbred racehorse found EIA-positive in Florida in 2017.
Several in-depth EP/EIA case studies, including the EIA-positive Florida Thoroughbred racehorse case described above, were presented during the committee meeting. These cases highlighted the ongoing challenges of illegal movement of horses from EP/EIA endemic countries, illegal interstate movement of unsanctioned racehorses and of quarantined horses for the purposes of continued racing, suspected illegal movement of blood products from other countries, and foreign veterinarians practicing in the U.S. without a license. Other challenges mentioned included: the need for diligent microchipping of EP/EIA infected and exposed horses in all states and the need for a searchable database to trace these microchip numbers; the lack of knowledge and interaction with unsanctioned racing venues in most states and the safety concerns inherent in those interactions; the apparent absence of involvement of sanctioned racing authorities in addressing EP/EIA positive horses and unsanctioned racing; and the ongoing concern about the potential for EP/EIA-positive horses to move into other equine industry sectors at the conclusion of their racing career.

**USDA Cattle Fever Ticks 2019**

Hallie Hasel, USDA, Animal and Plant Health Inspection Services (APHIS), Veterinary Services (VS)

The Cattle Fever Tick Eradication Program (CFTEP) encompasses an area of land along the Texas/Mexico border from Del Rio to Brownsville, approximately 500 miles. This strip of land was established in 1938 as the Permanent Quarantine Zone (PQZ), a border to keep the cattle fever tick from moving north following its eradication from most of the southeast U.S.

In FY2019, the number of infested premises increased slightly, primarily in Zapata and Webb Counties within the PQZ, and due to new infestations in Jim Hogg and Jim Wells Counties north of the PQZ. The CFTEP now has 3,121 premises under quarantine, with 185 as infested premises. Fever ticks have progressed into the northern portion of Webb County and into previously fever tick free areas of Webb and Zapata Counties. Changing demographics along the southern border, in conjunction with continued fever tick pressure from Mexico, have contributed significantly to the increase in infested premises. Mexico does not have a fever tick eradication program, and both infested livestock and wildlife continue to move across the border.

CFTEP has limited available treatments for fever ticks. Livestock treatments include CoRal spray/dip, Dectomax Injectable, and Ivermectin medicated molasses tubs. Wildlife treatment is limited to Ivermectin treated corn for whitetail deer; no other forms of treatment are available for exotic wildlife, including nilgai, axis, red deer, and other exotics now present along the southern border.

The BM86 fever tick vaccine was introduced in September 2016 and continues to be used in the PQZ. Limited herds have been injected outside
of the PQZ following an epidemiological risk assessment. CFTEP has administered over 28,000 doses since the vaccine was introduced.

Fever tick research is in high demand. Alternative treatment methods and treatments with longer duration of kill in livestock are currently under research with ARS and academic collaborators. Wildlife treatment methods, including exotics, and treatment for pastures/premises/cleaning/disinfection are also required for fever tick eradication to continue.

Fever tick deoxyribonucleic acid (DNA) continues to provide clues as to ongoing outbreaks, both within and outside of the PQZ. Recent outbreaks are primarily due to new DNA, thus from ticks recently introduced into Texas, most likely from south of the Rio Grande River.

The Rio Bravo Buffer Zone working group was formed in 2019 and will continue planning towards establishment of the zone on the south side of the Rio Grande River. The mission and goals are currently being established.

**Rio Bravo Buffer Zone**

Andy Schwartz, Texas Animal Health Commission (TAHC)

Cattle Fever Ticks (CFT), Rhipicephalus annulatus and R. microplus, vectors of bovine babesiosis (BB), are endemic to Mexico. Repeated and expansive outbreaks of CFT occur in Texas due to ticks carried by certain wildlife species and stray livestock moving northward across the U.S. border. USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Service (VS) and TAHC maintain a permanent quarantine zone along a 500 mile stretch of the Rio Grande, and regularly monitor livestock and wildlife in this buffer zone to detect incursions of CFT. In order to reduce the incidence of these incursions, a bi-national cooperative effort is underway to establish a buffer zone south of the Rio Grande in Mexico, mirroring the buffer zone in Texas, and named the Rio Bravo Buffer Zone. A steering committee has been assembled with representatives of both federal governments and the states of Tamaulipas, Nuevo Leon, Coahuila, and Texas. CFT eradication measures will be cooperatively deployed in the Rio Bravo Buffer Zone with the goal of reducing and eventually eliminating the population of CFT. Expected outcomes are improvements to the health and marketability of cattle in the zone, and reduction in the number of CFT outbreaks in Texas.

**Effects of Drought and Media-Reported Violence on Cattle Fever Tick (CFT) Incursions**

Amy Delgado, Center for Epidemiology and Animal Health (CEAH), USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS)

Ectoparasites, including cattle fever ticks, pose a risk to the global cattle population, both in reduced productivity and in livability. Cattle fever was once endemic in U.S. cattle, but was eradicated through concerted and costly efforts. Reintroduction to U.S. cattle could lead to substantial mortality and costs in terms of containment, eradication, and effects on producers and
PARASITIC AND VECTOR-BORNE DISEASES

consumers. A permanent quarantine area provides constant surveillance for reincursions to minimize those risks.

Factors influencing the movement of hosts and ticks through the border region are varied and complex. In addition to climate-related factors, human directed ecosystem changes can lead to instability and changes in tick habitation and pest pressure. In addition, societal factors leading to farm abandonment may increase the movement of infected cattle across the border. The purpose of this study was to examine the effects of media-reported violence on incursions of cattle fever tick infested livestock.

Violent activity was collected using a media index for search terms related to border violence adjacent to the PCFTQ. An overall media index was calculated by averaging and re-indexing indices collected for the study region of various search terms related border violence, drug cartel violence, and Mexican drug cartel activities using Google Trends. To account for environmental factors that may lead to increase in stray cattle movements or changes in optimal tick habitation, weather data were collected from the National Oceanic and Atmospheric Administration's (NOAA) National Climatic Data Center. This includes hydrological and ambient data such as maximum temperatures and precipitation indices.

Over time, the number of infested cattle apprehended by tick riders has increased. Media-reported violence was shown to have a positive effect on the number of infested cattle apprehended, even when accounting for the effects of patrol resources, climate, and ecosystem. With continued land use changes, social unrest, and changing weather patterns, the efforts to control and eradicate CFT, both in the United States and globally, will be an ongoing concern.

2019 Vesicular Stomatitis Outbreak
Angela Pelzel-McCluskey, USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS)

On June 21, 2019, the National Veterinary Services Laboratories (NVSL) in Ames, Iowa, confirmed a finding of vesicular stomatitis virus (VSV) infection (Indiana serotype) on an equine premise in Kinney County, Texas. This was the index case of VSV for the 2019 outbreak and for the state of Texas. As the outbreak progressed, seven additional states became confirmed as VSV-affected: New Mexico on June 26, Colorado on July 3, Wyoming on July 24, Oklahoma on July 29, Nebraska on August 9, Utah on August 19, and Kansas on October 23, 2019. A total of 1,131 premises in these eight states have been either suspected or confirmed as VSV-infected during the outbreak to date and placed under state quarantine. Quarantines remain for a period of 14 days from the onset of lesions in the last affected animal on the premises and vector mitigation strategies and enhanced biosecurity procedures are recommended on quarantined premises to reduce within-herd spread of the disease.
REPORT OF THE COMMITTEE

The breakdown of the number of quarantined premises and affected counties by state are shown in Table 1 below and the distribution of affected premises is shown in Figure 1.

Table 1. Total number of VSV-affected premises by state as of October 23, 2019

<table>
<thead>
<tr>
<th>State</th>
<th># Counties Positive</th>
<th># Confirmed Positive Premises</th>
<th># Suspect Premises</th>
<th>Total # Premises Quarantined</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colorado</td>
<td>38</td>
<td>269</td>
<td>417</td>
<td>686</td>
</tr>
<tr>
<td>Kansas</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Nebraska</td>
<td>4</td>
<td>15</td>
<td>10</td>
<td>25</td>
</tr>
<tr>
<td>New Mexico</td>
<td>12</td>
<td>47</td>
<td>29</td>
<td>76</td>
</tr>
<tr>
<td>Oklahoma</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Texas</td>
<td>37</td>
<td>76</td>
<td>96</td>
<td>172</td>
</tr>
<tr>
<td>Utah</td>
<td>6</td>
<td>12</td>
<td>11</td>
<td>23</td>
</tr>
<tr>
<td>Wyoming</td>
<td>11</td>
<td>41</td>
<td>106</td>
<td>147</td>
</tr>
<tr>
<td>TOTAL:</td>
<td>110</td>
<td>462</td>
<td>669</td>
<td>1,131</td>
</tr>
</tbody>
</table>
Figure 1. Cumulative map of VSV-affected counties: June 21 – October 23, 2019

Of the 1,131 VSV-affected premises identified, 1,119 premises have had only equine species clinically affected, 11 premises have had only cattle clinically affected, and one premises has had both equine and cattle clinically affected. Since the start of the outbreak, a total of 1,058 premises have completed the required quarantine period and been released, but there are 73 premises still quarantined for VSV at the time of this writing.

SCWDS Update: Epizootic Hemorrhagic Disease Virus (EHDV)/Bluetongue Virus (BTV) Surveillance and Arthropod Surveys
Mark G. Ruder, Southeastern Cooperative Wildlife Disease Study (SCWDS), College of Veterinary Medicine, University of Georgia
(Other authors) Stacey Vigil, Seth White, Alec Thompson, Natalie Stilwell, Brianna Williams, Rebecca Poulson, Michael Yabsley and David Stallknecht, SCWDS, College of Veterinary Medicine, University of Georgia; James Mertins, USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), National Veterinary Services Laboratories (NVSL)

In collaboration with the USDA-APHIS-VS and SCWDS member wildlife agencies, SCWDS conducts surveys for exotic arthropods across the United States and Caribbean region. Past and current programs include surveys for the tropical bont tick on wildlife; surveys for cattle fever ticks on wildlife in Texas; and surveys for *Haemaphysalis longicornis* and other exotic ticks on wildlife. Surveys for cattle fever ticks (*Rhipicephalus annulatus* and *R. microplus*) are ongoing in Texas, in collaboration with USDA-APHIS-VS and
the Texas Animal Health Commission (TAHC). SCWDS personnel examined 223 hunter-harvested animals during December 2018 and January 2019 from 20 counties in south Texas. No cattle fever ticks were found. Additional surveys are scheduled for December 2019, and January 2020.

Since the fall/winter of 2017, SCWDS has worked with numerous state, federal, and private groups to conduct surveys of wildlife for *H. longicornis*. Methods have included 1) live animal trapping and environmental sampling in localized areas where *H. longicornis* has been documented, 2) passive regional surveillance of white-tailed deer and other wildlife, and 3) tick collections from wildlife presented to wildlife rehabilitation facilities in areas where *H. longicornis* has been documented. As of October 25, 2019, we have examined ticks from ~1,600 individuals representing 53 species from 21 states resulting in numerous new state, county, and host records. Although the situation is dynamic, to date, we have detected *H. longicornis* in seven states (New Jersey, Maryland, West Virginia, Virginia, North Carolina, Kentucky, and Pennsylvania) on white-tailed deer, raccoons, Virginia opossum, elk, woodchuck, red fox, gray fox, coyote, eastern cottontail, and red-tailed hawk.

Annually, SCWDS processes tissue samples from throughout the United States from wild ruminants with suspected orbiviral hemorrhagic disease. Molecular detection (e.g., conventional and quantitative reverse transcription PCR). For samples that test positive by RT-PCR, virus isolation is attempted, and isolates are identified to serotype. Samples with no virus isolate are not further typed. Findings from the 2018 and 2019 transmission seasons are reported here. During 2018, 102 viruses were detected from 212 tissue samples, representing six species of wild ruminant (183 white-tailed deer, 16 mule deer, 10 elk, one pronghorn, one bighorn sheep, and one moose) from 23 states. Isolations of epizootic hemorrhagic disease virus (EHDV)-2 (58), EHDV-6 (1), bluetongue virus (BTV)-1 (1), BTV-18 (1), and BTV-24 (2) were made from white-tailed deer or mule deer (see Table). An additional 25 untyped BTVs were detected in white-tailed deer, mule deer, or elk (Florida, Georgia, Idaho, Maryland, Missouri, Mississippi, North Carolina, Nebraska, Pennsylvania, and South Carolina), and 14 untyped EHDVs were detected in white-tailed deer, mule deer, or elk (Florida, Missouri, Mississippi, Montana, North Carolina, Nebraska, Pennsylvania, South Carolina, Tennessee, and West Virginia). As of October 24, 2019, 196 viruses have been detected from 316 tissue samples, representing 25 states and five species (293 white-tailed deer, nine mule deer, eight elk, four pronghorn, and two cattle). To date, isolations of EHDV-1 (1), EHDV-2 (126), and bluetongue virus (BTV)-2 (1) were made from white-tailed deer, pronghorn, or cattle (see Table). An additional 16 untyped BTVs have been detected in white-tailed deer (Arkansas, Florida, Georgia, North Carolina, Nebraska, Pennsylvania, and West Virginia) and 52 untyped EHDVs have been detected in white-tailed deer, mule deer, or elk (Arkansas, Florida, Georgia, Idaho, Indiana, Kansas, Kentucky, Missouri, North Carolina, Wisconsin, and West Virginia).
### 2018 SCWDS EHDV & BTV Diagnostics

**Virus Serotypes Detected**

<table>
<thead>
<tr>
<th>STATE</th>
<th>SPECIES</th>
<th>VIRUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Florida</td>
<td>white-tailed deer</td>
<td>EHDV-2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>BTV-18</td>
</tr>
<tr>
<td></td>
<td></td>
<td>BTV-24</td>
</tr>
<tr>
<td>Georgia</td>
<td>white-tailed deer</td>
<td>EHDV-2</td>
</tr>
<tr>
<td>Idaho</td>
<td>white-tailed deer</td>
<td>EHDV-2</td>
</tr>
<tr>
<td>Kansas</td>
<td>white-tailed deer</td>
<td>EHDV-2</td>
</tr>
<tr>
<td>Kentucky</td>
<td>white-tailed deer</td>
<td>EHDV-2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Louisiana</td>
<td>white-tailed deer</td>
<td>EHDV-2</td>
</tr>
<tr>
<td>Missouri</td>
<td>white-tailed deer</td>
<td>EHDV-2</td>
</tr>
<tr>
<td>Mississippi</td>
<td>white-tailed deer</td>
<td>EHDV-2</td>
</tr>
<tr>
<td>Montana</td>
<td>mule deer</td>
<td>EHDV-2</td>
</tr>
<tr>
<td>North Carolina</td>
<td>white-tailed deer</td>
<td>EHDV-2</td>
</tr>
<tr>
<td>North Dakota</td>
<td>white-tailed deer</td>
<td>EHDV-2</td>
</tr>
<tr>
<td></td>
<td>mule deer</td>
<td>EHDV-2</td>
</tr>
<tr>
<td>Nebraska</td>
<td>mule deer</td>
<td>EHDV-2</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>white-tailed deer</td>
<td>EHDV-2</td>
</tr>
<tr>
<td>West Virginia</td>
<td>white-tailed deer</td>
<td>EHDV-2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>BTV-1</td>
</tr>
</tbody>
</table>

### 2019 SCWDS EHDV & BTV Diagnostics

**Virus Serotypes Detected**

*as of October 24, 2019*

<table>
<thead>
<tr>
<th>STATE</th>
<th>SPECIES</th>
<th>VIRUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alabama</td>
<td>white-tailed deer</td>
<td>EHDV-2</td>
</tr>
<tr>
<td>Arkansas</td>
<td>white-tailed deer</td>
<td>EHDV-2</td>
</tr>
<tr>
<td>Georgia</td>
<td>white-tailed deer</td>
<td>EHDV-1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>BTV-2</td>
</tr>
<tr>
<td>Idaho</td>
<td>white-tailed deer</td>
<td>EHDV-2</td>
</tr>
<tr>
<td></td>
<td>pronghorn</td>
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</tr>
<tr>
<td>Missouri</td>
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<td>EHDV-2</td>
</tr>
<tr>
<td>North Carolina</td>
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<td>North Dakota</td>
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</tr>
<tr>
<td>Virginia</td>
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</tr>
<tr>
<td>West Virginia</td>
<td>white-tailed deer</td>
<td>EHDV-2</td>
</tr>
<tr>
<td></td>
<td>cattle</td>
<td>EHDV-2</td>
</tr>
</tbody>
</table>
This presentation highlights research outcomes done by scientists with the Livestock Arthropod Pest Research Unit of the USDA-ARS Knipling-Bushland U.S. Livestock Insects Research Laboratory in collaboration with national and international collaborators. This presentation reported the results of research only. Mention of a proprietary product does not constitute an endorsement or a recommendation by the USDA for its use.

As part of a national emergency response, ARS scientists at Kerrville, Texas, collaborated with researchers at Texas A&M University System AgriLife Extension and in New Zealand to sequence the genome of the longhorned tick. The completed genome opens new avenues of research for longhorned tick control, including vaccine development and detection of pesticide resistance-associated genes. In this regard, pyrethroids comprise a class of acaricides altering the tick nervous system that are found in several products commercialized in the U.S. Mutations in the sodium channel targeted by pyrethroids are known to result in insensitivity to treatment. Thus, molecular experiments were done by ARS scientists in Kerrville, Texas and cooperators at Rutgers University to characterize the longhorned tick sodium channel to inform decisions on the use of treatments with products containing pyrethroids. No mutations previously associated to pyrethroid resistance were detected in the tested longhorned tick samples from New Jersey. This is the first characterization of a gene in the longhorned tick associated with acaricide resistance.

Cattle fever ticks (CFT) remain a real and present threat to U.S. cattle production because they are established in Mexico. Additionally, livestock-wildlife interactions in the Permanent Quarantine Zone (PQZ) established by the Cattle Fever Tick Eradication Program (CFTEP) in south Texas on the border with Mexico endanger its operations. Interactions between cattle, white tailed deer (WTD), and nilgai antelope were simulated by ARS scientists in Kerrville, Texas and collaborators at Texas A&M University to assess the risk for CFT infestations in the PQZ and beyond. This research documented the use of enhanced biosurveillance simulation tools to mitigate risk and enhance current control strategies for use in the operations of area-wide tick management programs like the CFTEP through integrated tactics for CFT suppression.

Alternative treatments with novel modes of actions are needed for the effective treatment of tick infestations in livestock because the frequency of tick populations that are resistant to conventional acaricides keeps growing worldwide. Tekko® Pro is an insect growth regulator concentrate product containing 1.3% novaluron and 1.3% pyriproxyfen as the active ingredient. This product is registered with the Environmental Protection Agency (EPA) for use indoors and outdoors on furniture, carpets, and kennels. Studies by
ARS scientists in Kerrville, Texas showed that Lone star tick larvae did not develop to the next stage when infesting treated cattle. This effect lasted for ~30 days. The development of cattle fever tick larvae was inhibited when the ticks were placed on cattle that had been treated on the previous day. This product could be developed to treat cattle against tick infestations.

White-tailed deer infestations threaten the viability of CFT eradication efforts. Hides from hunted white-tailed deer are systematically inspected and treated with substances to kill ticks, also known as acaricides, before they leave areas in south Texas known to be at risk of CFT infestation. However, safer acaricides are needed to treat deer hides infested with CFT, specifically the southern cattle fever tick (SCFT). The invasive SCFT is considered the most economically important external parasite of livestock worldwide. Laboratory experiments simulating infested deer hides by ARS scientists in Kerrville, Texas, showed that a commercial product containing a mixture of essential oils killed all the immature SCFT, reducing female fertility by 94%, and killing 98% of the fully engorged females.

Ticks are of significant One Health importance because most tick-borne diseases are zoonotic. Enhanced pathogen detection is needed to improve the diagnosis of tick-borne diseases impacting animal and public health. ARS scientists in Kerrville, Texas and collaborators at Texas A&M University developed the TickPath Layerplex, which is an innovative molecular assay to detect several tick-borne pathogens. TickPath Layerplex detects several groups of tick-borne pathogens in a sample distinguishing the type of tick-borne pathogen in the sample. Test results guide the decision for rapid and appropriate treatment. TickPath Layerplex testing is offered by the Texas Veterinary Medical Diagnostic Laboratory. It can be used during or after treatment of some tick-borne diseases as serologic titers can be persistent despite treatment of infection.

Surveillance for acaricide resistance is critical to design strategies that mitigate risks for its development and spread. A rapid molecular test was developed by ARS scientists in Kerrville, Texas to detect different mutations simultaneously in the SCFT genome associated with resistance to pyrethroids, which is a class of pesticidal compounds commonly used for their acaricidal properties. Results from tests using this assay were combined with data sets obtained previously and analyzed to evaluate the temporal epidemiology of resistance to the pyrethroid permethrin among SCFT causing outbreaks in the U.S.

ARS developed an ultra-quiet nematode sprayer used previously to treat nilgai. The nematode dispensed by the sprayer kills the ticks selectively. This technology is being adapted to treat white-tailed deer. ARS scientists in Kerrville, Texas and cooperators at Texas A&M University-Kingsville determined that deer behave normally at corn feeders with the attached sprayer system. This new technology could be used during the hunting season to treat CFT infestations in deer.

ARS scientists in Kerrville, Texas analyzed infestation and environmental
data, and samples collected from hunted or culled nilgai to enhance our understanding of how this exotic wildlife species complicates efforts by the CFTEP. The correlation noted between infestation and habitat with thorn scrub suggested that the vegetative canopy promotes fever tick survival, which likely impacts infestation levels of nilgai in southeastern Texas. One nilgai was seropositive for *Babesia bovis* and *B. bigemina*, the microbes causing bovine babesiosis, by complement fixation. However, it remains to be determined if productive infection with the agents of bovine babesiosis occurs in nilgai. Eleven of the nilgai tested were seropositive to antibodies against the bacterium causing bovine anaplasmosis.

*Rhipicephalus annulatus* is the other cattle fever tick species established in Mexico that threatens U.S. animal agriculture because of its vector ability to transmit the microbes causing bovine babesiosis. Collaborative efforts between ARS scientists in Kerrville, Texas with the Veterinary Pest Genomics Center and Texas A&M University unraveled the genome of *R. annulatus*. This offers the opportunity to translate genomic information for the innovation of technologies the CFTEP can use to keep the U.S. free of CFT in a sustainable manner. A way to do this is through comparative genomics using previously discovered sequences from the southern CFT for applied research to develop anti-fever tick vaccines.

Some arthropod disease vectors are known to modulate the immune response by susceptible host, which can promote the transmission of vector-borne pathogens. Based on previous results, it was hypothesized that the presence of an active acetylcholinesterase (AChE) in the saliva of the SCFT might be involved in the immunoregulation of the host response to tissue damage during blood feeding. ARS scientists in Kerrville, Texas obtained further evidence consistent with this hypothetical paradigm by demonstrating that multiple arthropods and biological vectors of disease including several tick species, mosquitoes, and sand flies contain AChE in their saliva. Non-biological vectors biting arthropods such as horn flies and stable flies that also feed on blood lacked salivary AChE. Science-based knowledge from confirmatory evidence that salivary AChE plays a role at the tick-host interface during blood feeding could be used to innovate tick control technologies that also block the transmission of SCFT-borne pathogens.

The use of genome editing technology CRISPR-Cas9 was validated in the New World screwworm through a research partnership between scientists with the ARS scientists at Kerrville, Texas, the University of North Carolina, and the University of Campinas in Brazil. This research technology is a key tool in developing gene drive strains and can be used to understand gene function. The technique was verified by knocking out genes for body color, olfaction, and sex determination. This method is being adapted for transgenic screwworm research.

Horn fly populations resistant to commercial products used to treat infestations in cattle is a growing problem. Safer insecticides with new modes of action are needed. ARS scientists at Kerrville, Texas determined that
laboratory grade limonene, a botanical with pesticidal properties, and a commercial formulation of limonene reduced horn fly egg viability whereas contact exposure to adults caused up to 100% knockdown. Moreover, laboratory grade limonene caused adult contact mortality. Limonene was attractive to horn flies at low concentrations of less than 0.1%. This property could be used to trap horn flies away from cattle.

Committee Business:
The Committee conducted a business meeting as follows:
1) Call to order - 9:53AM
   a. Review of Committee Mission
   b. Establish quorum – 13 members – quorum established
2) New Business
   a. Resolution – Equine Infectious Anemia (EIA) and Equine Piroplasmosis (EP) Control Strategies
      i. Motion to adopt
         1. Moved – Katy Flynn
         2. Seconded – Andy Schwartz
      ii. Discussion - none
      iii. Vote – carried unanimously
3) Old Business - none
4) A motion (moved and seconded) to adjourn the Committee was made and passed at 12:07 p.m.
The Committee met on Tuesday, October 29, 2019 at the Rhode Island Convention Center in Providence, Rhode Island from 8:00 a.m. to 5:20 p.m. There were 47 Committee members and 43 guests present for a total of 90 meeting attendees. Chair Yuko Sato presided, assisted by Melissa Yates, Vice Chair. Sato welcomed the Committee on Poultry and Other Avian Species (CPAS) members, summarized the 2018 meeting.

Presentations and Reports

USDA-APHIS-VS Update was presented by Alan Huddleston, United States Department of Agriculture, Animal and Plant Health Inspection
POULTRY AND OTHER AVIAN SPECIES

Services, Veterinary Services (USDA-APHIS-VS). A summary of the report is included in these proceedings.

Virulent Newcastle Disease (VND) in California Response Updates was given by Annette Jones and Lisa Quiroz, California Department of Food and Agriculture and Clint Turnage, USDA-APHIS, Wildlife Services (WS). A summary of the report is included in these proceedings.

Epidemiologic Analysis of Low Pathogenicity Avian Influenza (LPAI) Outbreak in Minnesota was presented by Marie Culhane and Emily Waltz, University of Minnesota. A summary of the report is included in these proceedings.

Association of Veterinarians in Broiler Production (AVBP) Current Diseases of Concern was given by Scott Gustin, Tyson Foods. A summary of the report is included in these proceedings.

Table Egg Layer Industry Report was given by Eric Gingerich, Diamond V. A summary of the report is included in these proceedings.

Turkey Industry Report was given by Lindy Froebel, National Turkey Federation. A summary of the report is included in these proceedings.

Multistate Analysis of Backyard Poultry Mortality was given by Kristy Pabilonia. A summary of the report is included in these proceedings.

American Association of Avian Pathologist (AAAP) Meeting Report was given by Eric Jensen, Aviagen Inc. and Eric Gingerich, Diamond V. A summary of the report is included in these proceedings.

Center for Disease Control (CDC) Update: Multistate Enteric Illness Outbreaks Linked to Poultry was given by Megin Nichols and Laura Gieraltowski, CDC. A summary of the report is included in these proceedings.

U.S. Poultry and Egg Association Report was given by Denise Heard, U.S. Poultry and Egg Association. A summary of the report is included in these proceedings.

Avian Influenza (AI) and Newcastle Disease Virus (NDV) Subcommittee Report was given by David Suarez, USDA, Agricultural Research Service (ARS), Southeast Poultry Research Laboratory (SEPRIL). A summary of the report is included in these proceedings.

National Veterinary Services Laboratories (NVSL) Avian Influenza and Newcastle Disease Report was given by Mia Kim Torchetti, USDA-APHIS-VS-NVSL. A summary of the report is included in these proceedings.

NVSL Bacteriology Diagnostics Report was given by Kristina Lantz, USDA-APHIS-VS-NVSL. A summary of the report is included in these proceedings.

USA Interagency Surveillance for Highly Pathogenic Avian Influenza (HPAI) in Wild Birds was presented by Tom DeLiberto, USDA-APHIS, Wildlife Services (WS). A summary of the report is included in these proceedings.

National Poultry Improvement Plan (NPIP) Update was presented by Elena Behnke, USDA-APHIS-VS-NPIP. A summary of the report is included in these proceedings.
National List of Reportable Animal Diseases (NLRAD) was given by Rebecca Jones. A summary of the report is included in these proceedings. Multistate Psittacosis Outbreak Among Poultry Plant Workers, 2018: Animal Health Perspectives was given by Tracey Dutcher, USDA-APHIS-VS. A summary of the report is included in these proceedings. World Organization for Animal Health (OIE) Update – Poultry was given by Michael David, USDA-APHIS-VS, National Import Export Services (NIES). A summary of the report is included in these proceedings. Live Bird Market System Report was given by Fidelis Hegngi, USDA-APHIS-VS. A summary of the report is included in these proceedings. Center for Epidemiology and Animal Health (CEAH) Report was presented by Amy Delgado, USDA-APHIS-VS-CEAH. A summary of the report is included in these proceedings. Compartmentalization of Primary Breeders was given by Alberto Torres, Cobb-Vantress Inc. A summary of the report is included in these proceedings. Estimating the Time of Disease Introduction in vND in Layer Barns Using Experimental Data was presented by Marie Culhane and Emily Waltz, University of Minnesota. A summary of the report is included in these proceedings.

Committee Business:
Sub-Committee Report: The Avian Influenza/Newcastle Disease Subcommittee Report as presented by David Suarez was approved by the Committee on Poultry and Other Avian Species (CPAS).

Old Committee Business: None
New Committee Business: None
Committee Recommendations: None
Committee Resolutions: There were two Resolutions that were brought before the Committee and passed.

There being no further business the CPAS adjourned at 5:20 p.m.

USDA-APHIS-VS Update
Alan Huddleston, USDA, Animal and Plant Health Inspection Services (APHIS), Veterinary Services (VS)
APHIS-VS Avian Health Accomplishments and Challenges in FY2019 Resources
In March 2019, the National Poultry Improvement Plan (NPIP) team welcomed back Elena Behnke. Dr. Behnke rejoined Federal service and specifically the NPIP after a period of years in the private sector. Elena joined the NPIP as the avian influenza (AI) Compartmentalization Program specialist.

In July 2019, the Aquaculture, Swine, Equine and Poultry Health Center (ASEP) welcomed a Julie Gauthier as the new Assistant Director of Poultry Health. Dr. Julie oversees the day-to-day planning and response for avian

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health. She also oversees the National Poultry Improvement Plan (NPIP) team.

In September 2019, Dr. Elena Behnke assumed the role of Senior Coordinator, filling in behind Dr. Denise Heard and ensuring a seamless transition to keep this critical leadership role filled and functional.

In FY2020, APHIS will address the current challenging personnel gap in Conyers. We will focus efforts on filling the two vacant NPIP positions: the compartmentalization specialist and the NPIP laboratory coordinator position.

Response
Avian Influenza

In FY2019, APHIS and State partners successfully responded to 17 low pathogenicity avian influenza (LPAI) infected premises in four States. Premises types represented included commercial meat-type turkey premises, a commercial breeder flock, a backyard non-commercial flock, a backyard/non-commercial live bird marketing system (LBMS) and a live bird market. Over 600,000 birds, including turkeys, chickens and ducks were affected in these detections.

Response activities included epidemiological investigations to identify all potentially affected flocks, controlled marketing where possible, depopulation and disposal when controlled marketing was not possible, cleaning and disinfection, continuity of business support and indemnity and compensation for depopulation, disposal and virus elimination.

There were no detections of highly pathogenic avian influenza (HPAI) in domestic poultry in FY2019.

Virulent Newcastle Disease (vND)

On May 17, 2018, the National Veterinary Services Laboratories (NVSL) confirmed virulent Newcastle disease (vND) in backyard exhibition poultry in Los Angeles County, California. The California Department of Food and Agriculture (CDFA) and the USDA initiated a unified command to respond to the incident. The response has been vigorous.

As of March 2019, over 1.1 million birds had been depopulated and over 4.5 million eggs had been destroyed. USDA had spent approximately $17 million dollars on the response, including support of CDFA activities through cooperative agreements, and CDFA had contributed approximately $8 million of non-recoverable funds toward the response.

In March 2019, APHIS and CDFA initiated an enhanced campaign to eradicate virulent Newcastle disease (vND) from Southern California. VS secured Commodity Credit Corporation (CCC) funding to support the effort and committed approximately $45M to the effort (in addition to approximately $17M spent from avian health funds).

In FY2019, VS identified and depopulated approximately 291 infected premises and 1,755 dangerous contact premises as part of the eradication effort. This included four large commercial operations.

Program Delivery

On July 5, 2019, Cobb-Vantress was officially recognized and awarded
certification as a U.S. Avian Influenza Clean Compartment by the National Poultry Improvement Plan. A review of all application documents and corresponding audits conducted on pedigree and great-grandparent facilities from July 12, 2018 through July 1, 2019 allowed verification that each component had successfully met or exceeded standards as set forth in the NPIP Program Standards F: Compartmentalization for Protection Against Avian Influenza Disease in Poultry Primary Breeding Companies in the United States of America in order to establish a compartment.

The first AI Clean Compartment in the USA was acknowledged in 2017, which makes Cobb-Vantress the second company in the USA to earn certified U.S. AI Clean Compartment status. The new compartment will allow foreign trading partners a high degree of confidence in the health status of Cobb breeding stock such that the evaluation of risk in the event of an AI outbreak can be based on management practices and biosecurity programs that have met the rigorous standards necessary to participate in the program.

**Policy**

**Flat Rates for Virus Elimination**

In November 2018, APHIS published the per-cubic-yard flat rates for table egg laying bird barns and per-square-feet for table egg storage and processing facilities. The full document is available on the APHIS Web page. This set of flat rates complemented the per-square foot flat rate for floor-raised poultry, published March 2018.

- The per-square-foot flat rate for floor-raised poultry is $0.65.
- The per-cubic-yard flat rates for table egg laying bird barns is $2.90.
- The per-square-foot for table egg storage and processing facilities is $1.20.

Payment is made to the owner of the land and structures that housed the infected birds. The compensation is issued in two payments:

- 50% after the flock plan is completed; and
- 50% after environmental samples from the affected areas of the premises test negative.

In FY2019 APHIS accepted comments on the published flat rates. Our economists are currently evaluating the comments submitted for a FY2020 review and update of the flat rate documents.

**LPAI Indemnity**

APHIS has two primary objectives in forming an H5/H7 LPAI indemnity and compensation policy:

- Stop the spread of virus as quickly as possible to minimize the number of affected flocks and also to mitigate the chance of mutation of an LPAI virus into an HPAI virus; and
- Partner with States and producers in our response, reducing total costs for indemnity and compensation wherever possible.
In FY2019, APHIS competed a series of stakeholder engagements with States and the poultry sector to develop a sustainable policy for LPAI indemnity and compensations levels. As part of this engagement, APHIS held multiple discussions with stakeholders:

- USAHA in Kansas City, Missouri in October 2018;
- Stakeholder meeting at APHIS Headquarters in Riverdale, Maryland in April 2019.

Policy for LPAI indemnity and compensation:

- APHIS, with input from the owner and the State Animal Health Official, will first determine if controlled marketing or depopulation via slaughter is a recommended option for the affected flock.

If the flock can be control marketed or depopulated via slaughter, APHIS will pay the following for indemnity and compensation:

- 0% indemnity or compensation for depopulation; and
- 100% of HPAI compensation/flat rates for disposal (materials), materials destroyed, and virus elimination in all occupied houses.

If the flock cannot be control marketed or depopulated via slaughter, APHIS will pay the following for indemnity and compensation:

- 100% indemnity and depopulation costs; and
- 100% of HPAI compensation/flat rates for disposal (materials), materials destroyed, and virus elimination in all occupied houses.

In both of these scenarios, the owner must present APHIS with evidence that the premises was following sufficient biosecurity measures to prevent the introduction of LPAI at the time the disease is suspected to have entered the flock.

If there is evidence of significant biosecurity lapses documented by State and/or Federal personnel, if the owner declines control marketing or depopulation via slaughter as recommended by APHIS, or the owner does not meet the requirements for 100% indemnity as described in 9 CFR part 56, then the following guidance will be applied:

- 25% indemnity;
- 100% depopulation costs; and
- 25% HPAI compensation/flat rates for disposal (materials), materials destroyed, and virus elimination in all occupied houses.

This policy will be incorporated into the revised VS Guidance Document 8603, Procedures for Flock Plans, Compliance Agreements, and Indemnity Claims in Cases of H5/H7 Low Pathogenicity Avian Influenza Infection in Poultry. We plan to publish the updated document in FY2020.

Analysis
FY2019, VS released the second (December 2018) and then third (July 2019) epidemiological analyses of the vND incident, available online for stakeholders.

In February 2019, VS released an epidemiological analysis of the LPAI event in Minnesota; other epidemiological analyses of LPAI events.

**Training and Outreach**

In FY2019, the NPIP staff hosted three technical workshops for the NPIP on its three major disease prevention programs: one on avian influenza, one on mycoplasma and one on salmonella.

In March FY2019, the NPIP staff hosted an NPIP Avian Influenza Clean Compartment Auditor training. This provides VS and the NPIP with sufficient resources to carryout compartment audits in FY2020 and beyond, critical to the success of the NPIP AI Clean Compartment program.

In June 2019, APHIS Veterinary Services hosted the biannual NPIP Official State Agency (OSA)/General Conference Committee (GCC) meeting in Albuquerque, New Mexico. The meeting was attended by over 90% of the OSAs, and provided a forum for information exchange, best practices, and requests for USDA action.

In FY2019, APHIS engaged in an extensive outreach campaign titled “Defend the Flock”, combining biosecurity messaging for commercial and backyard poultry producers. This campaign included stakeholder calls and announcements (November 2018), distribution of web and print materials, radio and print media interviews and monthly social media activities including Facebook and Twitter.

In FY2019, the APHIS-VS Poultry Health team participated in over 20 outreach activities spanning topics and audiences from trade and international animal health standards to laboratory training and domestic programs.

**Virulent Newcastle Disease (vND) in California Response Updates**

Annette Jones and Lisa Quiroz, California Department of Agriculture (CDFA)

Clint Turnage, USDA, Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS)

This panel, led by the California State Veterinarian Dr. Jones, provided a response summary of the 2018/19 California vND Incident, including an overview of how Secure Food Supply (Secure Poultry Supply) Plans were implemented in the face of the outbreak, providing impacted producers with business continuity through validated biosecurity implementation, continuous disease surveillance testing, and permitted product movement. In addition, Clint Turnage, provided a summary of how Wildlife Services personnel were integrated into the response and the critical role they performed in the eradication effort.

Turnage discussed Wildlife Services’ role in the vND outbreak in southern California from a “boots on the ground” perspective. Turnage and
his colleagues from across the country were deployed multiple times and played an integral part in the success of that endeavor.

Estimating Epidemiologic Parameters Using Diagnostic Testing Data from the 2018 Low Pathogenicity Avian Influenza (LPAI) H5N2 Outbreak in Minnesota

Emily Walz and Marie Culhane, University of Minnesota

Determining the time of LPAI virus introduction in a flock is an important part of outbreak investigations. By narrowing the time window of possible virus introduction, we can better identify the potential routes of virus introduction and enhance our understanding of the pattern of disease spread. In this analysis, diagnostic testing data was used to estimate the most likely date of virus introduction for all the barns that tested positive by real-time reverse transcription polymerase chain reaction (rRT-PCR) on the eight LPAI H5N2 virus infected turkey premises in Minnesota in 2018. The analysis was performed using a simulation-based method in which the likelihood of observing the diagnostic test results was estimated from a within-house disease transmission model for various candidate times of exposure.

Using this method, Kandiyohi 1 and Stearns 1 were estimated to have been the first premises infected with a most likely date of introduction of October 7. Stearns 2 was estimated to have been infected only shortly afterwards, on October 8. The most likely dates of virus introduction estimated for the subsequent premises was October 19 for Kandiyohi 2, October 26 for Stearns 3, and October 28 for both Stearns 4 and Kandiyohi 4. The last premises estimated to have been infected was Kandiyohi 3 on November 6. The last barn estimated to have been infected was Kandiyohi 4/Barn 4, with a likely date of virus introduction of November 23. These estimates helped industry veterinarians target their review of visitor logs and other activity on the infected premises to identify possible pathways of introduction and to conduct tracebacks on likely exposures.

The disease transmission simulation model was used to predict the time at which there were no infectious birds in the barn based on diagnostic test results. As an example, predictions were made based on a test result of 10/10 seropositive serum samples and 1/1 rRT-PCR positive samples with the samples for both tests taken on the same day. This test result was observed in five barns during the outbreak, including Kandiyohi 3/Barn 8, Stearns 2/Barn 1, Stearns 3/Barn1, Stearns 3/Barn 2, and Stearns 4/Barn 4. For model validation, the predicted time range was compared to two different observed intervals in the diagnostic testing data, the time until negative rRT-PCR test results were obtained and the time until virus isolation was not successful. The model predictions were consistent with the observed rRT-PCR interval for all five barns. The model predictions were conservative with respect to negative virus isolation results, with the predicted time to stop shedding being later than the observed interval in three out of five barns.

The results of this analysis are subject to some uncertainty due in part to a lack of information from infection and transmission studies with the LPAI
H5N2 strain. Proxy H5 and H7 LPAI strains were used instead in the transmission simulation model. Furthermore, the time between diagnostic tests was in some cases several days, which can also introduce uncertainty into the results. Nevertheless, the results of this analysis demonstrate the usefulness of diagnostic testing to better understand the behavior of LPAI in infected poultry flocks.

Association of Veterinarians in Broiler Production (AVBP) Current Diseases of Concern
Scott Gustin, Tyson Foods
Prepared by: Steve McCarter

**Broiler Production:** Broiler production (lbs.) increased in 2018 (3.0%) and is projected to be higher again in 2019 (1.20%). Average broiler weights basically stayed the same from 2017 to 2018 and are unchanged so far in 2019. Average feed cost increased from 2017 to 2018 (4.8%) and is lower for the first half of 2019 (down 2.9%).

**Mortality:** Average total mortality for the first half of 2019 is at 5.27% in U.S. broilers through 47.16 days, an increase of over 0.2% compared to 2018. Most broiler weight classes have experienced an increase in mortality. The one exception was the 5.20-6.0lbs bird class that was slightly lower at 0.21%. First week mortality is also higher in 2019 at 1.65%. The trend towards the removal of hatchery antibiotics, down over 73% since 2014, is likely contributing to this increase. Chick quality/early mortality ranked third in the 2018 AVBP survey as displayed later in this report.

**Condemnations:** Whole Bird Farm Condemnations and Parts Condemnations declined from 0.416% in 2018 to 0.385% in 2019. The movement of many processing plants to New Poultry Inspection System (NPIS) is the most likely explanation for the decline.

**Key Broiler Disease Issues (see below):** Among the major disease-related issues that broiler production veterinarians are concerned with, coccidiosis (specifically *E. maxima*) ranked first, and necrotic enteritis ranked second. These two diseases typically operate in tandem, and it’s likely that restricted-use antibiotic programs (ranked first on SPECIFIC disease importance chart below) have only exacerbated their impact on the broiler industry. As of July 2019, over 50% of U.S. broilers were raised without a shared-class antibiotic or ionophore. In addition, ionophore feed inclusion continues to decline each year since 2014. “Chemical” coccidiostat and coccidiosis vaccine usage has doubled over the same period. Marketing strategies and customer pressure are likely driving the move toward these methods of coccidiosis control. At the same time, the inclusion of a preventative antibiotic to control necrotic enteritis continues to decline. Seventy seven percent of broiler feed does not contain any growth promoting antibiotic compounds.

Infectious Bronchitis (Respiratory) ranked eighth on the survey. Many survey respondents highlighted bronchitis strain 1639 as an emerging issue.
Key Non-Disease Broiler Issues (see below): Every year since 2016, the survey indicated the highest ranked major non-disease issue among broiler veterinarians was restricted antibiotic-use programs. Ranking second in this year’s survey is poultry welfare. Welfare displaces increased food safety regulations by USDA, Food Safety and Inspection Service (FSIS) that ranked fifth in this year’s survey.

Of note, vaccine availability moved up the AVBP non-disease rankings considerably in 2018 and 2019. Several production and quality issues by major vaccine suppliers has disrupted supply. This has put a strain on the vaccine industry and caused concern for many broiler production companies.

1Agristats report, 2019
2019 Disease and Non-Disease Rankings

As in previous years, the AVBP membership was polled concerning disease and non-disease issues. Major issues were ranked for both areas, and a further breakdown of specific disease and non-disease issues is included below.

AVBP is comprised exclusively of veterinarians employed full-time by U.S. broiler companies. The veterinarians responding to the 2018 survey represented approximately 76% of USA broiler production.
POULTRY AND OTHER AVIAN SPECIES

<table>
<thead>
<tr>
<th>RANKING</th>
<th>2019 Major DISEASE Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Coccidiosis</td>
</tr>
<tr>
<td>2</td>
<td>Necrotic Enteritis</td>
</tr>
<tr>
<td>3</td>
<td>Chick Quality and Early Mortality</td>
</tr>
<tr>
<td>4</td>
<td>Infectious Bronchitis-Respiratory</td>
</tr>
<tr>
<td>5</td>
<td>Gangrenous Dermatitis</td>
</tr>
<tr>
<td>6</td>
<td>Novel Reovirus</td>
</tr>
<tr>
<td>7</td>
<td>General Polyserositis-E. coli</td>
</tr>
<tr>
<td>8</td>
<td>Bacterial Osteomyelitis of the Legs</td>
</tr>
<tr>
<td>9</td>
<td>Infectious Laryngotracheitis</td>
</tr>
<tr>
<td>10</td>
<td>Infectious Bursal Disease</td>
</tr>
<tr>
<td>11</td>
<td>Vertebral</td>
</tr>
<tr>
<td>12</td>
<td>Osteomyelitis/Kinkyback</td>
</tr>
<tr>
<td>13</td>
<td>Infectious Bronchitis (Kidney form)</td>
</tr>
<tr>
<td>14</td>
<td>Avian Influenza</td>
</tr>
<tr>
<td>15</td>
<td>Histomoniasis</td>
</tr>
<tr>
<td>16</td>
<td>Mycoplasma</td>
</tr>
<tr>
<td>17</td>
<td>Cholera</td>
</tr>
<tr>
<td></td>
<td>Newcastle Disease</td>
</tr>
</tbody>
</table>
Rate the importance of the following **DISEASE** issues to you/your company?

![Bar chart showing the importance ratings of various disease issues](chart-image)

Very Important

Not Important

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Overall layer health is good due to a number of factors as follows:

- Continued good supply of high-quality biologics
- Readily available veterinary technical assistance from primary breeder, vaccine company, diagnostic laboratory, feed additive suppliers, and consulting veterinarians
- Flock supervision by professional, well-trained flock service technicians
- High quality nutrition provided by professional nutritionists
- Housing is of good quality in general supplying feed, lights, air quality, water, and space in the needed quantities and quality.
- 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

2019 AVEP Disease Survey:
A poll of the Association of Veterinarians in Egg Production (AVEP) was conducted within the last month. The members were asked to categorize a list of common diseases of caged and cage-free pullets (22 and 23 conditions listed respectively) and caged and cage-free layers (32 and 36 conditions listed respectively) as to their importance in their area of service on a scale of 1 to 5 with the following categories

- 1 = Little or no importance to flock health or profitability. Very little effort to control
- 2 = Some importance to flock health or profitability. Moderate effort to control on some farms.
- 3 = Moderate importance to flock health or profitability. Moderate effort needed to control on most farms.
- 4 = High importance to flock health or profitability. Significant effort to control on some farms.
- 5 = Very high importance to flock health or profitability. Significant effort to control on most farms.

30 of 41 (73%) targeted AVEP members answered the survey.

Starveouts and yolk infections of chicks during the first week continue to be of moderate to high importance indicating there is still work to be done in breeder hatch egg sanitation, hatchery, and brooding management.

<table>
<thead>
<tr>
<th></th>
<th>Caged Pullets</th>
<th>Cagefree Pullets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starveouts</td>
<td>2.47</td>
<td>2.53</td>
</tr>
<tr>
<td>Yolk infections</td>
<td>2.40</td>
<td>2.27</td>
</tr>
</tbody>
</table>
The results showing the top ten diseases and conditions for the different classes of egg layers with their average ranking are shown below:

<table>
<thead>
<tr>
<th>Rank</th>
<th>Caged Pullets</th>
<th>CageFree Pullets</th>
<th>Caged Layers</th>
<th>CageFree Layers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Infectious Bronchitis (IB) 3.70</td>
<td>Coccidiosis 3.60</td>
<td>E coli 3.63</td>
<td>Peckouts 4.07</td>
</tr>
<tr>
<td>2</td>
<td>Coccidiosis 3.40</td>
<td>Piling 3.37</td>
<td>IB 3.53</td>
<td>E coli 3.73</td>
</tr>
<tr>
<td>3</td>
<td>Infectious Bursal Disease (IBD) 2.90</td>
<td>IB 3.23</td>
<td>Calcium Depletion 3.17</td>
<td>Piling 3.63</td>
</tr>
<tr>
<td>4</td>
<td>Necrotic Enteritis (NE) 2.83</td>
<td>IBD 2.77</td>
<td>Tie: Coccidiosis 3.13</td>
<td>Tie Coccidiosis 3.27</td>
</tr>
<tr>
<td>5</td>
<td>Post SE Bacterin Hepatitis 2.70</td>
<td>Tie: NE 2.73</td>
<td>Tie: Mg 3.13</td>
<td>Tie: IB 3.27</td>
</tr>
<tr>
<td>6</td>
<td>viLT (Vaccinal Infectious Laryngotracheitis) 2.67</td>
<td>Tie: E coli 2.73</td>
<td>Infectious coryza (IC) 3.10</td>
<td>False Layer 3.13</td>
</tr>
<tr>
<td>7</td>
<td><em>M. gallisepticum</em> (Mg) 2.50</td>
<td>viLT 2.63</td>
<td>Focal Duodenal Necrosis (FDN) 3.07</td>
<td>FDN 3.00</td>
</tr>
<tr>
<td>8</td>
<td><em>E. coli</em> 2.40</td>
<td>Tie: Mg 2.40</td>
<td>False Layer Syndrome 2.97</td>
<td>IC 2.97</td>
</tr>
<tr>
<td>9</td>
<td>Pox 2.27</td>
<td>Tie: Post SE bacterin hepatitis 2.40</td>
<td>Peckouts/Cannibal ism 2.87</td>
<td>Tie: Roundworms 2.73</td>
</tr>
<tr>
<td>10</td>
<td>Marek’s Disease 2.10</td>
<td>Roundworms 2.30</td>
<td>Necrotic enteritis 2.83</td>
<td>Tie: NE 2.73</td>
</tr>
<tr>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td>Tie: ILT 2.73</td>
</tr>
</tbody>
</table>

Coccidiosis and necrotic enteritis continue to be high on the lists of all classes of layers due to the hardy nature of coccidial oocysts once they are established in a house. Vaccination of caged pullets is a challenge due to difficulty in cycling sporulated vaccinal oocysts. Cagefree pullets and layers outbreaks are usually due to breakdowns in litter management which override coccidiostat and gut health medication programs. The lack of routine
antibiotic medication usage in early lay leads to an increase in necrotic enteritis should coccidiosis be a problem.

Infectious bronchitis (IB) and False Layer Syndrome (FLS) continue in the top ten for layers. Exposure to variant strain IB in very young pullets in the first three weeks is felt to result in FLS. This has been seen in locations in the northeast U.S., Ontario, Quebec, southwest U.S., and midwest in areas with high broiler populations infected with variant strain IB or multi-age pullet growing units that become infected. Vaccination at day old or just after placement with the Ma5 Mass or GA 08 vaccines have greatly prevented the problem.

Colibacillosis in layer flocks continues as highly important. The live E coli vaccine does a very good job of preventing the early lay onset problem, but immunity is short-lived and does not provide a lot of protection for the late lay onset problems. Some producers are beginning to administer the live vaccine in mid-lay as a booster vaccination.

Piling of cagefree flocks continues to be a major problem involving environment management.

Peckout mortality of cagefree layers continues as well as an important issue. Lighting and behavioral management is often at the root of the problem. Some pressure is on to move to intact beaks for some cagefree programs which may be a real challenge in some operations.

Infectious coryza caused by *Avibacterium paragallinarum* spread through Pennsylvania flocks like wildfire between late December through May 2019 affecting over 12 million layers, pullets, and broilers. Also, an outbreak in Arizona in multiple complexes which previously were coryza-free, occurred in early January 2019. The ease of spread of this supposedly environmentally fragile organism is troubling. Recent studies at the University of Pennsylvania shows the causative bacteria can survive in 43F and 77F water for 24 hours and possibly longer.

Post salmonella enteritidis (SE) Bacterin Hepatitis continues to be seen as an important cause of pullet mortality. Vaccine companies are continuing to work to determine why this syndrome exists. Preventing overheating of vaccine prior to use may be a key to prevention.

The high ranking of infectious bursal disease in pullets is the subclinical form resulting in poor growth rate, body weight uniformity, and response to vaccines not the acute mortality form.

The control of roundworms in egg layers got a boost as the product AquaSol (fenbendazole) was cleared for use in egg layers in production in 2018. Organic layers continue to be without a highly effective product to use for this condition.

Survey of Food Safety, Foreign Animal Diseases, and Other Issues of Concern:

The AVEP members were asked to rate their concerns on various topics according to the following scale:

- 1 = little importance, concern, or effort to prevent
The results are summarized as follows:

<table>
<thead>
<tr>
<th>Disease or Issue</th>
<th>Ave. Rating</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avian influenza</td>
<td>4.00</td>
<td>High to Very High</td>
</tr>
<tr>
<td>Virulent Newcastle Disease</td>
<td>3.37</td>
<td>Moderate to High</td>
</tr>
<tr>
<td>Lack of approved, effective treatments/antibiotics</td>
<td>4.31</td>
<td>High to Very High</td>
</tr>
<tr>
<td><em>Salmonella enteritidis</em> (SE)/FDA Egg Safety Rule compliance</td>
<td>3.28</td>
<td>Moderate to High</td>
</tr>
<tr>
<td>Group C or other non-SE serotypes resulting in egg recalls</td>
<td>3.67</td>
<td>Moderate to High</td>
</tr>
<tr>
<td>Welfare issues:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Possibility of banning beak trimming</td>
<td>3.50</td>
<td>Moderate to High</td>
</tr>
<tr>
<td>Inability to use maceration for of male chicks after hatched</td>
<td>3.07</td>
<td>Moderate to High</td>
</tr>
<tr>
<td>Continued misuse of MAK carts for on-farm euthanasia of spent fowl</td>
<td>3.57</td>
<td>Moderate to High</td>
</tr>
<tr>
<td>Lack of guidance regarding emergency depopulation of layers</td>
<td>3.80</td>
<td>Moderate to High</td>
</tr>
<tr>
<td>Cagefree management challenges</td>
<td>3.87</td>
<td>Moderate to High</td>
</tr>
<tr>
<td>Lack of effective vaccines</td>
<td>3.03</td>
<td>Moderate to High</td>
</tr>
<tr>
<td>Lack of effective diagnostics</td>
<td>2.10</td>
<td>Low to Moderate</td>
</tr>
</tbody>
</table>

Concerns and comments from AVEP members (a summary):

- *Salmonella serotypes other than SE:*
  - The FDA SE plan inhibits surveillance of other serotypes and hence appropriate methods of controlling them
  - Clear guidance from Food and Drug Administration (FDA) is lacking in this area

- **Lack of approved treatments:**
  - The availability of useful, economic treatments is sorely lacking
Treatments for organic layers are expensive and often lack effectiveness

- **Emergency depopulation procedures:**
  - We are not prepared for the next outbreak
  - Whole house gassing with CO2 information is lacking, at least it is for the majority of veterinary practitioners
  - More research on the use of Ventilation Shutdown as a means of depopulation is needed
  - Depopulation means for large caged or cagefree flocks is lacking

- **Cagefree management issues:**
  - Most cagefree egg producers are still in the early stages of learning cagefree management
  - Spotty Liver Disease is an emerging issue
  - Keel deformities and keel fractures are issues that have not been addressed
  - Products and information on internal parasite control is lacking

- **Use of Modified Atmosphere Killing (MAK) carts for euthanasia of spent fowl:**
  - The use of MAK carts needs to be discontinued and humane alternatives used or use the MAK carts as they were designed to be used
  - Whole house CO2 as an option for MAK carts needs to be evaluated
  - The biosecurity risk of using MAK carts is a concern

- **Lack of appropriate vaccines:**
  - The possibility of the prohibition of using live Salmonella and other genetically modified vaccines for organic production is a huge concern for flock health and food safety
  - The development of a mass applied fowl cholera or coryza vaccine would be quite useful in prevention and outbreak situations
  - The vaccine companies are struggling to keep up with changes in providing effective infectious bronchitis vaccines due to changes in the virus in the field
  - A vaccine for Spotty Liver Disease (*Campylobacter hepaticus*) would be useful in many areas where this disease is becoming enzootic

- **Prohibition of the use of maceration for male chick euthanasia:**
  - Until an acceptable, commercially viable, economic means of euthanizing male chicks is developed, maceration
POULTRY AND OTHER AVIAN SPECIES

continues to give a humane means of male chick euthanasia in my opinion
o In-ovo sexing prior to nine days of incubation is not likely on a commercial basis

• **Banning of beak trimming:**
  o At this point in the U.S., with the size and management ability of egg producers, banning of beak trimming would be a welfare disaster
  o A lot of trials on a small scale will be needed to develop management techniques to counter a lack of beak trimming before it can be adopted on large scale
  o Beak trimming is an effective and humane means of preventing feather pecking and cannibalism
  o Banning of beak trimming would greatly increase losses to feather pecking and cannibalism

• **Avian influenza:**
  o Much more discussion is needed in how to detect low pathogenic avian influenza (LPAI) and how to control it if found
  o The ability of infectious coryza to spread so easily in Pennsylvania does not give one much confidence in our biosecurity programs to deal with high or low path AI.

• **Other concerns:**
  o Shortage of qualified live production people
  o Colibacillosis prevention and control
  o Small intestine intussusception
  o Need to eradicate Mycoplasma gallisepticum (Mg) from multi-age complexes
  o Fast spread of infectious coryza in the northeast and midwest
  o Emergence of Infectious Bronchitis virus (IBV) strains like the Delmarva (DMV 1639) with no good means of prevention
  o Control of pullet or egg movement from diseased flocks to processing on other farms – premovement testing protocols needed
  o A different term for “starveouts” is needed
  o The significance of finding “vent gleet” in mortality
  o The need for a better reporting system for non-regulatory diseases such as Egg Drop Syndrome, infectious coryza, virulent IBD, variant IB viruses, etc. is desired
  o Feather loss cause(s) and prevention information needed
  o Cannibalism prevention information needed

**Emerging Diseases:**
Emerging diseases, those that are serious but only seen in a small region or number of flocks, are being seen mostly in cagefree, outdoor access/pastured layers. They are as follows:

- **Spotty Liver Disease (SLD)** – Flocks with this condition experience a five to 20% drop in egg production over a three to four-week period and have 0.5 to 3% mortality. This is also a major problem in pastured flocks in Australia where the cause was determined to be due to *Campylobacter hepaticus*.

- **Erysipelas** – Several cases of high mortality have been seen in the last year in pastured layers with some flocks losing as much as 4% in a day. Attempts to treat the disease with live vaccine in organic flocks have met with success.

- **Fowl Cholera** – As with erysipelas, several cases of fowl cholera have been seen this past year in vaccinated and unvaccinated layer flocks. Vaccination with the live vaccine by wingweb has met with success in some organic flocks. Antibiotic therapy in conventional flocks has also been successful. Increasing the frequency of vaccination during grow and lay is being used preventatively.

- **Feed Refusal Syndrome** – This problem is less serious this year compared to past years partially due more feed mills screening incoming ingredients for mycotoxins.

- **Bedbugs** – Cagefree operations that are infested with bedbugs in the northeast and midwest U.S. have been reported and concerns for house worker, bird movement, and other persons transfer of bedbugs to their dwellings is high. Some egg producers have been rejected by crews for consideration for moving their birds that have bedbugs.

### Egg Industry Economic Conditions:

The egg industry had a losing year compared to the past two years.

*Graphs from the Egg Industry Center, September 2019*

With a farm cost of approximately 60 cents per dozen, 2019 has not been profitable for egg producers this year. The reason is too many egg layers in production mostly due to adding cagefree production without taking caged housing out of production.
The total egg layer numbers increased over the number from last year during the same months.

As can be seen from this graph, the number of caged layers continued to increase in addition to the cagefree sector.
As of August 2019, #1 Iowa (55.5 million layers) continues to hold the top spot of states in egg production by far over #2 Ohio (34.8 million), #3 Indiana (32.5 million), #4 Pennsylvania (25.7 million), and #6 California (12.5 million). Texas (#5) numbers are not reported by USDA starting this year. Source: USDA, National Agricultural Statistics Service (NASS) Chickens and Eggs.

**Turkey Industry Report**

Lindy Froebel, National Turkey Federation (NTF)
Prepared by: Steven R. Clark, Devenish Nutrition, LLC.

In preparation for this report to the USAHA Committee on Poultry and Other Avian Species, Dr. Clark, surveyed turkey industry professionals and veterinarians representing (n=24) the U.S. turkey production regarding the
health status of turkeys produced in August 2018 through August 2019. The turkey industry reports several disease challenges for these 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 2019 are issues with lack of efficacious drugs, colibacillosis, clostridial dermatitis, Ornithobacterium infection (ORT), Salmonella, leg problems, Bordetella, and coccidiosis. The top-10 list for 2019 was near identical to 2018 with notable exception coccidiosis dropped in rank but salmonella and leg problems increased. Blackhead ranking dropped to #18 from #11 the prior year, and the number of reported cases decreased by 24%. Cases of Turkey Reovirus increased 108% and ranked #9.

The “lack of approved efficacious drugs” continues to be the top health issue (Table 1). The withdrawal of the New Animal Drug Application (NADA) for enrofloxacin in 2005 for use in poultry leaves the industry with no adequate therapeutic response to colibacillosis (has ranked #2 since 2016), or fowl cholera (ranked #14 from #12). In July 2011, the sale of roxarsone was suspended; September 30, 2013, the Food and Drug Administration (FDA) marketing authorization for NADA was withdrawn. The sponsor of Penicillin-100 Type A medicated article (in feed administration) withdrew the approval (NADA) June 30, 2015. Nitarsone (see blackhead) approval was withdrawn December 31, 2015. Issues 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), also referred to as Cellulitis, remains a major disease issue across all geographic regions; as the survey average changed slightly to a score of 3.7 (from 3.6 in prior year) and jumped to a #3 rank (from #5 in 2018, #4 in 2017, #3 in 2016 and #2, 2008-2015). 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, wet litter, feed outages and do not compost litter within 200 feet of poultry barn. Vaccinating at-risk flocks with autogenous bacterins and toxoids is not a viable option for the industry.
**Ornithobacterium rhinotracheale** (ORT) ranked #4 in 2019 and 2016 (#3, 2017, 2018; #7, 2015), is a highly contagious respiratory disease in poultry caused by a gram-negative pleomorphic rod-shaped bacterium. It has been isolated from chickens, ducks, partridges, and guinea fowl. It was originally recognized in Europe and South Africa. ORT was first confirmed in the U.S. from turkeys in 1993. Horizontal transmission (such as, bird-to-bird, contaminated people and equipment) by direct and in-direct contact is the primary route of spread. However, vertical transmission is suspected (Hafez, 2000). In the fall of 1995, it was a major cause of respiratory disease in midwestern states and since has become endemic across most of the USA. Management systems, such as brood-and-move have increased the exposure of ORT-naive birds to ORT in the finisher barns, resulting in respiratory disease and mortality in some operations. Biosecurity procedures must be taken. Proper water sanitation can minimize the severity and spread. Vaccination is limited and results are varied (toxoids, bacterins). Bacterins are used in breeders. No commercial vaccine is approved. Limited application of controlled exposure efforts on individual flocks have shown value. ORT in turkeys is an identified critical research need.

The turkey industry continues to work to reduce Salmonella (#5) colonization in birds. In 2019, the NTF has continued efforts to assist industry members with this task. A Salmonella Technology Summit was held July 2019 for the industry to evaluate and discuss emerging technologies for Salmonella monitoring and mitigation. A best practice guide for each sector of the industry was developed by NTF subcommittees to outline potentially important methods to reduce Salmonella. In addition, NTF has evaluated potential governmental policy changes to help advance Salmonella vaccine technologies.

Leg problems are ranked #6 in 2019 (#9, 6, 6, 10 in 2018 – 2015, respectively) 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. The year 2017 - 2019 was particularly noted increased incidence of valgus and various leg deformities across much of the U.S. industry due to undetermined etiology; the issue contributed to increased mortality in affected flocks. Issues were less prevalent in 2018. Bacterial chondronecrosis with osteomyelitis (BCO) -associated lameness, as described by Dr. Wideman, has been diagnosed in some cases. Leg problems can represent substantial production losses and welfare issues of turkeys.

**Bordetella avium** continues as a significant respiratory disease challenge in several geographic regions; bordetellosis ranked #7 and fluctuates between #5 and #8 the prior year 5-years. Bordetellosis, otherwise known as Turkey Coryza, is a highly infectious, acute upper respiratory tract disease of...
turkeys characterized by high morbidity and usually low mortality. Bordetella avium (BA) is a small, Gram-negative, nonfermentative, motile, strictly aerobic bacillus. Other birds and older turkeys can be carriers but may not show clinical signs. Commercial vaccines are available but are not routinely used. Water sanitation and biosecurity are emphasized to control Bordetella.

Coccidiosis decreased to #8 in 2019 (#4, #6, #13 in 2018 – 2016, respectively) most likely reflects the industry increasing raised without antibiotics (RWA) and no antibiotics ever (NAE) market. RWA and NAE programs do not permit the use of ionophore anticoccidials and some programs prohibit FDA approved chemical anticoccidials, so anticoccidial programs consist of alternative phytogenics or vaccination. An effective coccidiosis control program in turkeys involves the use of anticoccidial medications and/or phytoneutrients (eubiotics) and/or live vaccines and the subsequent development of immunity. Table 6 summarizes the U.S. turkey production coccidia control products (n=262.2 million head, survey total) and ionophores represent the majority, 62% (44%, 2018; 55%, 2017) of heads for an average use of 7.3 (7.7 and 7.5, 2018 - 2017) months during the 12-month survey period. Chemical anticoccidials account for 29% (30% and 33%, 2018 - 2017) head and 5.5 (4.6 and 4.5, 2018 - 2017) months. Coccidia vaccination was limited to 10% (10% and 7%, 2018 - 2017) head; the low incidence might be in part due to the limited availability of the only USDA approved commercial turkey coccidiosis live vaccine. Also, several colleagues are utilizing autogenous coccidiosis vaccination. Nutritional dietary supplementation with phytoneutrients (eubiotics) is becoming more popular, reported at 27% (28% and 14%, 2018 - 2017) head, either via in-feed application or drinking water administration. Programs may utilize phytoneutrients in addition to the current anticoccidial program, to potentiate the possible benefits, or as the sole supplement for coccidia control. Some phytoneutrients have purported activity against coccidia. Eubiotics consist of ‘alternative’ products including: organic acids, yeast, phytoneutrients from plant extracts (saponin, yucca, etc.) and essential oils (oregano, carvacrol, thymol, cinnamonaldehyde, capsicum oleoresin, turmeric oleoresin). Essential oils may be natural extracts or synthetic nature-identical compounds.

Turkey Reovirus Digital Flexor Tendon Rupture (TR-DFTR), also called Turkey Arthritis Reovirus (TARV), 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 continues 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 #9 in 2019 and #17 in 2018 (Table
REPORT OF THE COMMITTEE

1) with 486 “confirmed” cases or flocks (Table 2). Affected breeder companies have implemented an autogenous reovirus vaccination program to induce the maximum production of antibodies and resulting transfer of maternal antibodies. Historic results originally showed 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 once appeared to be controlling this disease. Increased recognition of TR-DFTR in 2016 - 2017 suggest that the reovirus has again mutated. TR-DFTR is an identified critical research need.

The University of Minnesota (UMN) working definition is: Turkey Arthritis Reovirus (TARV) is a progressive condition that appears as early as 10-12 weeks of age in male, and sometimes female, commercial turkeys. Younger birds are occasionally affected. The disease does not appear to be transmitted from chickens. Signs are most severe when the birds reach 15-16 weeks of age. Clinical signs are characterized by reluctance to move, recumbency and limping on one or both legs. There is often unilateral or bilateral swelling of the hock (intertarsal) joint. Morbidity can be as high as 40% and mortality is usually a result of culling or aortic rupture. Lesions observed in acutely affected birds at necropsy are unilateral or bilateral enlargement (subcutaneous edema) of the hock joints, which contain increased volume of clear yellow to serosanguinous synovial fluid. Similar fluid can expand the sheath of the gastrocnemius and digital flexor tendons. In chronic cases there is bruising of the skin of the hock, with prominent periarticular fibrosis, edema and occasional large flecks of fibrin within the subcutis and tendon sheaths. In a small percentage of cases one can observe partial or complete rupture of the proximal gastrocnemius tendon or a digital flexor tendon with hemorrhage at the level of the rupture. Histological sections of gastrocnemius tendon and sheath reveal lymphocytic infiltrates in the sub-synovium in acute cases, progressing to prominent sub-synovial and peritendon fibrosis in chronic cases. Secondary bacterial infections (e.g., Staphylococcus) occasionally occur and are accompanied by heterophilic inflammation. Definitive diagnosis requires (1) observation of typical gross lesions, (2) ruling out other causes of lameness in turkeys (e.g., osteomyelitis, primary bacterial arthritis, muscle rupture, footpad dermatitis, Mycoplasma synovitis) and (3) isolation of reovirus from the gastrocnemius and/or digital flexor tendon in embryonated eggs or cell culture.

Blackhead, also known as histomoniasis, changed to position #18 (#11, 8, 9, 13 in 2018 -2015, respectively). There were 96 reported cases of blackhead (Table 2) a decrease from 127 the prior year. Histomoniasis occurs regionally and seasonally in turkeys and can result in significant mortality. 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. Nitarsone FDA approval was withdrawn December 31, 2015, leaving the industry with no drugs approved with indications against histomoniasis. Nitarsone was approved for the prevention of histomoniasis (blackhead disease) in turkeys and chickens and was the only approved animal drug for this indication. Table 2a list some additional blackhead responses, including a survey as to management interventions in controlling or preventing blackhead disease. Of those 13 respondents reporting blackhead cases in 2019, enhanced biosecurity (85%) and insect control (85%) were the two most popular. Nine respondents (69%) will till or top dress the litter, once a flock is diagnosed; install migration (partition) fences; administer eubiotics in feed and/or drinking water. Other popular interventions include acidify or apply lime to the litter, once a flock is diagnosed (54%) and insure excellent intestinal health (62%). The variety of responses support that prevention and control of blackhead requires a multifactorial approach. Thirteen respondents equal to 54% of survey reported one or more cases of blackhead (63%, 2018; 74%, 2017). Of the 96 reported cases at least 10% (n=10) were destroyed to alleviate animal suffering and due to excess morbidity and mortality. Two recent peer reviewed publications of industry include Clark and Kimminau\(^1\) summary of current blackhead situation in the field and also Regmi\(^2\) details FDA considerations for antihistomonal drug approvals. Early diagnosis and start of interventions are considered part of controlling Histomonas meleagridis in field conditions; for this reason, a sound monitoring system using diagnostic tools, such as, polymerase chain reaction (PCR) and serology is needed, in particular on problem farms.

Poult enteritis of unknown etiologies has changed in importance, to position #12 (#8, 10, 14 from 2018 – 2016). Turkey Coronavirus (TCV), as a defined cause of enteritis, was ranked #29 (#30, 30, 31 from 2018 – 2016), with 95 reported cases, from 185 the previous year (Table 2).

Protozoal Enteritis, attributed to flagellated protozoa, Cochlosoma, Tetratrichomonas and Hexamita, ranked #16, changed from #13; protozoal enteritis remained relatively unchanged over past years until 2016 and associated with the loss of nitarsone. 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

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associated with enteritis, primarily in young turkeys, especially in the summer months. There are field reports of co-infections with *Cochlosoma* and *Tetraurichomonas*, 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 turkey farms, especially enteric diseases. Historically, production systems included two to three 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 five 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 2018 (n=23), 53% of brooding was single age, compared to 35% in 2010. 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 Poult Enteritis and Mortality Syndrome (PEMS) in North Carolina; advantages became obvious and it has expanded to other areas of the U.S. Tunnel ventilation of finisher (grow-out) barns is becoming more popular method to minimize heat stress; in 2018, 32% of the industry finisher production is tunnel ventilated, compared to 12% in 2010. *(The Survey was not updated in 2019).*

Late mortality ranked #10 health issue and changed from #14 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.

Heat stress ranked #20 in 2019 compared to #18 prior year. Tunnel ventilated barns allow growers to manage heat stress better than in years past. PEMS ranked #32 versus #30 previously. Avian Metapneumovirus (AmPV) ranked #34.

*Mycoplasma synoviae* (MS) (infectious synovitis) infections, ranked #24 (#29, 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 25 cases of MS reported (Table 2). The primary breeders have remained free of *M. gallisepticum* (MG), *M. meleagris* (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 30 cases of MG reported (Table 2).

The health of turkeys continues to be a leading concern for industry members. The Turkey Health Task Force, established in 2017, along with NTF staff, has continued working to find innovative solutions for the top disease challenges of the turkey industry. The Task Force aims to accelerate the research, development and approval of turkey health products. The Task Force began by creating dialogues with animal health companies to understand barriers to entry for developing products for prevention and treatment for turkey-specific diseases. Priorities of the Turkey Health Task Force have been set around disease challenges that have most impact to the turkey industry.

Blackhead, as previously discussed in this report, results in significant mortality and is a top disease of concern in the turkey industry. The pursuit to find an efficacious preventative for blackhead remains an important objective. FDA provided the Task Force with a Minor Use in Major Species (MUMS) designation for control in the incidence of mortality in turkeys at high risk of developing blackhead associated with *Histomonas meleagris* in flocks of turkeys where blackhead has been diagnosed. This designation can be given by the FDA if a condition can be shown to affect no more than 14 million turkeys, a treatment and/or preventive drug (with use limits on label to show it will not be used beyond those birds most at risk) could be eligible for MUMS status. In addition, the MUMS designation means the financial burden of product research burdens are lessoned and gives the supplier seven years of marketing without generic competition. To NTF’s knowledge, this is the first time a MUMS designation has been provided to an entire disease prior to the identification of a product. The Task Force continues to be cautiously optimistic on utilizing the MUMS regulations to speed approval of treatment of conditions such as blackhead and hopes the MUMS designation will incentivize companies to develop new molecules.

TARV and other leg-related problems continue to be an industry-wide concern. Under the direction of the Turkey Health Task Force, a subcommittee was established this year to promote coordination of research efforts to mitigate TARV. The collaborative group is composed of members in live production, veterinarians, researchers, and members of the allied industry. To date, the following primary objectives have driven the group’s efforts:

- Establish a common of nomenclature to use when naming isolates
- Develop a case definition for TARV
- Perform an economic impact analysis to assess the cost of TARV to the industry

Members of the Turkey Health Task Force and NTF staff continue to work with CVB to refine Agency policy that would speed the approval of autogenous vaccines. NTF has secured support throughout the other animal agriculture associations for this as well. In addition to enhanced approvals,
NTF is working to extend approval length from the two-year approval cycle in current policy. USDA has verbally supported this issue, and NTF will continue to push for the needed policy change to be implemented.

The turkey industry has a limited number of available anticoccidials and one commercial vaccine, which creates a great challenge for designing coccidia management rotation program. Options for rotation of anticoccidials are even more limited in antibiotic free production due to the restrictions of ionophores. At the beginning of this year, only two chemical coccidiostats are approved for use in turkeys. In February the Turkey Health Task Force, in coordination with NTF staff and animal health companies worked with Center for Veterinary Medicine (CVM) to gain re-approval for clopidol to address current challenges of coccidiosis. Options for control remain limited and focus in this area will be a continues focus for the Task Force.

Virulent Newcastle Disease (vND) reemerged in 2018 and continues to be a disease affecting the western portion of the country. Virulent Newcastle Disease, formerly known as exotic Newcastle Disease (END), is a contagious and fatal viral disease that affects the respiratory, nervous, and digestive systems of migratory birds and commercial poultry. To date, USDA-APHIS has confirmed at least 451 cases of vND this year. Most cases have occurred in backyard poultry in several California counties including, San Bernardino County, Riverside County, Los Angeles County, Ventura County, Alameda County, Utah County, Utah, and Coconino County, Arizona. However, vND has been confirmed in commercial laying facilities as well. Scientific evidence shows that vND is not a food safety concern, as no human cases of Newcastle disease have ever resulted from the consumption of any poultry products. The turkey industry remains alert to the threat of vND and continues to employ biosecurity practices to reduce risk of exposure. NTF and the other poultry groups have lobbied Congress to obtain appropriations funding to help control diseases and have maintained communication with USDA to control this outbreak.

A new report\(^3\) released August 5, 2019, by the U.S. Poultry and Egg Association (USPOULTRY) shows dramatic reductions of turkey and broiler chicken antimicrobial use over a five-year time frame. The USPOULTRY reports “use” in contrast to the FDA reporting “sales” data. The results showed a reduction in antimicrobial use by both turkey and broiler chicken operations. The report reflects data from 2013 – 2017 in turkeys and broilers from hatchery to the day of harvest. Key changes among turkeys over the five-year period include:

- Turkeys receiving antimicrobials in the hatchery decreased from 96% to 41%
- Hatchery gentamicin use decreased approximately 42%

POULTRY AND OTHER AVIAN SPECIES

- Medically important in-feed antimicrobial use in turkeys decreased: tetracycline 67%
- Medically important water-soluble antimicrobial use decreased substantially. For example, penicillin 42%, tetracycline 28%, lincomycin 46%, neomycin 49%, erythromycin 65%.

NTF has noted that even though it is promising to see the documentation showing a decrease in antibiotic use, the health of turkeys remains a chief concern for industry members. Increased consumer pressure for antibiotic free production and the inflated conversations surrounding antimicrobial resistance has created challenges for the turkey industry. Therefore, turkey professionals have turned to creative product innovation, increased research efforts and a multitude of other avenues to protect U.S. turkeys while simultaneously taking consumer wants and preferences under careful consideration.

Use of approved, efficacious drugs in a judicious manner is necessary to support animal welfare by preventing animal diseases and treating animals that become sick. Therefore, the turkey industry recognizes the need for research related to innovative prevention and treatment options for turkey producers. Several initiatives are working to reduce antimicrobial resistance, especially for antimicrobials of importance to human health.

In September 2018, CVM unveiled its five-year action plan to support antimicrobial stewardship in veterinary settings. The plan is part of a broader agency-wide strategy for combating antimicrobial resistance in both veterinary and human health care settings. It is being initiated in phases over the five fiscal years. Recently, the results from Veterinary Feed Directive (VFD) audits spanning 2016 to 2018. Of the 456 VFD inspections, 91% were classified as no action needed (NAI) or were inspections without significant deficiencies, and less than 0.5% of inspections were classified as needing official actions. In addition, NTF anticipates FDA will release updated antibiotic sales data report at the end of the calendar year and anticipates the announcement of a public meeting to update Appendix A of Guidance for Industry #152, Evaluating the Safety of Antimicrobial New Animal Drugs with Regard to Their Microbiological Effects on Bacteria of Human Health Concern. NTF’s Turkey Health and Welfare committee holds quarterly calls with CVM to discuss the effects of changes in policy on the turkey industry.

This September 2019, CVM released draft Guidance for Industry GFI #263 entitled Recommendations for Sponsors of Medically Important Antimicrobial Drugs Approved for Use in Animals to Voluntarily Bring Under Veterinary Oversight All Products That Continue To Be Available Over-the-Counter outlining a process for voluntarily bringing remaining approved animal drugs containing antimicrobials of human medical importance under the oversight of licensed veterinarians by changing the approved marketing status from over-the-counter (OTC) to prescription (Rx). This largely covers injectables and targets the beef and dairy industries.
Gene-edited animals continue to be of significant interest and are thought to be a potentially important technology to improve animal health. The administration still has not made a determination of whether gene-edited animals will be regulated by FDA or USDA. FDA issued a draft guidance in 2018 that proposes to regulate animal gene-editing as a new animal drug. The regulation of gene-edited animals as a new animal drug would be a lengthy and expensive process that would likely discourage development in the technology. Although there is some question as to what would happen if the product worked in a manner similar to a biologic, as defined in the Virus Serum Toxin Act (VSTA), NTF believes USDA should also be involved in regulating gene-edited animals. The VSTA gives USDA authority over biologics, but it is unclear if and how USDA will ultimately be involved. NTF continues to work with a barnyard coalition to press for the USDA to have the maximum regulatory authority possible under existing statutes, and NTF will continue to work with others in the barnyard to promote USDA as the leader on animal gene-editing as well as urge the White House and Congress to support that position.

On the congressional front, NTF, along with most other major animal-related commodity organizations as a part of the Animal Agriculture Coalition (AAC), pioneered the Animal Pest, Disease and Disaster Prevention and Response Program (APAD) in mid-2016 that was fully funded in the 2018 Farm Bill that passed at the end of last year. The program was established to transform animal disease prevention and response and ensure preparedness for responses during a food animal disease crisis. Further, the APAD program will significantly limit the threats of foreign diseases on American livestock and poultry producers.APHIS has begun moving forward with implementation of the program. Two arms of the program relate directly to turkey production—the strengthening of the National Animal Health Laboratory Network (NAHLN) and establishing the National Animal Disease Preparedness and Response Program (NADPRP). NADPRP allows APHIS to enter into cooperative or interagency agreements with States, universities, livestock and poultry producer organizations, and other eligible entities to fund targeted projects aimed at biosecurity and prevention, detection and surveillance, preparedness and response, and outreach and education. NADPRP funding will support multiple training and exercise projects that will help us enhance our existing disease emergency preparedness and response efforts. APHIS is seeking NADPRP proposals from potential collaborators for projects that will:

- Develop and deliver emergency management training for animal agriculture sector responders,
- Develop and conduct exercises for animal agriculture sector responders, or
- Support animal agriculture sector responder attendance at training and exercises.
APHIS will make available up to $10 million in funds to be divided between the NADPRP and the NAHLN. Specifically, projects selected will included disease prevention and emergency response training and exercise projects and targeted projects to enhance NAHLN diagnostic capability. NTF is working with executives from state associations on application efforts to secure funding for turkey-specific programs.

In 2018, turkey production decreased from 7,949,651.00 to 7,598,289.00 pounds (live weight). Overall, domestic per capita consumption for turkey products decreased from 16.4 in 2017 to 16.2 in 2018. Live production in 2018 decreased to 244,750,000 head with an average live weight of 31.12 lbs. In 2017, 245,500,000 head were produced with an average live weight of 30.92 lbs. (Reference: NTF Sourcebook, pending publication October 2019).

Multistate Analysis of Backyard Poultry Mortality
Kristy Pabilonia, Colorado State University

Understanding common causes of mortality affecting backyard poultry flocks provides essential information to veterinarians, animal health officials, backyard poultry owners and commercial poultry producers. The goal of this study was to collect necropsy reports from veterinary diagnostic laboratories from multiple states and evaluate commonality of diseases resulting in mortality within backyard flocks. Eight states participated in this study: California, Colorado, Georgia, Hawaii, Iowa, Pennsylvania, South Carolina, and Texas, representing different regions of the United States. Each laboratory or laboratory system was asked to provide necropsy reports for a three-year period. A total of 2,509 reports were submitted over a three-year period (2015-17), involving the necropsy of 2,687 birds. The vast majority of birds necropsied were chickens (96%).

More than one contributing cause of mortality was reported in 69% of the birds necropsied. Neoplasia or lymphoproliferative disease was the most common primary diagnosis and was determined to be a cause of death in 42% of the birds necropsied. Of these cases, 63% were diagnosed as Marek’s disease or leukemia/sarcoma. All infectious diseases potentially contributing to mortality were included as a cause of mortality. Bacterial, viral and parasitic organisms were detected in 42%, 7% and 28% of birds necropsied, respectively, with two or more organisms detected in 69% of those birds. A number of zoonotic bacteria were detected, including paratyphoid salmonellae, Listeria monocytogenes, Mycobacterium avium and Campylobacter spp. Toxins including lead and other heavy metals were detected in 1.5% of birds. The results of this study highlight the need for education of backyard flock owners on prevention of disease and biosecurity practices, as well as public health education for consumers of backyard poultry meat and egg products.

This study is published in the Journal of Veterinary Diagnostic Investigation. 2019; 31(3):318-326. doi: 10.1177/1040638719848718
Figure 1 – All causes of mortality in backyard poultry submitted to 12 veterinary diagnostic laboratories in 8 states, 2015-17. Percentages exceed 100% because of concurrent disease in multiple categories (69.1% of birds necropsied).

American Association of Avian Pathologists (AAAP) Meeting Report
Eric Jensen, Aviagen, Inc. and Eric Gingerich, Diamond V

AAAP’s net assets are $1,065,922, an increase of $30,300. Overall, for FY2019, total revenue was up $27,599 due to strong membership growth and investment growth. Annual meeting sponsorship increased with 80 sponsors contributing $170,650; an increase of 10% over the previous year.

Last year AAAP sponsored the second International Necrotic Enteritis Symposium. The conference had 260 attendees from 23 countries and 22 sponsors. A net profit of $38,185 is anticipated.

Sales of educational materials remained strong thanks in great part to the publication of “Gross Pathology of Avian Diseases” authored by Tahseen Abdul-Aziz and John Barnes. The 14th edition of “Diseases of Poultry” is expected to be available in January 2020.

The Avian Diseases journal continues to provide substantial royalties. This year the AAAP eliminated page charges for members and reduced page charges for nonmembers. The reduction in cost to publish an article is intended to encourage more manuscript submissions for the journal. AAAP plans to increase advertising revenue to offset the decrease in page charges.
AAAP membership increased by 32 and now includes 926 members. It is important that we continue to have all of our U.S. members who are veterinarians also be members of the American Veterinary Medical Association (AVMA) so that we can continue to be represented on the House of Delegates and important AVMA committees.

AAAP Board of Directors held a strategic planning session that resulted in creating goals to 1.) Recruit and retain members, 2.) Expand scientific information base, 3.) Improve member experience, 4.) Foster relationships with external organizations and groups that influence issues important to AAAP members, 5.) Support AAAP management team, and 6.) Strengthen AAAP’s financial stability.

The annual meeting was held in Washington DC with 500 attendees from 20 countries. This year’s symposium was “Investigating Disease and Assessing Productivity Using Epidemiological Tools” and was well received. There are plans to include more presentations on epidemiology at future meetings.

Two significant proposals were raised at the AAAP annual business meeting. The first was a proposal to revise the association’s bylaws. There had been no major revisions since 1957 so numerous changes were made for improvement. Significant changes included 1.) Membership changed to only two categories, voting members and associate members. Voting members are veterinarians, and if U.S. based then must be an AVMA member. All other members are associate members, 2.) All use of districts has been eliminated for membership categories as well as for electing Directors (in effect all Directors will be at Large), 3.) An associate member (voting) and student member (non-voting) were added to the Board of Directors, 4.) All Directors will serve four-year terms (previously District terms were not specified but served four years and Directors at Large served two years), 5.) Nominations for Directors may be from both the Nominating Committee and the membership, 6.) The Nominations Committee has been increased from three to five members with the Past-President serving as chairperson, and 7.) A procedures manual has been added. The second proposal was to hold the annual meeting independently from the AVMA in 2021 and was tabled for one year.

The AAAP Foundation supports scholarships, preceptorships and awards. Funding for the Foundation has increased significantly in recent years with endowment for scholarships and awards at $1,000,000 and corporate annual giving has increased to $69,100 this year. Twenty-one scholarships totaling $69,000 and 17 preceptorships totally $20,000 were distributed this year. The first Avian Bioscience Travel Scholarship for non-DVM research students was awarded and two new scholarship funds have been created; AAAP Women’s Network and the Foundation Yan Ghazikhanian scholarships.

For the coming year efforts will continue to recruit new membership and improve revenue from our educational products. Proposals to be addressed
REPORT OF THE COMMITTEE

will be having our meeting independent from the AVMA and changing the name of our organization to better represent the activities of the membership.

The AAAP Research Priorities Committee conducted a survey of the broiler, turkey, and egg layer production veterinarians as well as the Association of Primary Breeder Veterinarians to find the top research priorities for health/diseases, vaccines and pharmaceuticals, diagnostic tools, food safety, poultry welfare, and management/environmental concerns.

Dr. Natalie Armour, AAAP Research Priorities Committee chair prepared a presentation given at the annual meeting of AAAP. Her report will be given at the USAHA annual meeting in Providence, Rhode Island by Dr. Eric Gingerich.

The top research priorities for broilers, turkeys, and egg layers are listed as follows:

Broilers:
1. Salmonella – Intervention strategies at all phases of production or processing
2. Salmonella – Methods to quantify the impact of control interventions
3. Infectious bronchitis – Improved live vaccines
4. Campylobacter – Live production interventions
5. Histomoniasis – Improved preventative and treatment options
6. Reovirus – Improved live and killed vaccines
7. Campylobacter – Improved processing interventions
8. Necrotic enteritis and gangrenous dermatitis – Develop non-antibiotic strategies for control
9. Necrotic enteritis and gangrenous dermatitis – Develop effective vaccines
10. Gut Health – Develop non-antibiotic strategies for preventing gut health issues
11. Autogenous vaccines – Improved selection process of isolates

Turkeys:
1. Salmonella – Intervention strategies to reduce at all stages of production and processing
2. Salmonella – Methods to quantify the impact of control methods
3. Reovirus – Develop diagnostic tools for better surveillance and identifying variants
4. Salmonella – Develop preharvest interventions
5. Reovirus – Epizootiology and emergence of variant strains
6. Reovirus – Develop a rapid test to identify day-old poults that are infected
7. Reovirus – Develop new effective live and killed vaccines
8. Reovirus – Develop alternative vaccine technologies for protection against emerging variants
9. Histomoniasis – Develop better preventative and treatment options
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10. Ornithobacterium rhinotracheale (ORT) – Determine the pathogenesis and risk factors leading to ORT related disease

Egg Layers:
1. Infectious bronchitis – Strategies to prevent False Layer Syndrome
2. Infectious bronchitis – Strategies to prevent the Delmarva strain 1639
3. Infectious coryza – Development of an effective and safe live, mass-applied live vaccine
4. Infectious bronchitis – Effect of DMV 1639 virus on egg production
5. Treatments – Develop treatments for various diseases with no egg withdrawal
6. Post bacterin hepatopathy – Determine the causative factors
7. Colibacillosis – Develop non-antibiotic preventative and treatment options
8. In-ovo sexing – Develop and apply commercially
9. Infectious bronchitis – Develop safe and effective vaccines against variant strains

Dr. Armour is planning to publish the survey results in their entirety in the near future.

CDC Update: Multistate Enteric Illness Outbreak Linked to Poultry
Megin Nichols and Laura Gieraltowski, Centers for Disease Controls (CDC)
Illness outbreaks linked to backyard poultry

CDC and public health officials in several states are investigating multiple multistate outbreaks of Salmonella infections with serotypes Agona, Alachua, Altona, Anatum, Braenderup, Enteritidis, Infantis, Manhattan, Montevideo, Muenchen, Newport, and Oranienburg linked to contact with backyard poultry.

As of August 23, 2019, a total of 1,003 people infected with the outbreak strains of Salmonella have been reported from 49 states. Illnesses started on dates from January 1, 2019, to August 9, 2019. Ill people range in age from less than one year to 99 years, with a median age of 32 years. Of 850 ill people with age information available, 192 (23%) are children younger than five years. Fifty-seven percent are female. Of 605 people with information available, 175 (29%) have been hospitalized. Two deaths have been reported.

Whole genome sequence (WGS) analysis of 149 bacterial isolates from ill people predicted antibiotic resistance or decreased susceptibility to one or more of the following drugs: amoxicillin-clavulanic acid, ampicillin, azithromycin, cefoxitin, ceftriaxone, chloramphenicol, ciprofloxacin, fosfomycin, gentamicin, kanamycin, nalidixic acid, streptomycin, sulfisoxazole, tetracycline, and trimethoprim-sulfamethoxazole. Testing of
eight isolates by CDC’s National Antimicrobial Resistance Monitoring System (NARMS) laboratory using standard antibiotic susceptibility testing confirmed these results. If antibiotics are needed, this resistance profile may affect the choice of antibiotic. WGS analysis of an additional 512 isolates from ill people did not show evidence of antibiotic resistance. Testing of 30 of these isolates by CDC’s NARMS laboratory using standard antibiotic susceptibility testing confirmed these results.

Six of the outbreak strains making people sick have been identified in samples collected from backyard poultry environments at people’s homes in California, Minnesota, and Ohio, and from poultry environments at retail stores in Michigan and Oregon.

In interviews, ill people answered questions about animal contact in the week before they became ill. Of 511 people interviewed, 343 (67%) reported contact with backyard poultry before becoming ill. Ill people reported buying poultry from various sources, including agricultural stores, websites, and hatcheries.

Backyard poultry from multiple hatcheries are the likely source of these outbreaks. Regardless of where poultry are purchased, they can carry Salmonella germs that can make people sick. Backyard poultry owners should always follow steps to stay healthy around their poultry.

**Salmonella outbreak linked to raw chicken products**

During fall of 2018, CDC, USDA-FSIS, and state partners investigated a cluster of 51 *Salmonella Blockley* infections with the same DNA fingerprint from ten states. Bacteria isolated from chicken samples that originated from several different processors in the Northeast were closely related by WGS to clinical isolates. Overall, 90% (26/29) of interviewed patients reported any chicken exposure but chicken brand information was limited, and a single brand was not identified. A sub-cluster at a catered event in New York City (NYC) was identified and a case-control study implicated chicken consumption as the likely outbreak source. These epidemiologic findings in conjunction with the chicken isolate information suggests this was likely an outbreak linked to raw chicken products, but the ultimate source was not determined. Food isolate data indicate that multiple chicken producers could have contributed to this outbreak.

In 2019, a total of 94 people infected with the same outbreak strain of Salmonella were reported from five states in the Northeast (Connecticut, Massachusetts, New Jersey, New York, Pennsylvania, and Vermont). Illnesses started on dates from March 8, 2019, to September 17, 2019. Ill people range in age from less than one year to 77 years, with a median age of 31 years. Forty-three percent are female. Eighteen percent of ill people have been hospitalized. No deaths were reported. Officials in NYC identified a sub-cluster of illnesses associated with rotisserie chicken and chicken salad consumption at a single grocery location.

The outbreak strain of *Salmonella Blockley* was isolated from a leftover chicken product from a patient’s home. The bacteria from clinical isolates are closely related by WGS to Salmonella identified chicken isolates collected.
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from slaughter and processing establishments by USDA-FSIS. This strain may originate upstream of USDA-FSIS regulated slaughter and processing facilities because it has been identified in ill people who ate a variety of chicken products and brands in 2018 and 2019; two sub-clusters of illnesses linked to chicken and USDA-FSIS testing results from a number of slaughter facilities. Further investigation and intervention may be needed to help prevent new illnesses and similar outbreaks in the future.

U.S. Poultry and Egg Association Report
Denise Heard, U.S. Poultry and Egg Association

Dr. Heard gave a brief update of the U.S. Poultry and Egg Association as the new director of research.

National Veterinary Services Laboratory (NVSL) AI and NDV Report
Mia Torchetti, USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), NVSL

Dr. Torchetti gave an update on AI and NDV findings from NVSL.

National Veterinary Services Laboratory (NVSL) Bacteriology Diagnostics Report
Kristina Lantz, USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), NVSL

Salmonella serotyping

The Bacterial Identification section within the Diagnostic Bacteriology and Pathobiology Laboratory of the NVSL routinely performs serotyping of 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 the NVSL from January 1 through December 31, 2018, originating from poultry.

Salmonella isolates are identified as clinical (clinical signs of salmonellosis from primary or secondary infection) or non-clinical (flock monitoring programs, environmental sources, feed). 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 via classical serotyping using polyvalent and single factor antisera to determine the O and H antigens and/or via molecular typing using the xMAP Salmonella serotyping assay. Approximately 60% of the sera used at the NVSL are produced in-house as previously described (Ewing, 1986). 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, 1986) and interpreted via the White-Kauffmann-Le Minor scheme (Grimont, 2007). The subspecies designation precedes the antigenic formula for those serotypes other than subspecies I.

From January 1 to December 31, 2018, 13,037 isolates were received for Salmonella serotyping. Of those, 4,742 isolates were from chicken
sources and 874 isolates were from turkey sources. The most commonly isolated serotypes from chicken and turkey are listed in Tables 1 and 2 respectively.

The NVSL provided a *Salmonella* Group D proficiency test (PT) to 98 individuals from 85 different laboratories. The purpose of the PT was to assess the ability of laboratories to detect or isolate *Salmonella* Group D and/or *Salmonella* Enteritidis from simulated environmental samples. The test consisted of ten lyophilized cultures containing various combinations of *Salmonella* and common contaminants typically found in environmental swabs. The 2018 test included *Salmonella* serotypes Enteritidis, Heidelberg, Javiana, and Oranienburg. Contaminant bacteria included *Citrobacter sedlakii* or *rodentium*, *Citrobacter freundii*, *Enterobacter cloacae*, *Klebsiellae pneumoniae* and *Pseudomonas aeruginosa*. Laboratories were instructed to test the samples according to the procedures used in their laboratories. The NVSL randomly retained approximately 10% of the test kits for quality assurance (QA) purposes. All were tested blindly with no discrepancies. The results of the proficiency test are shown in Table 3.

**Salmonella Enteritidis**

From January 1 to December 31, 2018, 4,742 *Salmonella* isolates were received from chickens and their environment for identification of serotype. This was an 8% increase in chicken submissions from 2017. *Salmonella* Enteritidis was isolated in 9% of these isolates and remains in the top five serotypes observed in both clinical and non-clinical submissions. A summary of the number of *S*. Enteritidis isolates identified from chicken during the previous five years is shown in Table 4.

**Salmonella Pullorum and Gallinarum**

The NVSL received 551 samples for *Salmonella* Pullorum and Gallinarum serological testing in 2018. No isolates of *Salmonella* Pullorum or Gallinarum were identified or confirmed at the laboratory in 2018. The NVSL provided 4,005 mL of *S*. Pullorum tube antigen, a 41% increase from 2017; 2,323 mL of *S*. Pullorum stained microtiter antigen, a 63% increase from 2017; and 416 mL of control antisera, unchanged, to testing laboratories between January 1 and December 31, 2018.

**Pasteurella**

The NVSL received 167 isolates for *Pasteurella multocida* Gel-Diffusion Precipitin testing. Fifty-one isolates were identified as type 3 in 2018 compared to 14 isolates in 2017, a 73% increase. A summary of the results is provided in Table 5. Additionally, 169 isolates were received for *P. multocida* DNA fingerprinting. The NVSL supplied 39 mL of *P. multocida* typing sera to testing laboratories.

**Mycoplasma**

The NVSL received 191 samples for avian *Mycoplasma* hemagglutination inhibition testing in 2018. In addition, 738 mL of *Mycoplasma* control antisera and 315 mL of *Mycoplasma* hemagglutination
antigen were supplied to testing laboratories. Information on *Mycoplasma* reagents provided is shown in Tables 6 and 7.

**Table 1: Most common serotypes in 2018: 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>109</td>
<td>Kentucky</td>
<td>881</td>
</tr>
<tr>
<td>Typhimurium</td>
<td>58</td>
<td>Senftenberg</td>
<td>444</td>
</tr>
<tr>
<td>Kentucky</td>
<td>33</td>
<td>Montevideo</td>
<td>428</td>
</tr>
<tr>
<td>Infantis</td>
<td>29</td>
<td>Mbandaka</td>
<td>347</td>
</tr>
<tr>
<td>Braenderup</td>
<td>14</td>
<td>Enteritidis</td>
<td>309</td>
</tr>
<tr>
<td>All others</td>
<td>74</td>
<td>All others</td>
<td>2,061</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>317</strong></td>
<td><strong>Total</strong></td>
<td><strong>4,425</strong></td>
</tr>
</tbody>
</table>

**Table 2: Most common serotypes in 2018: Turkeys**

<table>
<thead>
<tr>
<th>Serotype</th>
<th>No. Isolates</th>
<th>Serotype</th>
<th>No. Isolates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albany</td>
<td>41</td>
<td>Senftenberg</td>
<td>100</td>
</tr>
<tr>
<td>Reading</td>
<td>39</td>
<td>London</td>
<td>96</td>
</tr>
<tr>
<td>Senftenberg</td>
<td>33</td>
<td>Bredeney</td>
<td>74</td>
</tr>
<tr>
<td>Uganda</td>
<td>31</td>
<td>Schwarzengrund</td>
<td>43</td>
</tr>
<tr>
<td>Anatum</td>
<td>28</td>
<td>Agona</td>
<td>29</td>
</tr>
<tr>
<td>All others</td>
<td>168</td>
<td>All others</td>
<td>192</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>340</strong></td>
<td><strong>Total</strong></td>
<td><strong>534</strong></td>
</tr>
</tbody>
</table>

**Table 3: Summary of the NVSL Salmonella Group D proficiency test**

<table>
<thead>
<tr>
<th></th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Participants</strong></td>
<td>80</td>
<td>94</td>
<td>98</td>
<td>101</td>
<td>98</td>
</tr>
<tr>
<td><strong>Mean Score</strong></td>
<td>98%</td>
<td>98%</td>
<td>97%</td>
<td>95%</td>
<td>98%</td>
</tr>
<tr>
<td><strong>Below Passing</strong></td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>3</td>
</tr>
</tbody>
</table>

**Table 4: Number of Salmonella Enteritidis isolates in chicken per calendar year at the NVSL**

<table>
<thead>
<tr>
<th></th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>No. chicken isolates</strong></td>
<td>4,688</td>
<td>4,593</td>
<td>3,539</td>
<td>4,397</td>
<td>4,742</td>
</tr>
<tr>
<td><strong>No. chicken SE isolates</strong></td>
<td>377</td>
<td>513</td>
<td>342</td>
<td>358</td>
<td>418</td>
</tr>
<tr>
<td><strong>SE percent of all isolates</strong></td>
<td>8.4%</td>
<td>11%</td>
<td>9.7%</td>
<td>8%</td>
<td>9%</td>
</tr>
</tbody>
</table>

**Table 5: Somatic types of Pasteurella multocida observed at the NVSL per calendar year**

<table>
<thead>
<tr>
<th></th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type 1</strong></td>
<td>10</td>
<td>18</td>
<td>34</td>
<td>37</td>
<td>35</td>
</tr>
</tbody>
</table>
### Table 6: Mycoplasma antisera (mL) provided by NVSL per calendar year

<table>
<thead>
<tr>
<th>Antisera</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>M. gallisepticum</td>
<td>246</td>
<td>290</td>
<td>192</td>
<td>376</td>
<td>236</td>
</tr>
<tr>
<td>M. meleagridis</td>
<td>34</td>
<td>68</td>
<td>42</td>
<td>58</td>
<td>48</td>
</tr>
<tr>
<td>M. synoviae</td>
<td>212</td>
<td>260</td>
<td>172</td>
<td>362</td>
<td>192</td>
</tr>
<tr>
<td>Negative</td>
<td>156</td>
<td>250</td>
<td>322</td>
<td>340</td>
<td>262</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>648</td>
<td>868</td>
<td>728</td>
<td>1,136</td>
<td>738</td>
</tr>
</tbody>
</table>

### Table 7: Mycoplasma antigen (mL) provided by NVSL per calendar year

<table>
<thead>
<tr>
<th>Antigen</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>M. gallisepticum</td>
<td>170</td>
<td>70</td>
<td>275</td>
<td>290</td>
<td>145</td>
</tr>
<tr>
<td>M. meleagridis</td>
<td>85</td>
<td>45</td>
<td>80</td>
<td>90</td>
<td>45</td>
</tr>
<tr>
<td>M. synoviae</td>
<td>230</td>
<td>205</td>
<td>215</td>
<td>235</td>
<td>125</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>485</td>
<td>320</td>
<td>570</td>
<td>615</td>
<td>315</td>
</tr>
</tbody>
</table>


USA Interagency Surveillance for Highly Pathogenic Avian Influenza (HPAI) in Wild Birds

Tom DeLiberto, USDA-APHIS-WS

A unique A(H5Nx) clade 2.3.4.4 highly pathogenic avian influenza virus (HPAIV) was detected in North America in late 2014. Motivated by both the alarming spread of new H5 reassortant viruses in Asia and Europe as well as by the detection of HPAIV in both domestic poultry in Canada, and in wild and captive birds in Washington State, initial HPAIV surveillance was conducted among wild birds in the Pacific Flyway of the United States. This effort was later expanded to include the Central and Mississippi Flyways. Positive HPAI H5 findings from wild waterfowl samples suggested that while some of these species exhibited no detectable morbidity or mortality, clinical disease was documented for other wild bird species similarly infected. Also, losses in U.S. domestic poultry were unprecedented. In July 2015, state and federal agencies initiated a national surveillance effort to provide information to guide management actions to address some of the issues associated with
POULTRY AND OTHER AVIAN SPECIES

HPAIVs in birds. This includes risks to commercial poultry, backyard poultry, game bird farms, wild birds, wild bird rehabilitation facilities, falconry birds, and captive bird collections in zoos/aviaries. Specific objectives of the plan were to: 1) determine the distribution of influenza viruses of interest in the U.S.; 2) detect spread of influenzas of interest to new areas of concern; and 3) provide a flexible surveillance framework that can be modified to monitor wild waterfowl populations for avian influenza, detect reassortant avian influenza viruses, and estimate apparent prevalence of important influenzas once detected in an area of concern. During 2015 and 2016, surveillance data indicated that A(H5Nx) clade 2.3.4.4 HPAIV was circulating in wild birds at about a 1% prevalence each year. No HPAI detections have been detected in wild birds since December 2016. An update on the current year's wild bird HPAIV surveillance program and associated research on avian influenza will be provided.

National Poultry Improvement Plan (NPIP) Update
Elena Behnke, USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), NPIP


Pullorum-Typhoid Status: There were no isolations of Salmonella pullorum in commercial poultry in FY2015, FY2016, FY2017, FY2018 or FY2019. There were no isolations of Salmonella pullorum in backyard birds in FY2015, FY2016, FY2017, FY2018 or FY2019. 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: 268 egg and meat-type chicken hatcheries, 66 turkey hatcheries, and 779 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**
230 Flocks with 6,004,447 birds

**Meat-Type Chickens**
6,385 Flocks with 114,368,511 birds

**Turkeys**
381 Flocks with 3,674,096 birds

**Waterfowl, Exhibition Poultry, and Game Birds**
REPORT OF THE COMMITTEE

7,170 Flocks with 2,554,380 birds

**Meat-Type Waterfowl**
130 Flocks with 350,564 birds

**Avian Influenza Status:**
From July 1, 2018-June 30, 2019, there were three isolations of confirmed Low Pathogenicity Avian Influenza (LPAI) in commercial poultry in the U.S.:
- CA – commercial turkey flock confirmed 9/8/18 – H7N3
- MN – commercial turkey flock confirmed 10/20/18 – H5N2
- CA – commercial duck flock confirmed 4/22/19 – H5N2

**Table 1: 2019 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>334</td>
<td>2,410,251</td>
<td>25,308</td>
</tr>
<tr>
<td>Table-Egg Layers-Commercial</td>
<td>5,888</td>
<td>470,012,204</td>
<td>128,465</td>
</tr>
<tr>
<td>Meat-Type Chicken Breeders</td>
<td>13,881</td>
<td>447,511,162</td>
<td>670,940</td>
</tr>
<tr>
<td>Meat-Type Chickens-Commercial</td>
<td>100,284</td>
<td>6,937,853,390</td>
<td>1,652,623</td>
</tr>
<tr>
<td>Turkey Breeders</td>
<td>1,018</td>
<td>8,620,452</td>
<td>43,114</td>
</tr>
<tr>
<td>Turkeys-Commercial</td>
<td>11,489</td>
<td>151,869,038</td>
<td>136,832</td>
</tr>
<tr>
<td>Waterfowl, Upland Game birds, Exhibition Poultry</td>
<td>5,066</td>
<td>2,350,306</td>
<td>108,245</td>
</tr>
<tr>
<td>Upland Game birds, Waterfowl, Raised for Release Upland Game birds, Raised for Release Waterfowl-Commercial</td>
<td>3,303</td>
<td>36,970,420</td>
<td>41,050</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>141,263</td>
<td>8,057,597,223</td>
<td>2,806,577</td>
</tr>
</tbody>
</table>
Table 2: 2019 MG, MS, and MM positive breeding flocks:

| Mycoplasma gallisepticum, Mycoplasma synoviae, and Mycoplasma meleagris positive breeding flocks - National Poultry Improvement Plan FY2019 |
|---------------------------------|--------|--------|--------|--------|
| WEGBY | Egg-Type | Meat-Type | Turkeys |
| M. gallisepticum | 16 | 2 | 9 | 0 |
| M. synoviae | 20 | 0 | 68 | 10 |
| M. meleagridis | 0 | 0 | 0 | 0 |

Authorized Laboratories Activities: The National Veterinary Services Laboratory issues a group D Salmonella check test and an AI check test for the Agar Gel Immunodiffusion test for Authorized Laboratories of the NPIP. Laboratory training provided to the authorized laboratories included a Salmonella Isolation and Identification Workshop, a Mycoplasma Diagnostic Workshop, and an Avian Influenza Diagnostic Workshop during FY2019.

National List of Reportable Animal Diseases (NLRAD)

Rebecca Jones, USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), Strategy and Policy (SP), Center for Epidemiology and Animal Health (CEAH)

The National List of Reportable Animal Diseases (NLRAD) is a proposed regulation that will create an obligation to report detections of animal disease to APHIS and to State Animal Health Officials. The joint effort of many stakeholders, including the United States Animal Health Association (USAHA), the American Association of Veterinary Laboratory Diagnosticians (AAVLD), and the National Assembly of State Animal Health Officials (NASAHO) resulted in the creation of the NLRAD.

The purpose of the NLRAD is to have consistent animal disease reporting across the United States and to help animal health officials protect the U.S. agriculture infrastructure. The NLRAD also supports domestic and international commerce; helps meet international reporting obligations to the World Organization for Animal Health (OIE) and trading partners; supports the creation of export certifications; contributes to the knowledge of zoonotic and endemic animal diseases; and aids in the response to an emerging disease or issue in the United States. Finally, the NLRAD helps inform reports made to the World Health Organization’s International Health Regulations and Public Health Emergencies of International Concern.

The national animal disease list is based on the OIE list of reportable diseases and is intended to complement and supplement State reportable disease lists. The NLRAD builds on the current National Animal Health Reporting System (NAHRS) that facilitates voluntary disease occurrence reporting by State animal health officials to APHIS.

The NLRAD includes two categories: 1) Notifiable Diseases and Conditions and 2) Monitored Diseases. The term ‘disease’ includes disease agents and pathogens.
REPORT OF THE COMMITTEE

Notifiable diseases and conditions consist of emergency incidents, emerging disease incidents, and regulated disease incidents. Any animal health professional who suspects or diagnoses a notifiable disease will be required to report it immediately to the State Animal Health Official (SAHO) and to APHIS. Proposed notifiable avian diseases include:

- Duck viral hepatitis (poultry only)
- Low pathogenic avian influenza (H5 or H7 subtypes) (poultry only)
- Highly pathogenic avian influenza
- Newcastle disease (exotic, virulent) (poultry only)
- *Salmonella enterica* – *Gallinarum & Pullorum*
- Turkey rhinotracheitis (poultry only)

Monitored diseases generally are those that are endemic in the United States and are required to be reported in 6-month and annual reports to the OIE. APHIS also uses data gathered to monitor changes in disease occurrence over time. States and laboratories will be required to report occurrence information (yes/no) on monitored diseases monthly; laboratories will report to State Animal Health Officials and States will report to APHIS. Proposed monitored avian diseases include:

- Avian chlamydiosis (psittacosis and ornithosis, *Chlamydia psittaci*)
- Avian infectious bronchitis
- Avian infectious laryngotracheitis
- Avian mycoplasmosis (*Mycoplasma gallisepticum & synoviae*)
- Infectious bursal disease (Gumboro disease)

Stakeholder collaboration and feedback has been important in the development of the NLRAD and APHIS would like to continue with this engagement into the future. Additional information about the stakeholder engagement process will be made available on the APHIS website when the proposed rule is published for public comment in the Federal Register. APHIS encourages and welcomes all stakeholders to review and comment on the proposed rule when it is published.

**Multistate Psittacosis Outbreak Among Poultry Plant Workers, 2018:**

*Animal Health Perspectives*

Tracey Dutcher, USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS)

From August – October 2018, 13 confirmed and multiple probable and suspect cases of psittacosis (ornithosis) were reported among workers at two FSIS-inspected poultry slaughter plants in Virginia and Georgia. A single corporation owns both plants, which slaughter spent broiler breeder hens supplied by 23 companies sourced from multiple grower farms east of the Mississippi River. This outbreak was unique in several ways. Psittacosis outbreaks among poultry slaughter plant workers in the United States are rare – or rarely reported – and previously associated with turkeys, rather than chickens. Additionally, illness among confirmed and suspected case-patients
was unusually severe; 28 individuals required hospitalization, three in intensive care units, and 26 of the case-patients had radiographically diagnosed lobar pneumonia. No deaths were reported.

This presentation highlights the roles and responsibilities of the different State and Federal agencies involved in the outbreak, and how they provided an integrated, multi-sectoral One Health response. While no single farm was conclusively identified as the source, survey results suggest that increased awareness of avian chlamydiosis combined with practical surveillance could mitigate or prevent future outbreaks of this rare but serious disease in humans. Key prevention areas include improving biosecurity and implementing targeted surveillance. Flocks experiencing an increase in mortality 1.75 times above expected during the last four weeks before processing should consider testing for *C. psittaci* following necropsy and diagnostic testing for common bacterial pathogens and other routine causes of increased mortality.

**World Organization for Animal Health (OIE) Updates**

Michael David, USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) National Import Export Services (NIES)

Every year the OIE updates existing terrestrial animal health code chapters or develops new ones. Additional chapters are in the process of being drafted or revised. Chapters of interest to the poultry industry and which will likely be presented for comment this fall are:

**Code chapter on avian influenza.** In an effort to clarify the chapter and help reduce unjustified import health measures Member countries place on the international trade of live poultry and poultry products, the OIE is revising this chapter. The revisions will include proposing a new definition for poultry, further clarifying the risk differences between low pathogenic and highly pathogenic avian influenza (AI) viruses, proposing that low pathogenic strains not be immediately reported, and clarifying the risk associated with the trade of certain poultry products.

**New Code chapter on laying hen production and welfare.** The OIE has circulated a draft chapter for Member country comment on two separate occasions. The second iteration included text that is potentially exclusive of the most common layer hen housing system used currently throughout the world (conventional cage systems), causing significant concern among major egg laying producing countries. The OIE is revising this language which should address those concerns.

**Code chapter on zoning and compartmentalization.** A new concept – the concept of establishing “temporary protection zones” – will be proposed for inclusion in this chapter. The aim of this concept is to help minimize the impact a foreign animal disease introduction has on the status of the rest of the country and, there, also on international trade from that country.
Live Bird Market System (LBMS) Report
Fidelis Hegngi, USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), Strategy and Policy (S&P)

Since 1986, States have been monitoring LBMs in the Northeastern United States for the presence of avian influenza (AI) viruses that may pose a threat to the commercial poultry industry. On October 20, 2004, USDA-APHIS published uniform program standards to prevent and control H5 and H7 LPAI subtypes in the U.S. LBMS. The standards cover 1) licensing, 2) AI testing, 3) recordkeeping, 4) sanitation, 5) biosecurity, 6) surveillance, 7) inspection, 8) trace backs, 9) premises registration, 10) trace outs when positives occur, and 11) response to positive facilities. The standards apply to LBMs, auctions, and small sales, as well as to producers and distributors who supply the markets. The LBMS Uniform standards have been revised in 2008, 2012 and 2016. The standards are currently being implemented.

States are responsible for enforcing LBMS LPAI program standards. All LBMs, producers, and distributors that supply the markets must be registered or licensed with the State and must allow Federal and State inspectors access to their facilities, birds, and records. These facilities must also have written biosecurity protocols in place. USDA-APHIS coordinates and administers the program. USDA-APHIS provides personnel and resources to assist States with implementation and compliance with program requirements.

The LBMS Working Group held its annual business meeting in February 2019 in San Diego, California. More than 71 participants representing 23 States attended the meeting including APHIS field, district, and headquarters staff; State Department of Agriculture representatives; and LBMS industry stakeholders. Participants discussed the program’s progress, shared ideas for continued program implementation, and agreed on further advancement of the program.

The working group also discussed:
1. Fiscal Year (FY) 2019 Avian Health line item budget update.
3. California AI Incidents – H7N3 LPAI Overview, Challenges and Lessons Learned.
4. Minnesota AI Incidents – H5N2 LPAI Overview, Challenges and Lessons Learned.
5. California Virulent Newcastle Disease: Overview and Lessons Learned; Farm Specific Secure Food Supply Plans; Biosecurity Accomplishments; Overview of LBMS vND and Lessons Learned; Education and Outreach Efforts.
6. Health Monitoring for People Exposed to Avian Influenza.
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8. AI Dashboard: Cooperative agreement future data processing and reporting.
10. An update on mass disposal methods and cleaning and disinfection.
12. New York LBM HPAI Response Exercise and Lessons Learned
13. An update on the National Poultry Improvement Program (NPIP) and the announcement of the 2020 NPIP Biennial and General Conference Committee (GCC) meeting in Providence, Rhode Island.
14. NPIP authorized laboratories system and compartmentalization update.
15. USDA Southeast Poultry Research Laboratory (SEPRL) Update on vND and Avian Influenza.
17. Vaccine immune evasion by AIV: Pandora’s Box opened with today’s technologies.
18. Discussion on Outreach and Education Projects: Defend the Flock (DTF) – Combined campaign; Background/Goals/Outreach materials; Webinar/Launch/Partnering; Calendar Replacements Social media vND response
19. 2018 LBMS Continuing Education Training Course, College of Veterinary Medicine, University of Minnesota.

In November 2018, USDA launched the new Defend the Flock campaign that combines outreach to both commercial and backyard poultry flocks. The new campaign emphasizes the importance of shared responsibility between anyone who owns or works with poultry. Since the launch, the campaign hosted two webinars to share information with all poultry owners and workers. We also launched a twice-yearly e-newsletter in July 2019. USDA is partnering with states, industry and other groups to share information and resources through social media and on the web. The campaign offers a series of checklists in English, Spanish, Chinese, Vietnamese and Tagalog, with new materials coming in FY2020. A webinar aimed at helping the commercial audience prepare for NPIP audits will take place in November 2019 featuring USDA, state and industry speakers. Defend the Flock materials and information are available at www.aphis.usda.gov/animalhealth/defendtheflock.

LBMS surveillance remained a high USDA priority in FY2019. There were two detections of H7N3 LPAI in the U.S. LBMS.
CEAH Report
Amy Delgado, USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), Center for Epidemiology and Animal Health (CEAH)

USDA-APHIS-VS-CEAH has provided extensive epidemiologic support for poultry-related issues in the past year. This work has ranged from epidemiologic study design and review to the integration and public sharing of outbreak investigations and epidemiologic analyses. CEAH provided support to the National Turkey Federation (NTF) in response to their request for a study design to estimate the national seroprevalence of infectious bursal disease virus (IBDv) in U.S. turkeys going to slaughter. The last study examining IBDv in U.S. turkeys was conducted 35 years ago. This new study, conducted by NTF in collaboration with Ohio State University will provide updated estimates of IBDv seroprevalence among turkeys being processed within the top U.S. poultry plants.

Fiscal year (FY) 2019 saw numerous outbreaks affecting U.S. poultry. CEAH assisted with analysis and integration of epidemiologic investigations for low pathogenic avian influenza and virulent Newcastle disease. Full information on these investigations is available online through the USDA APHIS avian health website at: https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/animal-disease-information/avian. The epidemiologic investigations and analyses conducted as part of the virulent Newcastle Disease outbreak have improved our understanding of disease transmission in affected poultry populations and led to more targeted surveillance and response efforts. CEAH continues to work with State and Federal partners, academia, and the poultry industry to improve our ability to detect and respond to disease incursions.

Compartm...
In this project, we developed a stochastic simulation model for vND transmission within a layer flock to predict the time to detection under various active surveillance protocol options and input parameter scenarios. The transmission model predicted the number of birds in various disease states (latently infected, infectious, immune, and dead) at various times post flock exposure. Statistical distributions for input disease state durations were estimated with a maximum likelihood method using data from experiments performed at the Southeast Poultry Research Laboratory (SEPRL). We used three scenarios for the adequate contact rate parameter that determines the rate of virus spread in the poultry house given the uncertainty regarding its value under field conditions. The adequate contact rate for the fast-spread scenario was estimated using data from contact experiments performed at SEPRL. The adequate contact rates for the slow and very slow spread scenarios were based on reproduction number estimates from the literature. Other model parameters included the proportion of birds immune to vND virus infection following vaccination and the proportion of infected birds that die, both of which were estimated from the SEPRL experimental data.

Preliminary results show considerable uncertainty regarding vND transmission dynamics in vaccinated flocks. The rate of transmission varies depending on vaccine efficacy and immunity under field conditions, which may be influenced by vaccination schedule, flock management, age, and co-morbidities. The time to detect vND in a vaccinated flock may be extended, especially in scenarios with slow spread due to factors such as high immunity levels, less virulent virus, and decreased adequate contact rates. To provide more certainty to the models, additional data regarding flock production, flock mortality, and diagnostic surveillance results are needed.

Acknowledgments: The authors would like to acknowledge the following people: Darrel Kapczynski, USDA, Agricultural Research Service (ARS), for providing experimental inoculation data for parameter estimation; Jennifer Siembieda, USDA, Animal and Plant Health Inspection Service (APHIS), Center for Epidemiology and Animal Health (CEAH), Surveillance Design and Analysis (SDA), for providing input regarding surveillance protocols; and the Minnesota Supercomputing Institute for supercomputing resources used to perform the analysis.

Funding: Authors Peter Bonney, Sasidhar Malladi, Amos Ssematimba, Marie Culhane and Carol Cardona acknowledge funding of their work by sponsored project contract number CON000000075615 (Secure Food Systems Team Contract with the State of Minnesota Board of Animal Health) and partial funding from a cooperative agreement between the CEAH-USDA-APHIS-VS and the University of Minnesota (UMN) as USDA Award number AP18VSCEAH00C016 (Risk Analysis and Modeling to Manage HPAI and Other Animal Disease Emergencies). Carol Cardona is also funded by the B.S. Pomeroy Chair in Avian Health at the University of Minnesota College of Veterinary Medicine.

Disclaimer: The authors contributed to this article in their personal capacities. The views expressed are their own and do not necessarily
represent the views of their funders nor the views of the University of Minnesota.
Newcastle disease virus

Viruses of genus Avian orthoavulavirus 1 (AOAV-1) (formerly designated as Avian avulavirus 1 (AAvV-1)), commonly known as Avian paramyxoviruses 1 (APMV-1) or Newcastle disease viruses (NDV), cause infections in a wide range of domestic and wild birds worldwide. Avian paramyxoviruses are found widely in both poultry and in wild birds, and as a single stranded negative sense ribonucleic acid (RNA) virus, it has considerable sequence variation. The virulent forms of the virus are reportable to the World Organisation for Animal Health (OIE) and therefore outbreaks of the virulent form of the virus affects trade. In order to characterize avian paramyxoviruses, different classification schemes have been proposed. Many of these early schemes had flaws that were exposed as more NDV sequences have become available for study. In an effort to provide a robust classification scheme, an international consortium of laboratories doing NDV diagnostics or research was developed to establish a classification scheme that was robust enough to allow for the continued evolution of the virus. Because of the availability of large numbers of sequences and the importance of the fusion gene as a virulence factor, it was determined to use the full coding sequence of this gene for classification. Analysis of available sequences showed APMV-1 viruses separate into two major classes, I and II. The class I viruses are primarily found in wild birds and has only limited genomic variation. The class II viruses, which includes almost all of the virulent viruses, has considerable genetic variation. The consortium used a criteria of 10% sequence differences for groups of viruses to identify it as a unique genotype, and within a genotype a difference of greater than 5% would classify a sub-genotype. Using this classification scheme, a total of 20 unique genotype were identified with some genotypes have multiple sub-genotypes. As the consortium contains most of the active laboratories working on NDV, this scheme has been rapidly adopted by the research community (Dimitrov el, 2019).

The virulent Newcastle disease virus (vNDV) outbreak in California that started in 2018 appears to be contained as of August 2019. This outbreak was largely centered in backyard flocks in southern California. Earlier phylogenetic analysis has shown that the virus was most related to viral sequences from Central America and was in the same genotype as the California 2002-03 outbreak virus. Although related to these viruses, in-depth sequence analysis supports that the differences between these viruses was too great for them to be the direct source of the virus. Unfortunately, little vNDV sequence is available from Mexico or Central America in the last 15 years. However, a new virus from Guatemala from 2018 was sequenced and this virus is now the closest virus to the original introduction into California.
However, because this virus is 0.8% different from the California virus, it also does not appear to be the direct progenitor.

**International Avian Influenza virus**

Both low pathogenic and highly pathogenic avian influenza viruses continue to circulate widely around the world of many different lineages. The H9N2 low pathogenic subtype remains widely distributed in Asia, the Middle East, and parts of Europe and Africa. The H9N2 virus actually has at least four unique poultry adapted lineages. The G1 lineage, first identified in China, is probably the most widespread lineage being found in Asia, the Middle East, and is spreading in Africa. The H9N2 subtype, although low pathogenic, can cause high morbidity and when combined with other poultry pathogens can result in low to moderate mortality. Vaccination is commonly used to control the disease, but because of antigenic variation well matched vaccines are not available in most countries. Of additional concern is the potential for zoonotic infection. There have been at least 24 cases of humans infected with H9N2, although mostly causing respiratory disease with no mortality. Serologic data suggests that infection of humans with H9N2, particularly those with poultry exposure, may be much higher. Additionally, these viruses have several molecular markers suggestive of human adaptation (Pusch et al 2018). This virus remains of concern to both poultry and public health officials.

In Mexico, both a low pathogenic H5N2 virus and a highly pathogenic H7N3 virus are endemic. The H5N2 virus has circulated in Mexico since 1994, and despite the widespread use of vaccines it remains endemic in the country, and it also has spread to several neighboring countries. The virus appears to be highly adapted to chickens and experimentally transmits efficiently. The H7N3 virus has been circulating in Mexico since 2012 and vaccination has also been used for control. The original vaccine was a related but not identical low pathogenic wild bird H7 virus, and initially provided good protection. However, field reports suggest the vaccine has lost its efficacy. Alternative vaccines have been made include viral-vectored vaccines and reverse genetics made viruses used as killed vaccines. Current vaccination programs may reduce clinical disease, but recent reports of outbreaks by Mexico show the virus is still widespread.

The H7N9 virus that was first detected in China in 2013 is also still being reported. The H7N9 virus was originally a low pathogenic virus, but it mutated to a high pathogenicity virus in 2016. The virus is zoonotic and has caused over 1,500 confirmed human cases with over a 30% case fatality rate. Vaccination was implemented in 2017 because of a spike in human cases and the virus being highly pathogenic. The Chinese government provides a bivalent H5-H7 vaccine free of charge to poultry producers, and the vaccine program appears to have greatly reduced the incidence of both human and poultry infections. The virus appears to have remained endemic in the country.

The goose/Guangdong lineage of highly pathogenic H5 avian influenza continues to be a global threat. The virus continues to reassort and currently
H5N1, H5N6, and H5N8 are commonly reported and H5N5 and H5N2 are occasionally reported. All the reassortant viruses should be considered to have unique attributes. Fortunately, zoonotic infections of these viruses have decreased to only sporadic human infections with H5N6 being reported most commonly in the last year. The H5N8 lineage of viruses has not been reported as zoonotic, but can potentially become zoonotic. Europe, which had numerous outbreaks in 2018 related to wild bird infection and introduction into poultry, have had only sporadic detections in 2019. However new outbreaks, likely related to wild birds, has resulted in outbreaks in several African countries including South Africa and Namibia in 2019. The goose/Guangdong lineage of virus continues to evolve and the infection and maintenance of the virus in wild birds makes it an ongoing threat to the United States.

References
REPORT OF THE COMMITTEE ON PROGRAM
Chair: Marty Zaluski, MT

Bruce Akey, TX; Gary Anderson, KS; Marianne Ash, IN; Lisa Becton, IA; Stephen Crawford, NH; Tarrie Crnic, KS; Barbara Determan, IA; Katie Flynn, CA; Linda Glaser, MN; Dale Grotelueschen, NE; Kristin Haas, VT; Keith Haffer, SD; Charles Hatcher, TN; Carl Heckendorf, CO; Amy Hendrickson, WY; Annette Jones, CA; Donna Kelly, PA; Diane Kitchen, FL; Charlotte Krugler, SC; Dale Lauer, MN; Eric Liska, MT; Linda Logan, TX; Bret Marsh, IN; Cheryl Miller, IN; Boyd Parr, SC; Barbara Powers, CO; Steve Rommereim, SD; Mo Salman, CO; Yuko Sato, IA; David Schmitt, IA; Andy Schwartz, TX; Charly Seale, TX; David Smith, NY; Michael VanderKlok, MI; Liz Wagstrom, DC; Peregrine Wolff, NV; Marty Zaluski, MT.

The Committee on Program met on Saturday, October 25, 2019 at the Rhode Island Convention Center in Providence, Rhode Island. There were 39 members present. Following introductions, Dr. Zaluski reviewed procedural practices for the meeting, including:
- 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

Next, Ben Richey covered discussion on committee report preparations, and instructions for handling the committee chair packets.

Handling security was discussed next, with instructions to chairs on how to treat emergency issues with respect to personnel and staff at the Convention Center.

Dr. Zaluski, and Resolutions Chair Barb Determan led a discussion on handling resolutions for multiple committees. The practice to have multiple committees approve one resolution was discouraged, since resolutions once approved become an organizational USAHA Resolution. It was further discussed that resolutions that benefit from discussion in different committees is acceptable and encouraged when different expertise is needed.

USAHA will formalize the response process for resolutions, to better qualify responses and required actions moving forward.

Dr. Dusty Oedekoven noted that chairs could be thinking about plans and ideas for the Government Relations meeting to take place in February or March. Chairs are invited to attend if they have issues of significance. A form

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will be started this year to help ensure topics are given the proper attention and detail with the various meetings.

The following chairs were recognized for their service:
- Liz Wagstrom, One Health
- Tarrie Crnic, Rabies
- Ernest Oertli, Rabies
- Gary Anderson, Diagnostic Laboratory and Veterinary Workforce Development
- Valerie Ragan, Diagnostic Laboratory and Veterinary Workforce Development
- Dale Groteleuschen, Cattle and Bison
- Marianne Ash, Animal Health Surveillance and Information Systems
- Charlotte Krugler, Animal Emergency Management

An overview of the Committee Review Process was provided, with a brief background on successes in this effort. Committees up for review were also discussed, with information on what to expect in the coming year.

Agenda scheduling was discussed, encouraging chairs to make sure ample time is provided for the committee business and resolutions. Business could be handled at any time through the meeting agenda, as chairs saw fit. Some committees do business at the beginning, or middle, to ensure a quorum and tied to any relevant presentations on the topics.

With no other business, the meeting was adjourned.
The Committee met on November 29, 2019 at the Rhode Island Convention Center in Providence, Rhode Island, from 1:00 to 6:00 p.m. There were 28 members and 12 guests present. The Chairman called the meeting to order at 1:02 p.m. and reviewed some housekeeping matters, including a request for all to sign the attendance sheet. Also discussed was the membership requirements to propose resolutions and recommendations, and voting. The chairman encouraged all to participate in discussions.

**Presentations and Reports**

**Coxiella Burnetii** Shedding from Naturally Infected, Never Bred Yearling Doe Goats: Implications for Transmission and Surveillance  
Stephen White, Research Geneticist, USDA, Agricultural Research Service (ARS) Animal Disease Research  
Stephen N. White¹,²,³, Ryan D. Oliveira², Mehmet Ulas Cinar²,⁴, Codie J. Durfee¹, Kristy L. Pabilonia⁵, David A. Schneider¹  
¹USDA-ARS, Animal Disease Research Unit  
²Department of Veterinary Microbiology and Pathology, Washington State University
Coxiella burnetii is a zoonotic bacterium endemic in the U.S. and nearly worldwide. Coxiellosis in ruminants is characterized by abortion events, including abortion storms in goats and sheep. Furthermore, ruminants are blamed for most human C. burnetii outbreaks, in part because the minimum infectious dose is a single bacterium while ruminant placentas can accumulate hundreds of millions to billions of organisms per gram. Many exposed human beings develop an acute disease known as Q Fever, characterized by varying degrees of fever, aches, pneumonia, and hepatitis. There is also a much rarer but more serious chronic form characterized by potentially fatal endocarditis, and adverse pregnancy outcomes. Common conditions including pregnancy can predispose to chronic disease. Since C. burnetii is not the most common cause of any of these conditions in either ruminant livestock or human beings, it is a widely underdiagnosed pathogen in both systems. Current understanding of C. burnetii transmission from domestic goats is derived in large part from experimental infection where no fecal or vaginal shedding was observed prior to parturition. We collected vaginal swabs from over 300 naturally infected U.S. goats with a very high proportion of C. burnetii shedders (>90%). Among these, many never-bred yearling doe goats had C. burnetii positive swabs by quantitative polymerase chain reaction (PCR). Additional analyses of other sample types from this herd are underway. The results to date suggest goats that have never been pregnant can present a transmission risk to goats and human beings, and future surveillance should include this class of animals.

Status of the NAHMS 2019 Goat study
Amy Delgado, USDA, Veterinary Services (VS)

From July 1 through December 2019, the USDA’s National Animal Health Monitoring System (NAHMS), in collaboration with the National Agricultural Statistics Service (NASS), is conducting its second national study of the U.S. goat industry. The NAHMS Goat 2019 study will take an in-depth look at the priority issues facing U.S. goat operations and provide new and valuable information regarding animal health and management practices in this growing industry. Approximately 4,700 goat producers from 25 of the Nation’s major goat producing States were invited to participate in the study.

The NAHMS Goat 2019 study is designed to provide individual participants and stakeholders with valuable information on the U.S. goat industry. The NAHMS Goat 2019 study will:

- Describe changes in animal health, nutrition, and management practices from 2009 to 2019,
REPORT OF THE COMMITTEE

- Describe practices producers use to control internal parasites and reduce anthelmintic resistance,
- Describe antimicrobial stewardship on goat operations and estimate the prevalence of enteric pathogens and antimicrobial resistance patterns,
- Describe management practices associated with, and producer-reported occurrence of, economically important goat diseases, and
- Provide a serologic bank for future research.

Phase I of the study began in July 2019 with NASS representatives contacting potential participants. The response rate for Phase I was over 62%, with over 72% of those respondents consenting to continue with Phase II. Phase II of the study began in September 2019 with goat producers who agreed to continue in the study. Phase II participants are contacted by APHIS or State veterinary health professionals to schedule an in-person interview and collect biologics. Free biologic testing for participants includes pre- and postdeworming fecal parasite egg counts, scrapie resistant genotyping, and Salmonella, E. coli, and Campylobacter culture results. Data collection will end in early 2020, with initial reports expected in late 2020.

Because NAHMS relies on voluntary participation, the privacy of every participant is protected. Only those collecting the data know the identity of respondents. No name or contact information will be associated with individual data, and no data will be reported in a way that could reveal the identity of a participant. Data are presented only in an aggregate manner.

Parasite Control in Small Ruminants and Camelids in the Wake of Increasing Drug Resistance
Dahlia O’Brien, Virginia State University

Internal parasite infections are a major cause for reduced productivity in the small ruminant industry. Years of overuse and misuse of available chemical anthelmintic treatments has led to the development of drug resistance in parasite populations on many farms. Anthelmintic resistance occurs when a drug loses its ability to effectively kill internal parasites and they continue to survive in the presence of therapeutic levels of the drug (standard prescribed dose). With an increasing number of farms experiencing drug resistance in the U.S., there has been research into and the promotion of alternative strategies that support sustainability and slows down the rate of drug resistance on farms. Strategies including targeted selective treatment, increasing drug efficacy, combination treatments, animal nutrition, pasture management, genetic selection, copper oxide wire particles, condensed tannins (e.g. Sericea lespedeza) and others are now being recommended to manage drug resistance on farms. In the wake of drug resistance, the ultimate goal of any worm control program should be reducing the deworming/drug use frequency and slowing down the rate at which further resistance is occurring to all drugs.
Genome-Wide Association Studies (GWAS): How it Works, Limitations, and New Developments
Brenda Murdoch, University of Idaho

The scientific community has used GWAS to identify underlying disease-causing genetic mutations for the past two decades. This information has aided in both the development of new genetic tests as well as a greater understanding of physiological underpinning of numerous livestock diseases, and on the flipside the embodiment of health. The basic information employed in genome wide analyses have also been used to provide information about genetic relatedness within and across breeds. Furthermore, understanding how these technologies and analyses are performed allows a greater comprehension of the power and limitations of these genomic tools. As the cost of generating sequence based genetic information continues to decline, the overall availability and utility of this information to producers is rapidly expanding resulting in the era of big data and hopefully big solutions.

Epigenetics: How Stress, Nutrition, and the Maternal Environment Impacts Offspring
Brenda Murdoch, University of Idaho

Although it is generally understood that maternal nutrition and stress can have an influence on offspring; we are only now beginning to understand the underlying mechanisms involved in this relationship. Epigenetics is a generalized term that describes modifications to the genome that do not change the deoxyribonucleic acid (DNA) nucleotide sequence itself, but nevertheless affect gene regulation and therefore directly contribute to biological variation between individuals. These epigenetic modifications include changes in DNA methylation, the expression of small non-coding ribonucleic acid (RNA) and the acylation or methylation of histone in chromatin. These epigenetic changes are environmentally induced modifications, which influence the regulation, expression and quantity for many physiologically important genes. Within the confines of this brief presentation, we will review these epigenetic processes to better understand the mechanisms and resulting physiological consequences so that we understand how this may affect an individual as well as its future progeny. Together we will remove the mystery of epigenetics, such that we all better understand its important role in regulation of phenotype.

Developing a North American Approach to Small Ruminant Drug Approvals
Corlena Paterson, Canadian Sheep Federation

Access to veterinary drugs and biologics is one of the Canadian sheep industry’s key challenges, and one that requires innovative tactics to overcome. Ms. Paterson discussed some of the challenges Canadian producers face, shared some innovative new approaches to drug approvals, and proposed ways by which our cumulative North American sheep and goat
industries can work together to get producers the tools they need to be successful.

Some examples of innovative approaches taken in Canada to date include:

- Facilitated access to low-risk veterinary health products (VHPs).
- Proposed new approval mechanism for Minor Use and Minor Species (MUMS): Review of Foreign Decisions for Veterinary Drugs.
- Adaptation of the Pest Management Regulatory Agency (PMRA) process for supplemental approvals.
- Simultaneous veterinary drug reviews through Regulatory Cooperation Council (RCC) between Canada‘s Veterinary Drugs Directorate (VDD) and Food and Drug Administration (FDA)‘s Center for Veterinary Medicine; 11 animal drug approvals to date but none for sheep or goats.
- Multi-lateral simultaneous reviews; Canada/Australia/New Zealand simultaneous approval of Metacam.

Paterson requested cooperation from this body in pushing forward with these or other potential solutions to the difficulties in getting approval of MUMS drugs and products.

**Ovine Progressive Pneumonia (OPP): Control and Challenges**

Cynthia Wolf, American Sheep Industry

Recent research by Leymaster et al, has demonstrated that the primary route of transmission of the OPPV is via contact with infected mature sheep. This work demonstrated that the virus is primarily spread through contact with nasal and oral secretions directly from infected to uninfected sheep.

Prior to this research, the historical belief was that this virus was spread by the ingestion of infected colostrum and milk thus infected ewes were blamed as sources of infection for their progeny. In 2013, interested sheep producers began eradicating OPPV from their flocks by participating in a cooperative state and industry-led program developed in Minnesota.

**METHODS**

There are four key components to this current eradication program:

1. All serological testing is performed using HYPHEN BioMed‘s Elitest® Enzyme Linked Immunosorbent Assay (ELISA) for Maedi Visna (MVV)/ Caprine Arthritis Encephalitis Virus (CAEV).

2. Producers with heavily infected flocks have been testing lambs intended as replacement breeding stock at 2-3-months post-weaning. The research published in 2013 indicated that 10-30% of the weaned lambs would initially test positive from infected ewe flocks. Recent field experiences support this finding.

3. The lambs that test negative are kept as a separate group away from the infected ewes with no nose-to-nose contact.

4. Once serologically positive lambs are removed after the initial test, follow-up testing, again using the Elitest® is scheduled to occur two months later. This testing strategy is repeated until the entire lamb
group has tested negative two consecutive times. It is imperative that producers adhere to test intervals of every 2-3 months to make expedited progress. See Appendix 2 on the Minnesota’s Healthy Sheep and Goats Program on the https://www.bah.state.mn.us and/or the oppsociety.org site for the recommended flow of testing depending on the initial results and the flock owner’s objectives.

RESULTS

It is possible to rebuild a test-negative flock from test-positive parent sheep in a single generation following this newer strategy, although it is recommended to proceed with caution to retain genetic diversity. A more prudent goal for achieving eradication would be three to five years, a timeline during which we have observed multiple flocks produce enough seronegative replacements such that all remaining seropositive sheep can be culled.

See OPP/CAE Program details at: https://www.bah.state.mn.us and at http://www.oppsociety.org (Excerpted from Minnesota’s Healthy Sheep and Goats Program).

Producers need to be realistic about the budget and facilities required to meet the eradication effort’s needs over a three to five-year period. The needs are as follows: multiple tests per animal are usually needed, improvement may be necessary in the individual animal identification, an electronic flock inventory needs to be generated and kept up to date, and practical straight-forward facility changes made to prevent nose-to-nose contact between positive, negative and untested sheep.

CONCLUSIONS

This eradication strategy has worked assuming certain caveats are followed:

1. The producer ought to maintain an electronic inventory of the flock to ensure that all sheep in the tested group have been sampled and are found at time of removal once results are returned.
2. All seropositive sheep need highly visible and permanent identification to distinguish them from the seronegative group in case of accidental mixing which serves to spread virus.
3. Modifications need to be made on the farm to ensure that nose-to-nose contact never occurs between seronegative and seropositive groups.
4. Adhering to the testing schedule is vital such that new infections are detected before there has been more than low levels of transmission.
5. This strategy requires financial and management commitment by the producer even though rearing on milk replacer is not needed.
6. Engaged producers have documented or been convinced of having higher levels of productivity in their sero-negative versus seropositive ewe groups and have been pleased with the outcome of their efforts.

References

Brinkhof, J.M.A., Moll, L., van Maanen, C., Houwers, D.J. 2010. Use of serology and polymerase chain reaction for the rapid eradication of


Committee Business:
The Committee approved the report of the Subcommittee on Scrapie and Identification. The committee reviewed the resolution that came from the Subcommittee to encourage USDA to continue to provide identification tags free of charge to producers who request a flock identification for the first time. Since the implementation of the new scrapie regulation, many new premises...
have been registered, including at least 800 in South Carolina alone. The full Committee considered two additional resolutions. One resolution encouraged continued research and development of preventative and genetic tools to reduce risk of *Coxiella brunetti*. The second encouraged continued scrapie research to inform the National Scrapie Eradication Program.

The Committee discussed the presentation provided by the Canadian Sheep Federation representative and expressed a desire to encourage our government to work with Canadian agencies to coordinate combined efforts to approve minor use minor species drug and products for the benefit of U.S. and Canadian producers. Due to time constraints the Committee chose not to craft a resolution and instead develop a letter of recommendation for USAHA action on this important matter. The committee leadership will create a draft letter to be shared with committee members and discussed on a future conference call. When finalized the letter will be submitted to the USAHA Executive Committee for consideration.

There being no further business the committee adjourned at 5:48 p.m.
The Subcommittee met on October 29, 2019 at the Rhode Island Convention Center in Providence, Rhode Island, from 9:00 a.m. until 12:10 p.m. There were 18 members and ten guests present. Meeting was called to order by the chairman, Dr. Cheryl Miller. All attendees were asked to sign in.

Presentations and Reports

Scrapie Program Updates
Diane Sutton, National Scrapie Program, Veterinary Services (VS), USDA

Highlights of Scrapie Program Regulatory changes
- Scrapie Final Rule and revised Scrapie Eradication Program Standards were published March 25, 2019 and went into effect April 24, 2019
- Goats now have the same federal identification (ID) and recordkeeping requirements as sheep; however, the consistent state ID requirements did not change
- Expanded use of Owner/Hauler Statements to include all animals in slaughter channels in interstate commerce
- All female scrapie exposed goats are now considered high-risk animals
- Low-risk animal definition added to regulation to:
  o Allow animals to be re-designated when warranted based on epidemiology, and
  o Allow Animal and Plant Health Inspection Service (APHIS) to establish policies on genetic resistance in goats and Nor98 like scrapie or other scrapie strains that may be discovered without revising 9 CFR.
- States are required to meet surveillance minimums in fiscal year (FY) 2021

Scrapie Eradication Program*
- The National Scrapie Eradication Program sampled over 26,884 sheep and 7,846 goats in FY2019. Sampling was down in FY2019 due to the government furlough and virulent Newcastle disease (vND) deployments.
- The United States has gone from 1 in 500 cull sheep tested at slaughter that were positive for classical scrapie in 2002, to none out of 22,664 cull sheep sampled at slaughter in FY2019 and tested as of September 30, 2019.
- The FY2018 Pennsylvania source herd was depopulated in October 2018; five sheep and one goat tested positive for classical scrapie; three of the positive sheep were AVQR and two were VVQQ.
Classical scrapie was confirmed in an Indiana goat sampled at slaughter in June 2019. The herd of origin was designated an infected herd but no exposed animals remained in the herd and are believed to have been slaughtered. Further investigation determined that two herds were the potential birth herd of the positive goat. Test eligible goats in these herds were rectal biopsied and all results were not detected. The herds were placed on monitoring plans.

This was third positive goat sampled at slaughter; first found November 2014 and the second in July 2018.

APHIS is doing an evaluation of the prevalence of genetic resistance codons in goats using slaughter and on-farm testing including samples collected as part of the NAHMS Goat Study. This data will be used to inform how genetic resistance will be used in the program.

National Scrapie Surveillance Plan Changes

- Sample all sheep and goats at least 18 months and under six years
  - No longer target older black-faced sheep
  - Sample untraceable sheep and goats
- Regional approach to setting sampling minimums
- Pilot and potentially fully implement genotyping of Regulatory Scrapie Slaughter Surveillance (RSSS) samples and only test susceptible sheep for scrapie to reduce cost
- Implement point system by FY2021

Official Eartags:

In FY2019, APHIS provided metal serial ear tags at no cost to markets and dealers and up to 100 tags to sheep and goat producers that had not gotten tags in the preceding two years. At the request of industry in February 2019, APHIS started providing up to 80 plastic tags to producers who had not previously been assigned a flock ID in exchange for no longer providing metal tags to producers after August 2019. At the end of FY2019, APHIS entered into a new plastic tag contract were the pricing allowed the maximum order to be increased to 100 plastic tags. APHIS is no longer providing applicators to industry.

Scrapie Flock Certification Program (SFCP)

- At the end of September FY2019 there were 232 producers enrolled in the program:
  - 43 Export Certified
  - 48 Export Monitored
  - 144 Select Monitored

*As of September 30, 2019. FY2019 numbers are not final and may change.

How the U.S. Can Use Electronic Identification in the National Scrapie Eradication Program (NSEP)

Cindy Wolf, University of Minnesota
The USDA, Animal and Plant Health Inspection Service (APHIS) requested that the U.S. sheep industry develop a plan to assist with the transition from mandatory visual identification to electronic identification (EID) used in the NSEP. The industry believes that all facets of the production chain need to learn of the economic and business benefits that EID offers. In countries such as the United Kingdom (U.K.), Canada and the state of Victoria in Australia, their sheep industries collaborated with their governments to develop their program of mandatory EID use and traceability when sheep leave the flock of origin and travel to the marketplace or other farms. The tags chosen are sheep- and people-friendly, not expensive and function well. Interestingly, in both Australia and the U.K., replacement EID tags are mandated to be a specific color. Some animal transactions are captured by panel readers and others by wand readers, both of which readily communicate with field-friendly apps on tablets and smartphones to create real-time lists of animals being moved. Multiple educational methods have been developed addressing the details on how to use EID, achieve its economic benefits, and comply with lifetime traceability regulations. Details on the EID tag subsidy program in Victoria were shared. Lastly, the industry is interested in forming a working group to resolve the existing technological challenges and use the lessons learned from other countries in order to develop a beneficial EID-based traceability program for the U.S. sheep industry.

Scrapie Transmission, Diagnostics and Genetics
David A. Schneider, Animal Disease Research Unit

To evaluate the risk of natural transmission of Nor98-like scrapie in U.S. sheep, four ewes homozygous for the PRNP codon R171 were inoculated by the intracerebral route with brain homogenate from a genotype matched U.S.-field case. Transmission was confirmed in all four by conventional methods. Placentas collected from these ewes were generally negative for detection of PrP-Sc(Nor98) accumulation, though in each case suspect accumulation appeared to increase with age. Testing for placental infectivity is underway using transgenic mice susceptible to Nor98-like scrapie. In addition, F1 progeny of these ewes are tested postmortem at seven years of age for evidence of natural transmission. To date, we have observed no evidence of placental infectivity nor of natural transmission to F1 progeny. Peripheral lymphoid accumulation of PrP-Sc is most commonly associated with the highly transmissible form of scrapie, classical scrapie, in genotype-susceptible sheep (QQ171). The first case of PrP-Sc accumulation in the lymphoid tissue of an RR171 sheep was recently detected in the U.S. through the Regulatory Scrapie Slaughter Surveillance (RSSS). Limited to testing residual samples of formalin-fixed paraffin-embedded (FFPE) tissue from this case, an effort to detect infectivity has commenced in Tg mice. In addition, initial results from sensitivity of protein misfolding cyclic amplification (sPMCA) have detected no misfolding activity in thin sections from these samples. Though rare in occurrence, PrP-Sc accumulation in
lymphoid tissues of resistant animals may indicate other genetic factors relevant to susceptibility are at play. To determine the effects of other PRNP genotypes, a study is underway on the long-incubation phenotype of GS127 goats. In the first two years of the study, all goat recipients were inoculated at birth by the oral route. Initial culls confirm strong transmission to GG127 goats (wildtype) by 18 months of age and have produced clinical disease in a few at <36 months. No clinical cases have yet been observed in GS127 goats. The GS127 progeny will help determine if slow incubation genotypes are associated with delayed peripheral accumulation of PrPSc. Finally, updates will be given on our collaborative efforts to develop methods of enhanced detection of both classical and atypical forms of scrapie.

Subcommittee Business:
- The subcommittee mission statement was read. The subcommittee discussed updating the mission statement to reflect current terminology. Motion was made and approved by the subcommittee to update the mission statement. The updated mission statement was sent on to the parent committee for approval.
- The subcommittee was informed that all recommendations and resolutions will be forwarded to the parent committee, Committee on Sheep, Goat and Cameliid.
- The subcommittee’s old business from 2018 which included the resolutions submitted to the parent committee were reviewed.
- The importance of continuing free plastic tags for first time producers and free metal tags for concentration points was discussed and resulted in the formation of a resolution supporting these efforts. A motion was made by Dr. Ben Smith to accept this resolution, seconded by Dr. Cindy Wolf, and passed by the subcommittee unanimously. This resolution was forwarded to the Committee on Sheep, Goat and Cameliid.
- Dr. David Schneider moved that the meeting be adjourned. Dr. Patty Scharko seconded this motion.
The Committee met on October 29, 2019 at the Rhode Island Convention Center in Providence, Rhode Island, from 1:00 - 5:00 p.m. There were 34 members and 22 guests present. Housekeeping items were reviewed including sign-in, member eligibility, resolution discussion and points of order.

Presentations and Reports

Review of Upcoming National Animal Health Monitoring System (NAHMS) 2020 Swine Study
Amy Delgado, USDA, Center for Epidemiology and Animal Health (CEAH)

Dr. Delgado reviewed the upcoming plans for the NAHMS 2020 Swine study. There are two components of the study to include both small enterprise (<1000 pigs) and large enterprise (>1000 pigs) The large enterprise survey will initiate from July-August 2020 – phase 1; phase 2 through January to include biologic testing for enteric pathogens as well as SVA testing for rope samples.
The small enterprise will be a mail-out survey and will focus on movement and mortality channels as well as emergency response planning. This will not include any biologic testing. There will be a follow-up phone call after the survey is sent out. See the NAHMS website for the launch sheets that detail the states that are participating and what will be completed. Next steps are to reach out to industry to get awareness level increased for the upcoming study and to garner good participation.

Swine Disease Surveillance update: Foreign Animal Disease’s (FAD) and Influenza A Virus (IAV)

John Korslund, USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS)

Dr. Korslund shared the background and an evolution of swine surveillance was provided during the meeting to include FADs, IAV, pseudorabies virus (PRV), porcine epidemic diarrhea virus (PEDV) and now classical swine fever (CSF) and African swine fever (ASF). Now many program efforts are looking at surveillance, preparedness and risk assessments.

ASF/CSF surveillance started in June 2019. CSF has been ongoing for approximately ten years. Now with the addition of ASF, multiple diseases are being monitored. The surveillance early data shows 1,550 dual tested samples, half come from slaughter plants and 1996 for CSF specific testing. There have been non-vesicular 26 FAD investigations. The samples are collected from the diagnostic laboratories that meet case-compatible criteria. There is a protocol that utilizes the same tissue process to run both ASF and CSF polymerase chain reaction (PCR) for cost-savings. All samples run are tested for both diseases, if case compatible. Other areas for sampling include packing plants, garbage feeders and other transitional herds. Garbage feeders are also tested for CSF only. This accounts for the 1,996 samples collected at high risk, backyard pigs to include garbage fed. The locations are in Florida, Puerto Rico and other locations. There is not approved serology for ASF, but it is done for CSF. This is done to try to detect low level of disease through antibody testing. Feral swine are also tested through Wildlife Services (WS) for CSF in high-risk populations in southern/southwestern states. Feral swine are not tested for ASF but will be done if there are suspect dead pigs. FAD investigations still provide a means to perform investigation and testing on suspect cases. Numbers have been increasing for FAD investigations and testing, so this remains a means for additional coverage on FAD surveillance. In most cases, sick or dead pigs have triggered the FAD investigations. The data is covered in the USDA Emergency Management Response System (EMRS) system. There is serologic testing occurring for swine populations for FADs. Serology is mainly for CSF. There are some concerns that serology could still catch some cases that are not apparent. If it is needed for recovery when we are positive, is there work in this sphere? There is an approved Ab test, commercially available in limited supply. There is work on an in-house test that can
become available. It is underway at Foreign Animal Disease Diagnostic Laboratory (FADDL). Validation of the confirmatory test at FADDL has been done.

Swine Vesicular FAD investigations are occurring. Surveillance has increased since 2015 and continues to rise in 2019. There is a seasonal trend of higher cases in late summer, early fall. The USDA does account for on-farm versus plant submissions. Location of cases = 88% from slaughter streams; 12% are on-farm; of the 88%, 44% are in sow slaughter and 37% are from roaster or light slaughter. Slaughter streams are definitely the highest incidence and some partly due to the length in time in slaughter channels. They are picking up Senecavirus A (SVA) in transit and end up in FAD investigations at slaughter. Many cases are difficult to track completely through the farm. From the epidemiology work that USDA is completing, the pigs do not appear to be originating from the farm.

Influenza surveillance showed limited influenza at fairs. There is good reporting of sick pigs at fairs and expositions. This is happening before reporting of people illness. The number of samples positive and sent to Genbank is still working and being completed. There is continued participation in the program. Samples that are virus positive should be able to be sequenced. Regions may not be indicative of what is occurring within the surveillance sampling areas. Funding is stable. It is time to review the need to assess influenza surveillance.

**Customs and Border Protection (CBP) Update**

*Kevin Harriger, Department of Homeland Security (DHS), CBP*

The goal is to exclude foreign animal diseases (FADs) from the U.S. The charge for coverage is huge. This encompasses food and agriculture as well and drug interdiction and other areas of focus. CBP is protecting export markets and yet provide consumers with products that they would like to have. We have seen 3-5% increase in volume of products over the border. One point one (1.1) million passengers travel to the U.S. every day, many by air, vessels, and other means. Two thousand nine hundred international arrivals daily. This does not include rail entry. Twenty-two thousand five hundred law enforcement to help deal with the entry of people and products. Twenty-five hundred agriculture specialists with further training in ag-specific activities. What is CBP doing to address the current risk? When a country is announced positive, they find out how many citizens visit on an annual basis, how they transit and gather that data. Then there is continued vigilance for disease protection. ASF education have been included in training sessions and curriculum. There are messaging boards up at points on entry to help alert passengers. There is a significant effort to prevent smuggling efforts and other illegal activities. There is a targeting platform that looks at the attributes of the movement and how that outcome has occurred. This is compared to country of origin and disease status. Then surveillance is done
according to this platform. There is a more successful effort to this process. There are 119 working dogs for interdiction. They are deployed at all major airports and ports of entry. Looking to get more signage for disease prevention and including screens that show education on ASF. “Don't Pack a Pest” campaign that is in collaboration with USDA and tied to the Farm Bill; also looking at the potential to have in other countries prior to coming back to the U.S. Likewise, performing education with students that are from foreign countries and working with them on risks of product entry. Developing a strategy to do internal “in-reach” to train internal staff on threats. Working to get funding to get an additional 60 more canine teams for support; enhance awareness of passengers to declare their risks and how they can mitigate those risks, i.e., on-farm visits and secondary screening.

Feed Risk Task Force Update and Feed Risk Focus
Paul Sundberg, Swine Health Information Center (SHIC)
An overview of the risk associated with feed was presented. There was a request for a task force to discuss the issue of risks for feed and disease transmission. The group has met twice since April, once in June and the second in September. The action should focus on minimizing trade disruptions, be based on science and achievable. The Task Force is broad participation. They have identified gaps and research needs including development of capability for testing feed/ingredients, an industry initiative with metrics on responsible import programs, infrastructure to have Canadian-like import holding program. Additional actions include development of a plan to assess and mitigate contamination within the feed system once the virus is identified and further overall development of efficacy of mitigations for feed contamination. There is how to reduce the risk of introduction and also how to reduce the chance of spread once the virus gets into the U.S. FDA has been involved in this task force. The next meeting will continue in 2020.

African Swine Fever (ASF) Exercise Outcome Panel
USDA:
- Jack Shere
- Jon Zack
State Vets:
- Jeff Kaisand, Iowa
- Doug Meckes and Mike Neault, North Carolina
- Bret Marsh, Indiana
- Greg Suskovic, Minnesota
- Jim Kober, Michigan
- Kevin Brightbill, Pennsylvania
- Robert Cobb, Georgia
Academic:
- Marie Culhane, University of Minnesota
SWINE

FADDL

- Kim Dodd
Veterinary Diagnostic Laboratory (VDL)/ National Animal Health Laboratory Network (NAHLN)
- Jerry Torrison, University of Minnesota

Producers

- Steve Rommereim, South Dakota
- Steve Brier, Missouri
- Jamee Eggers, Iowa
- Nick Lauterbach, Missouri

Benefits

- Have more than 20 or more private sector participants
- Do have laboratory capacity and continuing to ensure that the capacity to deal with a disease is available
  - Continued assessment of oral fluids is necessary to facilitate surveillance
- Multi-country disease collaboration and coordination
- Planning is valuable and is a must - need to take advantage of these exercises to continue to improve policy and existing plans
  - Need to be prepared to make the early, hard decisions
  - Continued collaboration is key!!
- Communications and collaborations with industry veterinarians has improved and continues to grow
  - Next phase is to garner upper-management company involvement
- Farm Bill application for additional funds to address the response and preparedness efforts
- Develop new teams for incident control
- Having a multi-state collaboration to address disease management = current 12 state coordination efforts

Challenges/Gaps

- National movement standstill and how best to implement this
  - What is start time?
  - What is stop time?
    - Do we have the testing capacity to get out of the standstill!
  - Does that extend to additional hours?
  - How does having feral pigs impact the shutdown?
  - Need to have some level of consistent surveillance on pigs prior to outbreak but also within the outbreak
  - What is included in the standstill?
  - How best to permit movements out of control zones?
- How to pay percent of indemnity in the event of a positive farm
  - Current 50% fair market value of pig with administrative discretion to pay more up to 100%
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- Will depopulate method influence indemnity
- Need to address farm types for differences – i.e. sow farm versus finisher

• Business continuity in the event of a disease outbreak
• Continued testing about capabilities for oral fluids – continue to understand true capacity and time to process tissues etc.
  - Need to test surge capacity!!
• Need to assess how to incorporate farm staff to collect samples (including farm veterinarians)
• VDLs need to have samples they can process quickly – common matrices can speed up the amount of testing
• Need to understand the epidemiology of the initial outbreaks quickly
• Need to have additional methods for rapid depop that conforms to American Veterinary Medical Association (AVMA) practices and that are acceptable by industry and farmers
• Incorporation of packing into the discussion
• Need to have biosecurity plans in place, data in Emergency Management Response System (EMRS) gateway – are all types of operations prepared to have a biosecurity plan in place?
  - Need to get widespread communications to additional folks on-farm to raise and build awareness on the slat level
  - Need to focus on getting producers in sanitary and phytosanitary (SPS)
• Communicating laboratory results in real-time
• External authority to assist in shut-down (highway patrol or other?)
• How to handle how packing plants accept animals with known status or how to get known status for pigs inside or outside of control zones?
• Address state to state variability for managing the outbreak
  - Certificate of veterinary inspection (CVI)
  - What/who is included in 72-hour standstill order?
  - How to work within different state animal health laws?
  - And deal the variability between federal and state rules
• Information technology (IT) coordination and Gateway capacity for permitting is important – need to have multiple permissions during an outbreak
  - Encourage others to “pre-load” data if at all possible
• Social media messaging and addressing non-farm people and how they perceive disease management
  - Stress messages for swine specific diseases and make sure all involved are on the same page
• Will the stand still order be a formal Secretary order to extend beyond those states directly involved?

Committee Business
Old Business:

2018 Resolutions - The responses provided for all of the 2018 resolutions were adequate.

2018 Recommendation - No action for 2019. Sundberg made the motion to look at the 2018 Recommendation for 2019-2020, Cobb seconded. Member made the motion to accept amended version and was seconded. The amended recommendation passed. The final amended motion was passed with majority voice vote.

New Business:

Resolutions
- African swine fever (ASF)/ Classical swine fever (CSF) National Animal Health Laboratory Network (NAHLN): Amended and passed by voice vote
- Farm Bill/NAHLN Funding: Amended and passed by voice vote
- Feed Sampling Validation: Passed by voice vote
- Efficient Dx of Samples: Passed by voice vote
- Foreign Animal Disease (FAD) Prevention: Passed by voice vote
- FAD Compartmentalization: Amended and passed
- FAD Movement Controls: Amended and passed
- Garbage Feeding
COMMITTEE ON WILDLIFE
Chair: Peregrine Wolff, NV
Vice Chair: Mark Ruder, GA

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The Committee met on October 29, 2019 at the Rhode Island Convention Center in Providence, Rhode Island, from 1:04 - 5:30 p.m. There were 33 members and 27 guests present. There were no resolutions submitted in 2018. The first presentation was given by Andreas Eleftheriou who was the joint USAHA and American Association of Wildlife Veterinarian’s student travel award recipient.

Presentations and Reports

The Role of Interspecific Competition in the Ecology of Hantavirus, and Their Host, the Deer Mouse
Andreas Eleftheriou, Amy Kuenzi, Angela D. Luis, University of Montana
As species biodiversity declines worldwide, infectious diseases of wildlife and humans are becoming more common. To explain this pattern, the "dilution effect" hypothesis was proposed, which posits that species diversity (i.e., number/evenness of species) can regulate disease risk. However, some claim that species identity is more important than merely species diversity. For example, competition from a dominant species in a given community may alter behavior, and induce chronic stress in another species, which can subsequently influence its exposure and susceptibility to infection, respectively. Chronic stress, typically characterized by a rise in baseline glucocorticoids (GCs), can increase susceptibility to infection through suppression of the immune system.

In western Montana grasslands, small mammal communities consist primarily of deer mice (*Peromyscus maniculatus*), voles (*Microtus* spp.) and shrews (*Sorex* spp.). Deer mice are asymptomatic carriers of Sin Nombre hantavirus (SNV), a directly transmitted pathogen that can cause fatal disease in humans. The deer mouse-SNV system is ideal for examining effects of competition on pathogen transmission because of two reasons. Firstly, voles are dominant competitors of deer mice, so they may influence their behavior, stress physiology, and/or immunity. Secondly, SNV transmission in deer mice increases with higher species diversity, which may be the result of higher intraspecific contact rates (i.e., exposure to infection) and/or higher susceptibility to infection given contact. Thus, we hypothesized that dominant voles will alter contact rates and/or induce stress-mediated immunosuppression in deer mice, while shrews may have a lesser effect.

To address our hypothesis, we live-trapped and marked small mammals over two years in western Montana grasslands. Deer mice were evaluated for scar numbers (proxy for contact rates), demography, and body condition scores (BCSs; a measure of stress physiology). We also collected blood and feces from deer mice, and prepared blood smears. To avoid trap-induced effects on baseline GCs, feces were collected within four hours of capture. Stress-induced GCs (a measure of stress physiology) were evaluated from feces collected from deer mice confined in a trap overnight. In the laboratory, blood was evaluated for white blood cell counts/differentials, and Sin Nombre Virus (SNV) antibodies, and feces for fecal corticosterone metabolites (FCMs) to measure stress physiology (baseline and stress-induced GCs). To quantify FCMs, we used a corticosterone enzyme immunoassay that was previously validated for use with deer mouse feces. Using mixed effect regression trees, we found that higher vole density was associated with lower scar numbers and BCSs, but that higher shrew density was associated with higher scar numbers, but lower BCSs and stress-induced FCMs. We were unable to directly examine relationships between competition and SNV infection because of low numbers of infected deer mice. Overall, our findings suggest that interspecific competition may influence SNV transmission in deer mice via contact rates and stress physiology. Consequently, competition may influence SNV outbreaks and spillover into humans. Hence, identity of species and their ecological roles may be more important in regulating...
Pullorum Disease Testing in Endangered Species: Challenges and Potential Impacts
Jessica A. Emerson, White Oak Conservation

Pullorum disease, caused by *Salmonella enterica* subspecies *enterica* serovar Gallinarum biovar Pullorum (commonly referred to as S. Pullorum), is an important disease in the poultry industry with mortality in commercial operations approaching 100%. Prevention and control of Pullorum disease is primarily achieved through testing and culling, vaccination of chicks, and biosecurity measures. These strategies have been critical in minimizing the risk and consequences of this disease in domestic chickens.

Gallinaceous birds and ratites are common in many zoological collections. Pullorum disease testing is often required in these species prior to movement throughout the U.S., often employing the same testing methodology of the poultry industry. These methodologies have not been validated in non-domestic avian species and information available at this time indicates that they are not predictive of infection. In endangered species where every individual matters for the future of the population, utilizing appropriate diagnostic tests, understanding results, and minimizing unintended consequences are imperative.

Update on 2019 Hemorrhagic Disease Activity and Asian Longhorned Tick Surveillance
Mark G. Ruder, Southeastern Cooperative Wildlife Disease Study (SCWDS), University of Georgia
Stacey Vigil, Seth White, Alec Thompson, Natalie Stilwell, Brianna Williams, Rebecca Poulson, Michael Yabsley and David Stallknecht, SCWDS, College of Veterinary Medicine, University of Georgia

In collaboration with the USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) and SCWDS member wildlife agencies, SCWDS has been conducting surveys of wildlife for *Haemaphysalis longicornis* (Asian longhorned tick) in the United States. Methods have included 1) live animal trapping and environmental sampling in localized areas where *H. longicornis* has been documented, 2) passive regional surveillance of white-tailed deer and other wildlife, and 3) tick collections from wildlife presented to wildlife rehabilitation facilities in areas where *H. longicornis* has been documented. As of October 25, 2019, we have examined ticks from ~1,600 individuals representing 53 species from 21 states resulting in numerous new state, county, and host records. Although the situation is dynamic, to date, these surveys have detected *H. longicornis* in seven states (New Jersey, Maryland, West Virginia, Virginia, North Carolina, Kentucky, and Pennsylvania) on white-tailed deer, raccoons, Virginia opossum, elk, woodchuck, red fox, gray fox, coyote, eastern cottontail, and red-tailed hawk.
Annually, SCWDS processes tissue samples from throughout the United States from wild ruminants with suspected orbiviral hemorrhagic disease. For samples that test positive by reverse transcriptase-polymerase chain reaction (RT-PCR), virus isolation is attempted, and isolates are identified to serotype. Samples with no virus isolate are not further typed. Findings from the 2018 and 2019 transmission seasons are reported here. During 2018, 102 viruses were detected from 212 tissue samples, representing six species of wild ruminant (183 white-tailed deer, 16 mule deer, 10 elk, one pronghorn, one bighorn sheep, and one moose) from 23 states. Isolations of epizootic hemorrhagic disease virus (EHDV)-2 (58), EHDV-6 (1), bluetongue virus (BTV)-1 (1), BTV-18 (1), and BTV-24 (2) were made from white-tailed deer or mule deer (see Table). An additional 25 untyped BTVs were detected in white-tailed deer, mule deer, or elk (Florida, Georgia, Idaho, Maryland, Missouri, Mississippi, North Carolina, Nebraska, Pennsylvania, and South Carolina), and 14 untyped EHDVs were detected in white-tailed deer, mule deer, or elk (Florida, Missouri, Mississippi, Montana, North Carolina, Nebraska, Pennsylvania, South Carolina, Tennessee, and West Virginia). As of October 24, 2019, 196 viruses have been detected from 316 tissue samples, representing 25 states and 5 species (293 white-tailed deer, nine mule deer, eight elk, four pronghorn, and two cattle). To date, isolations of EHDV-1 (1), EHDV-2 (126), and BTV-2 (1) were made from white-tailed deer, pronghorn, or cattle (see Table). An additional 16 untyped BTVs have been detected in white-tailed deer (Arkansas, Florida, Georgia, North Carolina, Nebraska, Pennsylvania, and West Virginia) and 52 untyped EHDVs have been detected in white-tailed deer, mule deer, or elk (Arkansas, Florida, Georgia, Idaho, Indiana, Kansas, Kentucky, Missouri, North Carolina, Wisconsin, and West Virginia).
## 2018 SCWDS EHDV & BTV Diagnostics

### Virus Serotypes Detected

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## 2019 SCWDS EHDV & BTV Diagnostics

### Virus Serotypes Detected

as of October 24, 2019

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Update from the OIE National Focal Point for Wildlife and the OIE Working Group on Wildlife
Jonathan Sleeman, National Wildlife Health Center, United States Geological Survey

The need to fight animal diseases at global level led to the creation of the Office International des Epizooties (World Organization of Animal Health; OIE) through an international agreement signed in 1924. The OIE is the intergovernmental organization responsible for improving animal health worldwide with 182 Member Countries and regional offices on every continent. The OIE recognizes the threats to public, animal and environmental health from wildlife diseases and encourages all countries to increase capacity to conduct surveillance, early detection, and initiate appropriate response to outbreaks and spread of diseases in wildlife. Activities of the OIE related to wildlife diseases include a Working Group on Wildlife of scientific experts, development of science-based standards related to disease risks at the wildlife, domestic animal, and human interface, support to Member Countries to protect animal health including wildlife and biodiversity, and surveillance and notification of wildlife diseases through the global OIE information system Wild Animal Health Information System (WAHIS-Wild). Each Member Country is encouraged to appoint a National Focal Point for Wildlife (NFW) with several responsibilities, including:

1. establish a network of wildlife experts within his/her country or to communicate with the existing network, and to facilitate communication among several authorities where responsibility is shared;
2. under the authority of the OIE Delegate of his/her country, to support the optimal collection and submission of wildlife disease information to the OIE through WAHIS-Wild.

Specifically, there are approximately 50 non-OIE listed wildlife diseases of interest (http://www.oie.int/wahis_2/public/wahidwild.php?Diseaseinformationpopup/diseaselist) and the NFW is responsible for submission of the annual voluntary report for wildlife to OIE concerning detections of these diseases. Reporting of wildlife diseases is important to build situational awareness regarding wildlife health, build national knowledge capacity, increase coordination among agencies, and integrate wildlife health into other surveillance frameworks. Reports of a detection of a wildlife disease of interest in the United States can be submitted via the U.S. National Focal Point for Wildlife, Dr. Jonathan Sleeman (Center Director, USGS, National Wildlife Health Center, Madison, WI 53711, Tel: (608) 270 2401; Email: jsleeman@usgs.gov). Alternatively, reports can be submitted via Wildlife Health Information Sharing Partnership (WHISPers) (https://www.usgs.gov/centers/nwhc/science/whispers) which is partner-driven, web-based tool for sharing information about historic and ongoing wildlife mortality and morbidity events. WHISPers provides natural resource management partners and the public with timely, accurate information on where wildlife disease events are occurring or have occurred for better preparation and decision making. The recently redeveloped WHISPers portal

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allows partners to directly enter event information for real-time display and to share information with colleagues within and across agencies for better communication and event response coordination.

Changes in chronic wasting disease ecology in elk at Rocky Mountain National Park
Jenny G. Powers, National Park Service, Biological Resources Division
Nathan L. Galloway, National Park Service, Biological Resources Division,
Ryan J. Monello, National Park Service, Inventory and Monitoring Program,
Pacific Island Network, Margaret A. Wild, Washington State University,
Department of Veterinary Microbiology and Pathology

We conducted two key studies at Rocky Mountain National Park, Colorado, to investigate the population-level effects of chronic wasting disease (CWD) in elk with historically high densities (up to 110 elk/km² on portions of the winter range). CWD was first detected in this population in 1981 and by the early 2000s half of the adult elk found dead tested positive for CWD. We estimated disease prevalence of ~13% (8-19%; n=136) in adult females in 2008. Additionally, we estimated that the population growth rate in female elk was flat (λ~1.0) and that CWD can reduce adult female survival and decrease population growth of elk (Monello et al. Journal of Wildlife Management, 2014). In a subsequent study, we are investigating disease dynamics in the elk population and monitoring changes in disease transmission pressure associated with locally specific reduced elk density and increased elk dispersion. We have a preliminary estimate of prevalence for 2012-2016 of ~8.5% (4.6-13.3%; n=138). Results corroborate that CWD reduces adult female elk survival and this increased mortality decreases the population growth rate. Concurrent with our study, elk are re-distributing to lower elevations outside of the park, where CWD prevalence has always been lower, resulting in much lower densities within the park. The effects of this on CWD prevalence are unclear; movement may simply spatially dilute disease across the landscape or lower densities may reduce disease transmission.

Bovine Tuberculosis in Indiana: An Update from the Wildlife Perspective
Nancy Boedeker, Indiana Department of Wildlife

In response to bovine tuberculosis (TB) identified in farmed deer and cattle, the Indiana Department of Natural Resources (DNR) began surveillance for the disease in hunter-harvested deer in 2009. Between 2009 and 2015, the DNR submitted samples from 1,415 hunter-harvested deer from the surveillance zones in the southeastern part of the state and all tested negative. Although expecting to stop testing deer in 2015, due to the detection of bovine tuberculosis on additional southeastern Indiana farms in 2016, the DNR instead intensified testing, with 2,270 hunter-harvested deer submitted for surveillance during the next two hunting seasons (2016-17, 2017-18). Additionally, wildlife samples (deer and mesocarnivores) were
collected by USDA, Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS) from affected premises and submitted for testing. A single wild deer and three raccoons collected directly from affected premises between 2016 and 2019 were positive for *Mycobacterium bovis*, with whole genome sequencing strongly suggestive of transmission from livestock to wildlife. An additional 89 hunter-harvested and targeted wild deer were submitted by the DNR during the 2018-2019 hunting season. All hunter-harvested deer from Indiana have tested negative for bovine tuberculosis. There is no evidence that bovine tuberculosis is established in wildlife populations in Indiana. Continued vigilance is recommended with testing of additional wildlife from the most recently affected cattle farm (depopulated in August 2018) under consideration for the spring and fall of 2020. The DNR remains committed to supporting state and federal partners in maintaining the eradication of bovine tuberculosis from Indiana.
Ante-mortem Chronic Wasting Disease Testing Cervids in Texas

Bob Dittmar, Texas Parks and Wildlife Department

Ante-mortem testing for chronic wasting disease (CWD) in Texas is being used to increase surveillance for CWD in captive facilities for intrastate movement of deer. To date over 34,000 samples from almost 33,000 animals have been tested. Of those, a few over 4,700 were subsequently tested after death and 85 of those were determined to be positive on postmortem tests. Analysis of the number and types of ante-mortem tests, length of time from ante-mortem testing to postmortem testing and comparative sensitivity is ongoing. Ante-mortem sampling is used to upgrade status for movement, substitute for missing mortalities and evaluate disease presence in positive facilities. Medial retropharyngeal lymph node (MRLN), recto-anal mucosa associated lymphoid tissue (RMALT), and tonsil biopsies are the tissues sampled, with rectal providing most samples. Age of the animal, biopsy size and operator expertise are factors in limiting inconclusive results. Ante-mortem testing is a useful tool to increase surveillance for CWD on a herd level basis.

Annual Update from the Cervid Health Team Fiscal Year (FY) 2019

Tracy Nichols, USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS)

The APHIS National chronic wasting disease (CWD) Herd Certification Program (HCP) was implemented in 2014. It is a voluntary Federal-State-industry cooperative program administered by APHIS and implemented by participating States. The program provides uniform national herd certification standards that minimize the risk of spreading CWD in farmed cervid populations. Participating States and herd owners must comply with requirements for animal identification, fencing, recordkeeping, inspections/inventories, as well as animal mortality testing and response to any CWD-exposed, suspect, and positive herds. APHIS monitors the Approved State HCPs to ensure consistency with Federal standards through annual reporting by the States.

With each year of successful surveillance, herds participating in the HCP will advance in status until reaching five years with no evidence of CWD, at which time herds are certified as being low risk for CWD. Only farmed cervids from enrolled herds certified as low risk for CWD may move interstate. Currently, 28 States participate in the voluntary CWD Herd Certification Program and have Approved HCPs. FY2019 marks the seventh year that Approved States have submitted their CWD HCP annual reports to APHIS. In FY2019 there were 2,192 enrolled cervidae herds: 1,696 deer, 361 elk and 135 mixed species herds. Of those, there were 1,748 certified cervidae herds: 1,337 deer, 314 elk and 97 mixed species herds.

CWD in Farmed Cervids

Summary of CWD detections. As of September 30, 2019, CWD has been confirmed in wild deer and elk in 23 U.S. States, and in farmed cervids in 17 States. In total, 26 States have identified CWD in wild and/or farmed...
cervids. CWD has been reported in 117 farmed cervid herds in the United States.

**FY2019 CWD Detections in Farmed Cervids**

Seventeen newly identified CWD positive farmed cervid herds were identified in FY2019 (nine white-tailed deer, six elk, and two mixed herds). Twelve herds were within 20 miles of confirmed CWD positives in the wild.

**Pennsylvania:**

- November 2018: National Veterinary Services Laboratories (NVSL) confirmed CWD in a three-and-a-half-year-old white-tailed doe in Fulton County. The doe was a natural addition to the 23 head breeding deer herd that sits within a half mile of where CWD has been identified in the wild. This herd was not enrolled in the HCP and was depopulated with Federal funds in April of 2019. All 23 depopulated animals were found to be CWD positive.

- January 2019: NVSL confirmed CWD in a three-and-a-half-year-old white-tailed buck in Clearfield County. The buck was a purchased addition to a hunt preserve of 12 white-tailed deer that was not a participant in the Federal HCP. This animal resided on the preserve four days before being hunted. The animal was traced back to an HCP-certified breeding herd in Fulton County within a CWD-endemic area. This breeding herd consisted of 137 white-tailed deer and was depopulated in May 2019 with Federal indemnity. There were 27 additional positives identified at depopulation.

- April 2019: NVSL confirmed CWD in one three and one four-year-old white-tailed doe in a breeding herd in Fulton County in a CWD-endemic area. The herd consists of 12 white-tailed deer and is not enrolled in the Federal HCP. The herd is under quarantine and the owner will depopulate.

- May 2019: NVSL confirmed CWD in a two-and-a-half-year-old white-tailed buck in Fulton County. The buck was a natural addition to the 320 head breeding deer herd that lies within a CWD-endemic area. This herd was double fenced and certified in the Federal HCP. It is currently under quarantine.

**Wisconsin:**

- January 2019: NVSL confirmed CWD in a six-year-old white-tailed buck in Forrest County. The buck was a natural addition from a breeding facility in Marinette County in FY18 and is not enrolled in the Federal HCP. This hunt preserve consists of approximately 399 animals, is not in a CWD endemic area, and remains under quarantine.

- June 2019: NVSL confirmed CWD in a two-and-a-half-year-old white-tailed buck in Portage County. The buck was a purchased addition to a hunt preserve of 151 white-tailed deer not enrolled in the Federal HCP. CWD has been detected 11 miles from this site. The index animal resided there for five days prior to being harvested. This herd was depopulated with State indemnity and no additional positive cases were found. The source herd for
the index animal was a double-fenced, federally certified HCP breeding herd within a CWD-endemic area consisting of 42 white-tailed deer. The herd was depopulated with Federal funds. An additional six CWD-positive animals were identified at depopulation.

August 2019: NVSL confirmed CWD in a six-year-old elk bull in in Burnette County. The bull was a purchased addition to a small breeding herd of five elk five years prior to CWD detection. The herd is certified in the Federal HCP, within an area endemic for CWD, and is currently under quarantine.

**South Dakota:**

January 2019: NVSL confirmed CWD in a two-year-old elk cow in Clark County. The cow was a purchased addition to the herd, which was certified in the Federal HCP. The herd consisted of 18 animals and was depopulated with Federal funds in October 2019. CWD test results are pending. CWD has not been identified in the wild in this area. The source herd for this animal was in Meade County certified in the Federal HCP. CWD was identified in a seven-year-old bull and an eight-year-old cow elk in September 2019. This herd consisted of five animals, was not in a CWD-endemic area, and was depopulated with Federal funds in October 2019. CWD test results are pending.

**Colorado:**

October 2018: NVSL confirmed CWD in a seven-year-old cow elk from a hunt preserve in Mesa County. The bull was a purchased addition and was moved into a pasture that had previously contained CWD-positive animals. This herd is certified in the Federal HCP certified, consists of 191 animals, and remains under quarantine.

November 2018: NVSL confirmed CWD in a one-and-a-half-year-old elk bull in Jackson County. The bull was a natural addition to the herd which is certified in the Federal HCP and consists of 42 animals within a CWD-endemic area. This herd is under quarantine.

**Michigan:**

September 2019: NVSL confirmed CWD in a two-year-old female white-tailed deer in Montcalm County. The doe was a natural addition to the breeding herd which consists of 50 white-tailed deer. This herd is not enrolled in the Federal HCP, is within a CWD-endemic area, and is under quarantine.

**Nebraska:**

September 2019: NVSL confirmed CWD in a five-year-old elk cow in Buffalo County. The cow was a purchase addition to the herd in 2018. This is a breeding herd of 48 elk, and it is not enrolled in the Federal HCP. The herd is currently under quarantine and is not in an area where CWD has been identified. The source herd of this animal was an HCP-certified herd in Lincoln County, Oklahoma.

**Oklahoma:**

April 2019: NVSL confirmed CWD in a two-year-old elk bull in and in a two-year-old elk cow in May 2019 in Lincoln County. Both were natural
additions to the herd. This herd was certified in the Federal HCP and consisted of 246 elk in the breeding area, and more than 50 in the hunt preserve. Animals in the breeding facility and hunt preserve were depopulated with Federal funds in August and September 2019. No additional CWD positive animals were identified.

**Cervid Health Program Staffing**

The USDA-APHIS Cervid Health Program (CHP) has undergone some organizational and staffing changes in FY19. Small ruminant health programs including CHP are now a part of the Ruminant Health Center under the direction of Alecia Naugle. Diane Sutton is the Ruminant Health Center Assistant Director for small ruminant health programs. Nancy Hannaway is no longer with the CHP and Byron Schick and Tracy Nichols are the current CHP points of contact. Dr. Nichols is primary for CWD policy, research coordination and tissue archive. Dr. Schick is primary for cervid indemnity, cervid tuberculosis (TB) and brucellosis policy, and CWD annual reporting.

**CWD Program Standards**

The CWD Program Standards were published and took effect in May 2019. A webinar highlighting the most significant changes was presented to State Animal Health Officials (SAHOs) to clarify important aspects of the standards such as consequences of poor quality and missing samples, ante mortem diagnostics, sample collection and submission, epidemiological investigations, indemnity, and biosecurity. This webinar, and others related to the revised Program Standards, can be found on the Cervid Health Webpage (www.aphis.usda.gov/animalhealth/cervid) on the CWD Herd Certification Program page linked from the CWD Section. Additionally, the Cervid Health Program continues to address topics related to the changes in the Program Standards on monthly calls with State Animal Health Officials to allow for questions and clarifications.

**CWD Research and the Cervid Health Program - Determination of the predictive value of whole genome markers**

USDA-APHIS initiated, and then collaborated with Texas Parks and Wildlife, on a study with Texas A&M University geneticist Christopher Seabury to evaluate the white-tailed deer (WTD) genome for genetic markers that might influence susceptibility to CWD. Dr. Seabury identified a suite of genes (inside and outside of the prion gene) that appear to predict the susceptibility of WTD to CWD with greater than 80% accuracy. The study will be submitted for scientific peer review shortly. Based on the preliminary findings from this initial study, APHIS and Texas Parks and Wildlife have provided funding to validate the predictive model and will provide additional samples to better inform the model for potential use in the future.

**Evaluation of RT-QuIC assay on targeted ante and postmortem tissue samples**

The real-time quaking-induced conversion (RT-QuIC) amplification assay has been demonstrated by numerous scientific studies to be a highly sensitive tool for the detection of CWD. There is increased interest by both the cervid industry and wildlife managers to develop more sensitive ante and
postmortem CWD diagnostic tools. This topic was also identified as one of the top five most important CWD research targets at the 2019 CWD Research Consortium hosted by Michigan State University. Dr. Nichols from the APHIS Cervid Health Program is a member of this consortium and is collaborating with the USDA, Agricultural Research Service (ARS) in Pullman, Washington, and United States Geological Survey (USGS) National Wildlife Health Center in Madison, Wisconsin to evaluate RT-QuIC CWD detection sensitivity and specificity on retropharyngeal lymph node, as tonsil and rectal biopsy.

**TB in Farmed Cervids - Annual TB Surveillance Summary**

In FY2019, 10,285 cervids were tested for bovine TB using the Dual Path Platform (DPP) serologic test and 2,658 cervids were tested using the single cervical test (SCT).

The primary DPP serological testing identified 27 TB suspects (0.26%); 12 of these animals tested negative, nine tested positive on the re-test at least 30 days later and were classified reactor, and three were euthanized without a second DPP. Three animals are pending retest. From the nine reactors, eight cultured negative for *M. bovis* and one animal is pending necropsy.

The SCT test identified 41 responders (1.54%). All responders were retested with the Comparative Cervical Test and were found negative.

**Cervid TB: DPP evaluation in Mule and Sika Deer**

On October 1, 2018, VS initiated a pilot project to evaluate the DPP test in Mule and Sika deer.

The Center for Veterinary Biologics (CVB) licensed the DPP in 2012 as a primary test for elk, red deer, white-tailed deer, and fallow deer. Veterinary Services approved the DPP for official TB program tests in cervid species for elk, red deer, white-tailed deer, fallow deer and reindeer.

The DPP has been widely accepted in the cervid industry. The test has demonstrated sufficient sensitivity and specificity in the species for which it is approved. The advantage of the serologic test is that it requires only one capture event; thereby, reducing the potential for injury and improving animal welfare. Cervid industry representatives have identified the evaluation of the DPP for use in mule deer and sika deer as a priority.

The DPP will be evaluated as a primary and secondary test for TB in Mule and Sika deer. The project will utilize serum samples submitted by designated accredited veterinarians for herd TB certification purposes. Samples will be collected and submitted in a manner consistent with the requirements of Veterinary Services Guidance 6701.3 and will be considered Official cervid TB tests.

The project will end for each species when a sample size target of 306 individual animals has been reached. The project for Mule and Sika DPP validation will occur concurrently. As of September 30, 2019, VS-NVSL has processed ten samples for Mule deer and zero samples for Sika deer.
Industry representatives have indicated the use of the DPP will likely increase in Mule and Sika deer over the next two years as herds rotate through the 36-month herd accreditation interval.

**Association of Fish and Wildlife Agencies CWD Updates: Additional BMPs, State Surveillance and Management Survey, and Diagnostic Laboratory Capacity Survey**

Jonathan Mawdsley, Association of Fish and Wildlife Agencies
Colin Gillin, Oregon Department of Fish and Wildlife; Jennifer Mock Schaeffer, Association of Fish and Wildlife Agencies; Kaitlyn McGarvey and Krysten Schuler, Cornell Wildlife Health Laboratory

**Additional Best Management Practices (BMPs) for Chronic Wasting Disease (CWD)**

The Association of Fish and Wildlife Agencies (AFWA) had developed an initial set of best management practices for prevention, surveillance, and management of CWD in 2017-2018. These practices were endorsed by AFWA’s Fish and Wildlife Health Committee and the Directors in September, 2018. The approved version of these BMPs and the accompanying technical report have been posted on committee’s website.

The intent of the Association is for this to be a “living document” to track new developments in science, management of this disease. Subsequent to the development and approval of the original BMPs, several topics identified as high priorities by state wildlife agencies and partners.

Four topics were selected by the AFWA Fish and Wildlife Health Committee for development of new best management practices: taxidermy and meat processing; facilities quarantine; Inter-state/ Inter-provincial notification of positive testing results; and responding to hunter inquiries re: testing of animals. The Association convened over thirty wildlife disease experts, veterinarians, academics, state and federal agency biologists to write, edit, and review these new practices. Drafts of the practices were circulated to state wildlife agency directors and wildlife chiefs for review. The practices were presented in September, 2019, at the AFWA Annual Meeting where they were approved by the AFWA Directors. The final approved texts of these practices is available for download on the AFWA Fish and Wildlife Health Committee’s website: [https://www.fishwildlife.org/afwa-acts/afwa-committees/fish-wildlife-health-committee](https://www.fishwildlife.org/afwa-acts/afwa-committees/fish-wildlife-health-committee)

**AFWA State CWD Needs Survey**

At the Association we have heard anecdotal information from state wildlife agency staff indicating that states are seeing significant increases in expenditures related to the prevention, surveillance, and management of CWD. States are improving their surveillance efforts and there is also increased hunter demand for testing, particularly in response to recent recommendations from the U.S. Centers for Disease Control and Prevention (CDC).

AFWA staff surveyed the state fish and wildlife agencies in 2017 and again in 2019 to determine current and anticipated expenditures on CWD.
testing and management. In 2019, thirty states responded, including all states with CWD-positive wild deer. Key findings include:

- State agencies are spending $14.3 million this year on testing; at least 159,000 animals will be or are being tested this year (average of 5,600 animals/state reporting).
- There is a dramatic increase in testing demand: average expected increase of 32% in number of animals tested between this year and next, across all states.
- State agencies anticipate spending $84 million on CWD testing over next five years.
- State spending on prevention and management is roughly equivalent to expenditures on testing; $13 million in 2019 alone.
- Common management activities reported by multiple states include: development and revision of CWD management plans; interagency coordination among state, federal, and local government partners; communications among partners, with hunters, and with the general public; review of regulations; and also targeted research to answer high-priority management questions.

**National Animal Health Laboratory Network (NAHLN) Laboratory Survey: Chronic Wasting Disease Capacity and Needs**

At the Association, we have heard significant concerns from multiple states regarding existing capacity for CWD testing and anecdotal information about the lack of testing capacity, shortages of key testing resources, and staffing shortages at the existing testing laboratories. Working collaboratively with the Cornell Wildlife Health Laboratory, we reached out to the 28 NAHLN approved laboratories to obtain information about laboratory testing capacity. Twenty-two of the 28 NAHLN-approved laboratories participated in the survey. Six of these laboratories use ImmunoHistoChemistry (IHC) only, eight laboratories use Enzyme Linked Immunosorbent Assay (ELISA) only, and eight use IHC and ELISA.

With regards to ELISA testing, all 16 laboratories performing this testing use the BioRad equipment, and two laboratories also use the IDEXX equipment. The age of the equipment ranges from one to nine plus years, two laboratories report that they will be replacing equipment in the next two years, and one laboratory expressed the possibility of needing additional equipment if testing demand continues to increase. Nine of the 16 laboratories reported issues with the availability of BioRad testing kits, resulting in delays in testing. Nine of the 16 laboratories reported difficulties in having enough staff to support testing, because it is a seasonal job (with highest demand during hunting season).

Additional concerns expressed by laboratories in regard to ELISA testing include:

- General concern for availability of replacement equipment.
- Bio-Rad equipment needs to be repaired fairly regularly.
- Annual service contract plan is expensive.
WILDLIFE

- Repairs do not happen in a timely manner.
- Short expiration dates on the kits which becomes a problem in the off season.
- The two-plate kit is inconvenient for laboratories with large numbers of samples.
- Bio-Rad is not updating their operating system for new versions of Windows; this presents challenges when the laboratories has to go to a new computer system.
- Desire for automated instrument for the detection part of the assay – currently available and in use in Europe.

Six of 16 laboratories would like to increase their testing capacity; the remaining laboratories would like their capacity to remain the same. Thirteen of 16 laboratories would be interested in running the IDEXX ELISA if it was approved for captive cervids.

Fifteen of 21 laboratories test samples directly for hunters. At two laboratories, the state pays the fee; at the other 13, the hunter pays the fee. Prices range from $0 to $80 per test with an average of $48 per test. At some laboratories, the cost depends on in-state versus out-of-state and whether the whole head or just the sampled tissues are received.

Twenty of 22 laboratories said that they would be interested in using real-time quaking-induced conversion (RT-QuIC) testing technology if it were approved for CWD testing. Many of these laboratories stipulated that the switch would be dependent on NAHLN approval, affordable pricing for the equipment, and that the appropriate specificity and sensitivity could be achieved. Five of these laboratories expressed that they did not know a lot about this platform but were interested in learning more. One of the two laboratories that was not interested in RT-QuIC expressed concern that laboratory contamination would be a major issue in endemic states. The other laboratory that was not interested said that additional research would be required before they would be willing to move away from the current standard for CWD testing across the country.

Potential Use of Detection Dogs in Detecting and Managing Diseases in Wildlife and the Environment
Tom DeLiberto, National Wildlife Research Center (NWRC), USDA, Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS)

Recent avian influenza outbreaks have resulted in global biosecurity and economic concerns. Monitoring can be complicated because primary reservoirs are often asymptomatic for the disease and can potentially spread the influenza virus along migratory bird flyways. In a previous study, trained mice correctly discriminated the health status of individual ducks on the basis of fecal odors when feces from post-infection periods were paired with feces from pre-infection periods. Chemical analyses indicated that avian influenza infection was associated with a marked increase of acetoin (3-hydroxy-2-butanone) in feces. This was followed by a study with domesticated male
ferrets (*Mustela putorius furo*) trained to display a specific conditioned response (i.e. active scratch alert) in response to a marked increase of acetoin. Ferrets rapidly generalized this learned response to the odor of feces from infected mallards. More recently, six dogs have been similarly trained to identify avian influenza infection via olfactory cues found in feces. These results bolster the assertion that trained mammalian biosensors should be employed in an avian influenza surveillance program.

**Committee Business:**

Two resolutions were presented, discussed and approved. The first requested USDA, Animal and Plant Health Inspection Service (APHIS) to consider validating the use of amplification assays for the detection of chronic wasting disease (CWD) and the second for the Department of the Interior to prioritize the identification of resources to support the proposed facility updates at the United States Geological Survey (USGS) National Wildlife Health Center Laboratory (NWHC) Facilities.
III. Organizational Matters

A. Bylaws of USAHA
B. USAHA Administrative Policies
C. Previous Meetings
D. USAHA Award Recipients
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
III.A. USAHA BYLAWS

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.
h. Honorary Member. Any person not otherwise a member of the Association who has contributed materially to the advancement of animal science, food safety, public health, veterinary medicine, animal research, or the purposes of the Association, may be nominated by the Executive Committee for Honorary Membership. Honorary Membership shall be conferred by a majority vote of the Board of Directors. Honorary Members shall be exempt from the payment of all dues and shall not have voting privileges as provided in 3.2.

3.2. Voting. Each member shall have one vote, unless otherwise provided in these By-Laws.

a. By State and Federal Official Agency Members and Allied Organization Members. The director or chief executive officer of each Official Agency Member and Allied Organization Member shall appoint and certify in writing to the Executive Director of the Association a person to be its representative who shall represent, vote, and act for each of these classifications of member in all the affairs of the USAHA, until further notification.

3.3. Dues. The Board of Directors at any annual meeting shall have the power to determine the amount of dues.

a. Non-payment of Dues. Subject to any policy the Board of Directors may establish for reinstatement, failure to pay dues within 90 days of notice of delinquency shall result in automatic termination of membership.

b. Voluntary Withdrawal of Membership. A member may voluntarily terminate membership effective upon submission of notice of withdrawal to the Association but shall not be entitled to a refund of any dues paid.

3.4. Effective Date of Membership. Membership shall become effective upon submission of written application in the form required, satisfaction of eligibility requirements, election to membership by an appropriate vote of the Executive Committee, and payment of annual dues.

3.5. Suspension or Expulsion. For cause, and upon reasonable notice setting forth the specific reasons therefore any member may be suspended or terminated. Sufficient cause for such suspension or termination of membership shall be violation of these bylaws or any lawful rule or practice duly adopted by this Association, or any other conduct prejudicial to its interests. Suspension or expulsion shall be by two-thirds vote of the entire membership of the Board of Directors.
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ARTICLE IV – MEETINGS

4.1. Annual. There shall be an annual meeting between September 15 and November 15 for receiving annual reports and the transaction of other business.

a. Notice Requirements. Written notice setting forth the Agenda and location of the annual meeting shall be mailed or transmitted electronically to all members at least 60 days prior to the first day of such meeting.

b. Annual Meeting Location. The location of the annual meeting shall be selected by the Regional Districts on the following rotational basis: North Central, Northeast, Western, and Southern; and with the concurrence of the state animal health official of the state in which the meeting is to be held. The location and site shall be finally selected in accordance with guidelines proposed by the Executive Director and approved by the Executive Committee. The Board of Directors shall be advised of the selected meeting location at least five years in advance of the meeting. In the event that any annual meeting location becomes unavailable and/or unacceptable the Executive Committee is authorized to select an alternate location.

c. Closure. The annual meeting shall be considered officially closed upon the completion of the Board of Directors’ meeting held on the last day of the annual meeting.

4.2. Special. Special meetings may be called by the President, in consultation with the Executive Committee, or by a majority of the Board of Directors. Notice of any special meeting shall be mailed, published in the Association newsletter and/or transmitted electronically to the membership with a statement of time and place and information as to the subject(s) to be considered at least 30 days prior to the date of the meeting. Emergency situations shall be dealt with by the Executive Director with the approval of the Executive Committee who shall provide as much notice to the Board of Directors as may be practical under the circumstances.

4.3. Committee and General Membership Meetings. Unless otherwise specifically set forth in these bylaws, all committee and general membership actions require a majority vote provided a quorum of the voting membership is present.

4.4. Quorum. A quorum of the Executive Committee shall consist of two-thirds of its membership. A quorum of the Board of Directors shall consist of
III. ORGANIZATIONAL MATTERS

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
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inability to act; and shall perform such duties as the President, Board of Directors or Executive Committee may assign.

e. Third Vice-President. The Third Vice-President shall take the place of the Second Vice-President in the event of his/her absence, death, or inability to act; and shall perform such duties as the President, Board of Directors or Executive Committee may assign.

f. Treasurer. The Treasurer shall be the chief financial officer of the Association, shall be chairman of the Audit Committee and perform those duties that are delegated to the office by the Board of Directors and the Executive Committee. The treasurer shall not be responsible for the day-to-day financial transactions of the Association, which will be assumed by the Executive Director.

g. Election.

1) The Committee on Nominations and Resolutions shall annually report its recommendations for the offices of President, President-Elect, First Vice-President, Second Vice-President, Third Vice-President, Treasurer and Regional Delegates to the Association membership at the first business session.

2) The District from which the President originated shall submit a nominee for the office of Third Vice President.

3) Should vacancy(ies) occur before the next annual meeting, the District(s) from which the officer(s) vacated shall submit a nominee for the office of Second Vice President (if two vacancies occur a First Vice President will also need to be nominated).

4) Nominees for Regional Delegates from the Districts shall be selected by the individual districts and supplied in a timely fashion to the Committee on Nominations and Resolutions for inclusion in its report.

5) The Committee on Nominations report will be presented during the first business session. The committee report shall be posted on the registration bulletin board immediately following its presentation at the first business session. The report shall be read again during the second business session at a time certain specified in the program for “Report of Action of the Committee on Nominations and Resolutions.” If a paper is being presented at the specified time, the presentation will be completed and, immediately after, the report shall be read. If the program is ahead of schedule, a recess will be
III. ORGANIZATIONAL MATTERS

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
III. ORGANIZATIONAL MATTERS

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

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
III. ORGANIZATIONAL MATTERS

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.
III. B. USAHA ADMINISTRATIVE POLICIES

Less than 50%

The Executive Committee shall undertake a major financial overhaul of the organization and develop a plan to: 1) operate in a sustainable manner and 2) rebuild the reserve funds to the target area. Adjustments should be made immediately upon Executive Committee approval of the new plan, with modifications subject to Board of Directors at the next annual meeting.

Should the above mitigations prove unsuccessful, the Executive Committee should evaluate all options for the organization to reduce expenses to a sustainable manner. This can include merging management with other organizations, merging the organization collectively with another, or ceasing operations altogether, in which case the organization will be dissolved according to the bylaws and applicable laws.

YEAR-ROUND ACTIVITIES

2008

USAHA is a year-round organization, and is often asked to comment on specific issues related to its mission. USAHA should first refer to its resolutions to address a given issue.

USAHA staff will act upon all resolutions as directed by the membership and Board of Directors, involving necessary correspondence. For issues that arise, that pertain to resolutions, can have direct action taken as deemed necessary. No additional voting is necessary, though the input of the executive committee is encouraged.

Should an issue be presented that no resolution has been approved, the Executive Director/Secretary will coordinate with President and First Vice President (Chair of Government Relations) to determine if USAHA should address the specific issue, with consensus from the Executive Committee.

SPECIAL FUNDS POLICY

2009

USAHA will manage special funds for Committees and closely related organizations to house finances and bookkeeping services. Special funds will be held separate of the general USAHA fund, and USAHA will record transactions accordingly. USAHA will enter into a written agreement for each account with the primary representative of the group or Committee and a designated treasurer for that account. The designated account treasurer holds authority for all transactions. Special fund oversight is held by the USAHA Treasurer with support of the Secretary/Executive Director.

JOB POSTINGS FOR NEWS ALERTS AND WEB SITE

2010

USAHA has available opportunities for distributing position announcements through its daily News Alert Summaries, currently on a weekly basis. The following policy sets forth guidelines for use of this service.
III. ORGANIZATIONAL MATTERS

USAHA Job Postings are available to any member of the association at no fee. The association will post positions to its web site in addition to the distribution among members.

Non-member groups may also submit positions, however, are subject to review and approval for distribution. The following criteria will be considered:

1) Animal health or animal agriculture related
2) Fields of veterinary medicine, research, diagnostics, regulatory, technical services, non-profit, and/or other related supporting disciplines
3) Align with the mission of USAHA

USAHA reserves the right to refuse posting of any position.

OFFICIAL AGENCY, ALLIED ORGANIZATION MEMBER SUBSTITUTIONS

2011

Official Agency and Allied Organization Members have a designated representative to serve on the board of directors and receive the member benefits for that organization. Occasionally, the designated representative is unable to attend all or some of the annual meeting. In these instances, the representative can designate a substitution to fulfill their obligations on behalf of their agency/organization. This includes:

- Board of Directors Meetings
- Membership Meetings
- Committee Meetings (of which the original representative is an appointed member)

While the USAHA Bylaws state that proxy voting is not allowed, the substitution is treated differently as a transfer of the representative duties.

STUDENT MEMBERSHIP POLICY

2012

Students must be a full-time student in an accredited college or university, in a field of study outlined in the bylaws, part 3.1, E in order to be eligible as a student member and to receive student meeting registration rates.

POLICIES REGARDING USAHA ANNUAL MEETING

ANNUAL MEETING SPEAKER REGISTRATION/COMPLIMENTARY REGISTRATION

Revised 2011

USAHA will not provide complimentary registration to any member or regular attendee of USAHA annual meetings that is speaking on a committee agenda.
III. B. USAHA ADMINISTRATIVE POLICIES

USAHA will provide a complimentary registration to non-member, invited speakers by request for committees for the purpose of presenting to a committee or general session. Requests must be submitted to the USAHA office.

USAHA will consider providing for travel expenses for general session and committee speakers on a limited basis. Requests must be submitted to the Executive Committee in advance, with consideration being given to a proposed speaker’s expertise, timeliness of subject matter, likelihood of attending the meeting otherwise, and budgetary capabilities.

VIDEO & AUDIO RECORDING OF COMMITTEE PROCEEDINGS

USAHA prohibits third-party video and audio recording of committee meetings at the Annual Meeting.

THIRD PARTY MEETINGS

USAHA will permit related organizations, with missions consistent with those of USAHA, to partner in its Annual Meeting to provide a venue for their gatherings. Agreements are arranged on a case-by-case basis, with input from the Program Chair and approval by the Executive Committee. In general, these organizations are expected to cover related expenses to USAHA for their event. Attendees are also expected to pay registration fees for the Annual Meeting.

AAVLD PARTNERSHIP

USAHA will maintain a Memorandum of Understanding with AAVLD regarding all issues surrounding the Annual Meeting execution. The MOU will serve as a basis for coordination between the two organizations, and be reviewed annually.

ANNUAL MEETING HOST STATE BENEFITS POLICY

As the State hosting the Annual Meeting is often requested to provide support to the organization in terms of staff, supplies and time commitments, USAHA will provide reciprocal in-kind benefits to the hosting State to help offset those costs. USAHA will provide one complimentary registration for every three (3) paid registrations for host state employees. The state animal health official is responsible for communicating the complimentary registration designees to USAHA by the pre-registration deadline. Exceptions to this guideline are subject to review and approval by the Executive Committee.
III. ORGANIZATIONAL MATTERS

DIRECTOR, OFFICER AND STAFF RELATED POLICIES

REIMBURSEMENT AND EXPENSES

2008

In accordance with the Bylaws, Section 10.7, USAHA may provide reimbursement or stipend to its officers, board of directors or committee leadership for reasonable expenses incurred while performing specific assignments of the Association. Requests must be submitted to the Executive Committee for approval in advance of the assignment. The Executive Committee will remain judicious in granting requests and mindful of budgetary limitations when considering requests.

USAHA will reimburse staff for all reasonable expenses incurred while performing duties of the Association. Each individual will furnish full documentation of expenses for audit purposes, subject to review of the Treasurer.

Mileage will be reimbursed at the federal Internal Revenue Service rate.

CONFLICT OF INTEREST POLICY

2008

Due to increased scrutiny of non-profit organizations, by the IRS and requirements for increased transparency, USAHA should have in place a conflict of interest policy for its Board of Directors, Officers and Employees.

Policy:

Any member or employee involved in a business transaction of the United States Animal Health Association in which a conflict of interest may be present, shall notify the Executive Committee promptly. Said individual shall refrain from voting on such transactions, and exclude themselves from deliberations. The individual will refrain from any personal influence on the transaction. A transaction that involves a conflict of interest should be reviewed against relative competitive bids or proposals. Decisions to pursue a transaction with a potential conflict of interest should first uphold the best interests of USAHA, and include terms that are reasonable to USAHA within the given marketplace.

Approvals will be made by the Executive Committee. A written disclosure summarizing any possible conflict of interest shall be kept on file at the USAHA office. Discussion and resolution shall be indicated in the minutes of the USAHA Executive Committee session.

Conflict of interest should be disclosed if: a transaction of USAHA involves any close relative of a Director or Employee as the direct vendor/provider, or the Director/Employee stands material gain through a transaction. A Director or Employee holds financial interest if holdings are of 5% or greater of the potential vendor, or holds position of influence with an organization that seeks to do business with USAHA.

A close relative is defined as any parent, spouse, sibling, child, grandchild, or spouse of the aforementioned. Also to be included would be
any individual residing in the same household that would resemble a parental or marital relationship.

WHISTLEBLOWER POLICY
2008
Employees and members of USAHA should report illegal or unethical activities, directly relating to the business of USAHA, to the President. The President, in consultation with the Executive Committee, will then determine appropriate actions for investigation, reporting to proper authorities, and reconciliation as necessary.

Employees and members will be provided full confidentiality for reporting such activities, and the President and Executive Committee will ensure due diligence in protecting against retaliation by the organization, its members or other employees and supervisors.

DOCUMENT RETENTION AND DESTRUCTION POLICY
2008
USAHA will maintain all financial records for seven years. They will then be disposed of by either cross-shredding or incineration.

Meeting registrations and membership renewals will be kept for three years.

USAHA PROFESSIONAL DEVELOPMENT SUPPORT
2011
USAHA sees the importance of continuing education for its employees. USAHA may support the opportunities sought by its employees to enhance his/her skill sets. The following is an outline of benefit for employees.

USAHA may provide support as follows:

General
Support for professional development must be pre-approved by the employee’s supervisor prior to commitment in order to receive benefits. Any opportunity should be directly beneficial to current job functions or can be justified as direct future benefit to the Association.

Flexible Scheduling
USAHA may work with employee to accommodate scheduling of work hours to allow for professional development. This can include:

- University/College courses during normal work hours
- Conferences/seminars for professional development
- Other events with pre-approval of supervisor

Employees should strive to maintain a full work week (40 hours) by making up any lost time at hours mutually agreed upon by employee and supervisor.

Academic Courses
USAHA may support tuition for courses directly beneficial to the employee’s job duties, up to $1000 per fiscal year. Tuition will be reimbursed
upon completion of the course by the employee, with a minimum of a C grade or relative “passing” status when grading is not applicable. Courses will be considered regardless of degree/non-degree track. (*Reimbursements are a taxable benefit.)

**Conference/Seminar Registration**

USAHA may support registration costs for conferences, seminars or other related courses (self-directed, web-based, etc.) Such programs should enhance the employee’s ability to do current job functions, or expand skill sets to take on additional duties. USAHA may support up to three conferences per year to a maximum of $1000, unless employee is taking academic courses.

**Travel**

Travel, lodging and meals are reimbursable at federal per diem rates for development opportunities outside of local meetings, such as the St. Joseph or Kansas City areas.
III. C. Previous Meetings of the United States Animal Health Association
### III. ORGANIZATIONAL MATTERS

<table>
<thead>
<tr>
<th>No.</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, 1898</td>
<td>Omaha, NE</td>
<td>*Mr. C.P. Johnston, Springfield, IL</td>
<td>*Mr. Taylor Riddie, KS</td>
</tr>
<tr>
<td>3</td>
<td>Oct. 11-12, 1899 ‡</td>
<td>Chicago, IL</td>
<td>*Mr. C.P. Johnston, Springfield, IL</td>
<td>*Mr. Mortimer Levering, Lafayette, IN</td>
</tr>
<tr>
<td>4</td>
<td>Oct. 2-3, 1900</td>
<td>Louisville, KY</td>
<td>*Mr. C.P. Johnston, Springfield, IL</td>
<td>*Dr. E.T. Eisenman, Louisville, KY</td>
</tr>
<tr>
<td>5</td>
<td>Oct. 8-9, 1901</td>
<td>Buffalo, NY</td>
<td>*Dr. E.P. Niles, VA</td>
<td>*Dr. E.T. Eisenman, Louisville, KY</td>
</tr>
<tr>
<td>6</td>
<td>Sept. 23-24, 1902</td>
<td>Wichita, KS</td>
<td>*Mr. W.H. Dunn, TN</td>
<td>*Mr. Wm. P. Smith, Monticello, IL</td>
</tr>
<tr>
<td>7</td>
<td>Sept. 22-23, 1903</td>
<td>Denver, CO</td>
<td>*Mr. E. Bolton, Woodward, OK</td>
<td>*Mr. Wm. P. Smith, Monticello, IL</td>
</tr>
<tr>
<td>8</td>
<td>Aug. 23-24, 1904</td>
<td>St. Louis, MO</td>
<td>*Dr. J.C. Norton, AZ</td>
<td>*Mr. Wm. P. Smith, Monticello, IL</td>
</tr>
<tr>
<td>9</td>
<td>Aug. 15-16, 1905</td>
<td>Guthrie, OK</td>
<td>*Mr. Wm. P. Smith, Monticello, IL</td>
<td>*Dr. S. H. Ward, St. Paul, MN</td>
</tr>
<tr>
<td>10</td>
<td>Aug. 15-16, 1906</td>
<td>Springfield, IL</td>
<td>*Mr. M. M. Hankins, Quanah, TX</td>
<td>*Dr. S. H. Ward, St. Paul, MN</td>
</tr>
<tr>
<td>11</td>
<td>Sept. 16-17, 1907</td>
<td>Richmond, VA</td>
<td>*Dr. D. F. Luckey, Columbia, MD</td>
<td>*Dr. S. H. Ward, St. Paul, MN</td>
</tr>
<tr>
<td>12</td>
<td>Sept. 14-16, 1908</td>
<td>Washington, DC</td>
<td>*Dr. Charles G. Lamb, CO</td>
<td>*Dr. C. E. Cotton, St. Paul, MN</td>
</tr>
<tr>
<td>13</td>
<td>Sept. 13-15, 1909 ‡</td>
<td>Chicago, IL</td>
<td>*Dr. W. H. Dalrymple, Baton Rouge, LA</td>
<td>*Dr. C. E. Cotton, St. Paul, MN</td>
</tr>
<tr>
<td>14</td>
<td>Dec. 5-7, 1910</td>
<td>Chicago, IL</td>
<td>*Dr. C. E. Cotton, St. Paul, MN</td>
<td>*Mr. J. J. Ferguson, Chicago, IL</td>
</tr>
<tr>
<td>15</td>
<td>Dec. 5-6, 1911</td>
<td>Chicago, IL</td>
<td>*Dr. John F. Devine, Goshen, NY</td>
<td>*Mr. J. J. Ferguson, Chicago, IL</td>
</tr>
<tr>
<td>16</td>
<td>Dec. 3-5, 1912</td>
<td>Chicago, IL</td>
<td>*Dr. Macyck P. Ravener, Madison, WI</td>
<td>*Mr. J. J. Ferguson, Chicago, IL</td>
</tr>
<tr>
<td>17</td>
<td>Dec. 2-4, 1913</td>
<td>Chicago, IL</td>
<td>*Dr. Peter F. Bahnsen, Atlanta, GA</td>
<td>*Mr. J. J. Ferguson, Chicago, IL</td>
</tr>
<tr>
<td>18</td>
<td>Feb. 16-18, 1914</td>
<td>Chicago, IL</td>
<td>*Dr. S.H. Ward, St. Paul, MN</td>
<td>*Mr. J. J. Ferguson, Chicago, IL</td>
</tr>
<tr>
<td>19</td>
<td>Dec. 2-3, 1915</td>
<td>Chicago, IL</td>
<td>*Dr. J. L. Gibson, Des Moines, IA</td>
<td>*Mr. J. J. Ferguson, Chicago, IL</td>
</tr>
<tr>
<td>20</td>
<td>Dec. 5-7, 1916</td>
<td>Chicago, IL</td>
<td>*Dr. O. E. Dyson, Springfield, IL</td>
<td>*Mr. J. J. Ferguson, Chicago, IL</td>
</tr>
<tr>
<td>21</td>
<td>Dec. 3-5, 1917</td>
<td>Chicago, IL</td>
<td>*Dr. J. G. Wills, Albany NY</td>
<td>*Dr. S. H. Ward, St. Paul, MN</td>
</tr>
<tr>
<td>22</td>
<td>Dec. 2-4, 1918</td>
<td>Chicago, IL</td>
<td>*Dr. M. Jacob, Knoxville, TX</td>
<td>*Dr. S. H. Ward, St. Paul, MN</td>
</tr>
<tr>
<td>23</td>
<td>Dec. 1-3, 1919</td>
<td>Chicago, IL</td>
<td>*Dr. G. W. Dumphy, Lansing, MI</td>
<td>*Dr. D. M. Campbell, Chicago, IL</td>
</tr>
</tbody>
</table>
### III. C. PREVIOUS MEETINGS

<table>
<thead>
<tr>
<th>No.</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>Nov. 28-30, 1921</td>
<td>Chicago, IL</td>
<td>*Dr. W. F. Crewe, Bismarck, MD</td>
<td>*Dr. Theo. Burnett, Columbus, OH</td>
</tr>
<tr>
<td>26</td>
<td>Dec. 6-8, 1922</td>
<td>Chicago, IL</td>
<td>*Dr. T. E. M. Munce, Harrisburg, PA</td>
<td>*Dr. Theo. Burnett, Columbus, OH</td>
</tr>
<tr>
<td>27</td>
<td>Dec. 5-7, 1923</td>
<td>Chicago, IL</td>
<td>*Dr. W. J. Butler, Henena, MT</td>
<td>*Dr. O.E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>28</td>
<td>Dec. 3-5, 1924</td>
<td>Chicago, IL</td>
<td>*Dr. J. G. Ferneyhough, Richmond, VA</td>
<td>*Dr. O.E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>29</td>
<td>Dec. 2-4, 1925</td>
<td>Chicago, IL</td>
<td>*Dr. J. H. McNeil, Trenton, NJ</td>
<td>*Dr. O.E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>30</td>
<td>Dec. 1-3, 1926</td>
<td>Chicago, IL</td>
<td>*Dr. John R. Mohler, Washington, DC</td>
<td>*Dr. O.E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>31</td>
<td>Nov. 30-Dec. 2, 1927</td>
<td>Chicago, IL</td>
<td>*Dr. L. Van Es, Lincoln, NE</td>
<td>*Dr. O.E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>32</td>
<td>Dec. 5-7, 1928</td>
<td>Chicago, IL</td>
<td>*Dr. C. A. Cary, Auburn, AL</td>
<td>*Dr. O.E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>33</td>
<td>Dec. 4-6, 1929</td>
<td>Chicago, IL</td>
<td>*Dr. Chas. O. Lamb, Denver, CO</td>
<td>*Dr. O.E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>34</td>
<td>Dec. 3-5, 1930</td>
<td>Chicago, IL</td>
<td>*Dr. A. E. Wright, Washington, DC</td>
<td>*Dr. O.E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>35</td>
<td>Dec. 2-4, 1931</td>
<td>Chicago, IL</td>
<td>*Dr. J. W. Connaway, Columbia, MD</td>
<td>*Dr. O.E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>36</td>
<td>Nov. 30-Dec. 2, 1932</td>
<td>Chicago, IL</td>
<td>*Dr. Peter Malcolm, Des Moines, IA</td>
<td>*Dr. O.E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>37</td>
<td>Dec. 6-8, 1933</td>
<td>Chicago, IL</td>
<td>*E. T. Faulder, Albany, NY</td>
<td>*Dr. O.E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>38</td>
<td>Dec. 5-7, 1934</td>
<td>Chicago, IL</td>
<td>*Dr. T. E. Robinson, Providence, RI</td>
<td>*Dr. O.E. Dyson, Kansas City, MO</td>
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<tr>
<td>39</td>
<td>Dec. 4-6, 1935</td>
<td>Chicago, IL</td>
<td>*Dr. Edward Records, Reno, NV</td>
<td>*Dr. O.E. Dyson, Kansas City, MO</td>
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<td>40</td>
<td>Dec. 2-4, 1936</td>
<td>Chicago, IL</td>
<td>*Dr. Walter Wisnicky, Madison, WI</td>
<td>*Dr. O.E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>41</td>
<td>Dec. 1-3, 1937</td>
<td>Chicago, IL</td>
<td>*Dr. R. W. Smith, Concord, NH</td>
<td>*Dr. O.E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>42</td>
<td>Nov. 30-Dec. 2, 1938</td>
<td>Chicago, IL</td>
<td>*Dr. D. E. Westmoreland, Frankfort, KY</td>
<td>*Dr. O.E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>43</td>
<td>Dec. 6-8, 1939</td>
<td>Chicago, IL</td>
<td>*Dr. J. L. Axby, Indianapolis, IN</td>
<td>*Dr. O.E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>44</td>
<td>Dec. 4-6, 1940</td>
<td>Chicago, IL</td>
<td>*Dr. H. D. Port, Cheyenne, WY</td>
<td>*Dr. Mark Welsh, College Park, MD</td>
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<tr>
<td>45</td>
<td>Dec. 3-5, 1941</td>
<td>Chicago, IL</td>
<td>*Dr. E. A. Crossman, Boston, MA</td>
<td>*Dr. Mark Welsh, College Park, MD</td>
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<tr>
<td>46</td>
<td>Dec. 2-4, 1942</td>
<td>Chicago, IL</td>
<td>*Dr. I. S. McAdory, Auburn, AL</td>
<td>*Dr. Mark Welsh, College Park, MD</td>
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III. ORGANIZATIONAL MATTERS

<table>
<thead>
<tr>
<th>No.</th>
<th>Date</th>
<th>Place of Meeting</th>
<th>President</th>
<th>Secretary/Executive</th>
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</thead>
<tbody>
<tr>
<td>48</td>
<td>Dec. 6-8, 1944</td>
<td>Chicago, IL</td>
<td>*Dr. J. M. Sutton, Atlanta, GA</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
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<tr>
<td>49</td>
<td>Dec. 5-7, 1945</td>
<td>Chicago, IL</td>
<td>*Dr. C. U. Duckwork, Sacramento, CA</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
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<td>50</td>
<td>Dec. 4-6, 1946</td>
<td>Chicago, IL</td>
<td>*Dr. William Moore, Raleigh, NC</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
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<tr>
<td>51</td>
<td>Dec. 3-5, 1947</td>
<td>Chicago, IL</td>
<td>*Dr. Will J. Miller, Topeka, KS</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>52</td>
<td>Oct. 13-15, 1948</td>
<td>Denver, CO</td>
<td>*Dr. Jean V. Knapp, Tallahassee, FL</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>53</td>
<td>Oct. 12-14, 1949</td>
<td>Columbus, OH</td>
<td>*Dr. T. O. Brandenburg, Bismarck, ND</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>54</td>
<td>Nov. 1-3, 1950</td>
<td>Phoenix, AZ</td>
<td>*Dr. C. P. Bishop, Harrisburg, PA</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>55</td>
<td>Nov. 14-16, 1951</td>
<td>Kansas City, KS</td>
<td>*Mr. F. E. Mollin, Denver, CO</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>56</td>
<td>Oct. 29-31, 1952</td>
<td>Louisville, KY</td>
<td>*Dr. Ralph L. West, St. Paul, MN</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
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<tr>
<td>57</td>
<td>Sept. 23-25, 1953</td>
<td>Atlantic City, NJ</td>
<td>*Dr. T. Childs, Ottawa, Canada</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>58</td>
<td>Nov. 10-12, 1954</td>
<td>Omaha, NE</td>
<td>*Dr. T. C. Green, Charleston, WV</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
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<tr>
<td>59</td>
<td>Nov. 16-18, 1955</td>
<td>New Orleans, LA</td>
<td>*Dr. H. E. Wilkins, Helena, MT</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>60</td>
<td>Nov. 28-30, 1956</td>
<td>Chicago, IL</td>
<td>*Dr. A. L. Brueckner, Baltimore, MD</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
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<tr>
<td>61</td>
<td>Nov. 13-15, 1957</td>
<td>St. Louis, MO</td>
<td>*Dr. G. H. Good, Cheyenne, WY</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>62</td>
<td>Nov. 4-6, 1958</td>
<td>Miami Beach, FL</td>
<td>*Dr. John G. Milligan, Montgomery, AL</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
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<tr>
<td>63</td>
<td>Nov. 15-18, 1959</td>
<td>San Francisco, CA</td>
<td>*Mr. F. G. Buzzell, Augusta, ME</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
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<tr>
<td>64</td>
<td>Oct. 17-21, 1960</td>
<td>Charleston, WV</td>
<td>*Dr. J. R. Hay, Chicago, IL</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
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<tr>
<td>65</td>
<td>Oct. 30-Nov. 3, 1961</td>
<td>Minneapolis, MN</td>
<td>*Dr. A. P. Schneider, Boise, ID</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
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<tr>
<td>66</td>
<td>Oct. 30-Nov. 2, 1962</td>
<td>Washington, DC</td>
<td>*Dr. W. L. Bendix, Richmond, VA</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
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<tr>
<td>67</td>
<td>Oct. 15-18, 1963</td>
<td>Albuquerque, NM</td>
<td>*Dr. T. J. Grennan, Jr. Providence, RI</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
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<tr>
<td>69</td>
<td>Oct. 25-29, 1965</td>
<td>Lansing, MI</td>
<td>*Dr. J. W. Safford, Helena, MT</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
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### III. C. PREVIOUS MEETINGS

<table>
<thead>
<tr>
<th>No.</th>
<th>Date</th>
<th>Place of Meeting</th>
<th>President</th>
<th>Secretary/Executive</th>
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<tr>
<td>70</td>
<td>Oct. 10-14, 1966</td>
<td>Buffalo, NY</td>
<td>*Dr. C. L. Campbell, Tallahassee, FL</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
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<tr>
<td>71</td>
<td>Oct. 16-20, 1967</td>
<td>Phoenix, AZ</td>
<td>*Dr. Grant S. Kaley, Albany, NY</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
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<tr>
<td>72</td>
<td>Oct. 6-11, 1968</td>
<td>New Orleans, LA</td>
<td>*Dr. John F. Quinn, Lansing, MI</td>
<td>*Dr. W.L. Bendix, Richmond, VA</td>
</tr>
<tr>
<td>73</td>
<td>Oct. 12-19, 1969</td>
<td>Milwaukee, WI</td>
<td>*Dr. John L. Ohrar, Reno, NV</td>
<td>*Dr. W.L. Bendix, Richmond, VA</td>
</tr>
<tr>
<td>74</td>
<td>Oct. 18-23, 1970</td>
<td>Philadelphia, PA</td>
<td>*Dr. Frank B. Wheeler, Baton Rouge, LA</td>
<td>*Dr. W.L. Bendix, Richmond, VA</td>
</tr>
<tr>
<td>75</td>
<td>Oct. 24-29, 1971</td>
<td>Oklahoma City, OK</td>
<td>*Dr. M.D. Mitchell, Pierre, SD</td>
<td>*Dr. W.L. Bendix, Richmond, VA</td>
</tr>
<tr>
<td>76</td>
<td>Nov. 5-10, 1972</td>
<td>Miami Beach, FL</td>
<td>*Dr. J. C. Shook, Mechanicsburg, PA</td>
<td>*Dr. W.L. Bendix, Richmond, VA</td>
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<td>77</td>
<td>Oct. 14-19, 1973</td>
<td>St. Louis, MO</td>
<td>*Dr. W. C. Tobin, Denver, CO</td>
<td>*Dr. W.L. Bendix, Richmond, VA</td>
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<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, Atlanta, GA</td>
<td>*Dr. W.L. Bendix, Richmond, VA</td>
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<tr>
<td>80</td>
<td>Nov. 7-12, 1976</td>
<td>Miami Beach, FL</td>
<td>*Dr. H. E. Goldstein, Columbus, OH</td>
<td>*Dr. W.L. Bendix, Richmond, VA</td>
</tr>
<tr>
<td>81</td>
<td>Oct. 16-21, 1977</td>
<td>Minneapolis, MN</td>
<td>*Dr. A. E. Janawicz, Montpelier, VT</td>
<td>*Dr. W.L. Bendix, Richmond, VA</td>
</tr>
<tr>
<td>82</td>
<td>Oct. 21-Nov. 3, 1978</td>
<td>Buffalo, NY</td>
<td>**Dr. L. E. Bartell, Sacramento, CA</td>
<td>*Dr. W.L. Bendix, Richmond, VA</td>
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<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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<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>
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<tr>
<td>86</td>
<td>Nov. 7-12, 1982</td>
<td>Nashville, TN</td>
<td>*Dr. G. B. Rea, Salem, OR</td>
<td>*Dr. J. C. Shook, Hyattsville, MD</td>
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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>
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<tr>
<td>88</td>
<td>Oct. 21-26, 1984</td>
<td>Fort Worth, TX</td>
<td>*Mr. J. O. Pearce, Jr. Okeechobee, FL</td>
<td>*Dr. J. C. Shook, Annapolis, MD</td>
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<td>89</td>
<td>Oct. 27-Nov. 1, 1985</td>
<td>Milwaukee, WI</td>
<td>*Dr. David U. Walker, Montpelier, VT</td>
<td>*Dr. J. C. Shook, Annapolis, MD</td>
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<td>90</td>
<td>Oct. 14-19, 1986</td>
<td>Louisville, KY</td>
<td>*Dr. N. W. Kruse, Lincoln, NE</td>
<td>*Dr. J. C. Shook, Mechanicsburg, PA</td>
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<td>91</td>
<td>Oct. 25-30, 1987</td>
<td>Salt Lake City, UT</td>
<td>*Dr. J. F. Hudelson, Denver, Co</td>
<td>*Dr. J. C. Shook, Mechanicsburg, PA</td>
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<td>92</td>
<td>Oct. 16-21, 1988</td>
<td>Little Rock, AR</td>
<td>*Dr. J. A. Cobb, Atlanta, GA</td>
<td>*Dr. J. C. Shook, Mechanicsburg, PA</td>
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<td>93</td>
<td>Oct. 28-Nov. 3, 1989</td>
<td>Las Vegas, NV</td>
<td>Mr. P. E. Bradshaw, Griggsville, IL</td>
<td>*Dr. J. C. Shook, Mechanicsburg, PA</td>
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### III. ORGANIZATIONAL MATTERS

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<tr>
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<th>President</th>
<th>Secretary/Executive</th>
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<tr>
<td>94</td>
<td>Oct. 6-12, 1990</td>
<td>Denver, CO</td>
<td>Dr. M. A. Van Buskirk, Harrisburg, PA</td>
<td>*Dr. J. C. Shook, Mechanicsburg, PA</td>
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<td>95</td>
<td>Oct. 26-Nov. 1, 1991</td>
<td>San Diego, CA</td>
<td>*Dr. P. L. Smith, Sacramento, CA</td>
<td>*Dr. J. C. Shook, Mechanicsburg, PA</td>
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<td>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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<td>97</td>
<td>Oct. 23-29, 1993</td>
<td>Las Vegas, NV</td>
<td>Dr. T. J. Hagerty, St. Paul, MN</td>
<td>*Dr. J. C. Shook, Mechanicsburg, PA</td>
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<td>98</td>
<td>Oct. 29-Nov. 4, 1994</td>
<td>Grand Rapids, MI</td>
<td>*Mr. J. B. Finley, Jr., Encinal, TX</td>
<td>*Dr. J. C. Shook, Mechanicsburg, PA</td>
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<td>99</td>
<td>Oct. 28-Nov. 3, 1995</td>
<td>Reno, NV</td>
<td>Dr. H. Wesley Towers, Dover, DE</td>
<td>*Dr. J. C. Shook, Mechanicsburg, PA</td>
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<td>100</td>
<td>Oct. 12-18, 1996</td>
<td>Little Rock, AR</td>
<td>Dr. M. R. Marshall, Salt Lake City, UT</td>
<td>*Dr. J. C. Shook, Mechanicsburg, PA</td>
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<td>101</td>
<td>Oct. 17-24, 1997</td>
<td>Louisville, KY</td>
<td>Dr. Larry L. Williams, Lincoln NE</td>
<td>*Dr. J. C. Shook, Mechanicsburg, PA</td>
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<td>102</td>
<td>Oct. 3-9, 1998</td>
<td>Minneapolis, MN</td>
<td>Dr. Jones W. Bryan, Columbia, SC</td>
<td>*Dr. J. C. Shook, Mechanicsburg, PA</td>
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<td>103</td>
<td>Oct. 7-14, 1999</td>
<td>San Diego, CA</td>
<td>Dr. Richard H. McCapes, Davis, CA</td>
<td>*Dr. J. C. Shook, Mechanicsburg, PA</td>
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<td>104</td>
<td>Oct. 19-26, 2000</td>
<td>Birmingham, AL</td>
<td>Dr. Ernest W. Zirkle, Trenton, NJ</td>
<td>Dr. J Lee Alley, Montgomery, AL</td>
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<td>105</td>
<td>Nov. 1-8, 2001</td>
<td>Hershey, PA</td>
<td>Dr. Bob R. Hillman, Boise, ID</td>
<td>Dr. J Lee Alley, Montgomery, AL</td>
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<td>106</td>
<td>Oct. 1-24, 2002</td>
<td>St. Louis, MO</td>
<td>Dr. Maxwell Lea, Jr., Baton Rouge, LA</td>
<td>Dr. J Lee Alley, Montgomery, AL</td>
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<td>107</td>
<td>Oct. 9-16, 2003</td>
<td>San Diego, CA</td>
<td>*Mr. Bob Frost, Lincoln, CA</td>
<td>Dr. J Lee Alley, Montgomery, AL</td>
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<td>108</td>
<td>Oct. 21-27, 2004</td>
<td>Greensboro, NC</td>
<td>Dr. Donald Lein, Ithaca, NY</td>
<td>Dr. J Lee Alley, Montgomery, AL</td>
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<tr>
<td>109</td>
<td>Nov. 3-9, 2005</td>
<td>Hershey, PA</td>
<td>Dr. Richard D. Willer, Phoenix, AZ</td>
<td>Dr. J Lee Alley, Montgomery, AL</td>
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<td>110</td>
<td>Oct. 12-18, 2006</td>
<td>Minneapolis, MN</td>
<td>Dr. Bret D. Marsh, Indianapolis, IN</td>
<td>Dr. J Lee Alley, Montgomery, AL</td>
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<td>111</td>
<td>Oct. 18-24, 2007</td>
<td>Reno, NV</td>
<td>Dr. Lee M. Myers, Atlanta, GA</td>
<td>§Dr. J Lee Alley, Montgomery, AL/Mr. Benjamin Richey, St. Joseph, MO</td>
</tr>
<tr>
<td>112</td>
<td>Oct. 23-29, 2008</td>
<td>Greensboro, NC</td>
<td>Mr. James W. Leafstedt, Alcester, SD</td>
<td>Mr. Benjamin Richey, St. Joseph, MO</td>
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<tr>
<td>113</td>
<td>Oct. 8-14, 2009</td>
<td>San Diego, CA</td>
<td>Dr. Donald E. Hoenig, Belfast, ME</td>
<td>Mr. Benjamin Richey, St. Joseph, MO</td>
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<td>114</td>
<td>Nov. 11-17, 2010</td>
<td>Minneapolis, MN</td>
<td>Dr. Richard E. Breitmeyer, Sacramento, CA</td>
<td>Mr. Benjamin Richey, St. Joseph, MO</td>
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<tr>
<td>115</td>
<td>Sept. 29-Oct. 5, 2011</td>
<td>Buffalo, NY</td>
<td>Dr. Steven L. Halstead, East Lansing, MI</td>
<td>Mr. Benjamin Richey, St. Joseph, MO</td>
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III. C. PREVIOUS MEETINGS

<table>
<thead>
<tr>
<th>No.</th>
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<th>President</th>
<th>Secretary/Executive</th>
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<tr>
<td>116</td>
<td>Oct. 18-24, 2012</td>
<td>Greensboro, NC</td>
<td>Dr. David T. Marshall, Raleigh, NC</td>
<td>Mr. Benjamin Richey, St. Joseph, MO</td>
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<tr>
<td>117</td>
<td>Oct. 17-23, 2013</td>
<td>San Diego, CA</td>
<td>Dr. David L. Meeker, Alexandria, VA</td>
<td>Mr. Benjamin Richey, St. Joseph, MO</td>
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<tr>
<td>118</td>
<td>Oct. 16-22, 2014</td>
<td>Kansas City, MO</td>
<td>Dr. Stephen K. Crawford, Concord, NH</td>
<td>Mr. Benjamin Richey, St. Joseph, MO</td>
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<tr>
<td>119</td>
<td>Oct. 22-28, 2015</td>
<td>Providence, RI</td>
<td>Dr. Bruce L. King, Axtell, UT</td>
<td>Mr. Benjamin Richey, St. Joseph, MO</td>
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<tr>
<td>120</td>
<td>Oct. 13-19, 2016</td>
<td>Greensboro, NC</td>
<td>Dr. David D. Schmitt, Ankeny, IA</td>
<td>Mr. Benjamin Richey, St. Joseph, MO</td>
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<tr>
<td>121</td>
<td>Oct. 12-18, 2017</td>
<td>San Diego, CA</td>
<td>Dr. Boyd H. Parr, Columbia, SC</td>
<td>Mr. Benjamin Richey, St. Joseph, MO</td>
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<tr>
<td>122</td>
<td>Oct. 18-24, 2018</td>
<td>Kansas City, MO</td>
<td>Ms. Barbara C. Determan, Early, IA</td>
<td>Mr. Benjamin Richey, St. Joseph, MO</td>
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<td>123</td>
<td>Oct. 24-30, 2019</td>
<td>Providence, RI</td>
<td>Dr. Kristin M. Haas, Montpelier, VT</td>
<td>Mr. Benjamin Richey, St. Joseph, MO</td>
</tr>
</tbody>
</table>

**Key**

* Deceased
‡ Last meeting of the Interstate Association of Livestock Sanitary Boards
** Resigned Dec. 12, 1977
§ USAHA hired an Executive Director, in lieu of the Secretary, effective 2006-2007
† Reprinted in 54th Annual Proceedings †† Reprinted in 66th Annual Proceedings
III. D. USAHA Award Recipients
III.D. USAHA AWARD RECIPIENTS

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 T. Hawks, Washington, District of Columbia

119th Annual Meeting, Providence, Rhode Island – 2015
Dr. Richard E. Breitmeyer, Davis, California

120th Annual Meeting, Greensboro, North Carolina – 2016
Mr. Jim W. Leafstedt, Alcester, South Dakota

121st Annual Meeting, San Diego, California – 2017
Mr. Bobby R. Acord, Rocky Point, North Carolina

122nd Annual Meeting, Kansas City, Missouri – 2018
Dr. Donald E. Hoenig, Belfast, Maine

123rd Annual Meeting, Providence, Rhode Island – 2019
Dr. Belinda Thompson, Ithaca, New York
III. ORGANIZATIONAL MATTERS

USAHA FEDERAL PARTNERSHIP AWARD RECIPIENTS

Dr. Jack A. Shere, Raleigh, North Carolina
Dr. William G. Smith, Sutton, Massachusetts

Dr. Donald J. Otto, Knoxville, Iowa

117th Annual Meeting, San Diego, California – 2013
Dr. Donald E. Evans, Topeka, Kansas

118th Annual Meeting, Kansas City, Missouri – 2014
Dr. Sarah M. Tomlinson, Fort Collins, Colorado

119th Annual Meeting, Providence, Rhode Island – 2015
Dr. Kevin L. Petersburg, Des Moines, Iowa

120th Annual Meeting, Greensboro, North Carolina – 2016
Dr. Angela M. Pelzel-McCluskey, Fort Collins, Colorado

121st Annual Meeting, San Diego, California – 2017
Dr. Jonathan T. Zack, Riverdale, Maryland

122nd Annual Meeting, Kansas City, Missouri – 2018
Dr. Jack C. Rhyan, Fort Collins, Colorado

123rd Annual Meeting, Providence, Rhode Island - 2019
Dr. Barb Porter-Spalding, Raleigh, North Carolina
### OTHER AWARDS

<table>
<thead>
<tr>
<th>Year</th>
<th>APHIS Administrator’s Award</th>
<th>National Assembly Award</th>
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<tr>
<td>2019</td>
<td>Dr. Beate Crossley</td>
<td>Dr. Susan Keller</td>
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<td>2018</td>
<td>Dr. Andy Schwartz</td>
<td>Dr. David Schmitt</td>
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<td>2017</td>
<td>Dr. Bruce Akey</td>
<td>Dr. Kent Fowler</td>
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<td>2016</td>
<td>Dr. Annette Jones</td>
<td>Mr. Paul Rodgers</td>
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<td>2015</td>
<td>Dr. Dustin Oedekoven</td>
<td>Dr. Bob Meyer</td>
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<td>2014</td>
<td>Dr. Donald Ritter</td>
<td>Dr. Tom Holt</td>
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<td>2013</td>
<td>Dr. James Roth</td>
<td>Dr. Bill Hartmann</td>
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<td>2012</td>
<td>Dr. Donald Hoenig</td>
<td>Dr. Jim Logan</td>
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<td>2011</td>
<td>Dr. Don Lein</td>
<td>Dr. Taylor Woods</td>
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<td>2010</td>
<td>Dr. Alex Ardans; Dr. Alfonso Torres</td>
<td>Mr. George Teagarden</td>
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<td>2009</td>
<td>Mr. James Leafstedt</td>
<td>Mr. John Adams</td>
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<td>2008</td>
<td>Dr. Claude Barton</td>
<td>Dr. Bret D. Marsh</td>
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<td>2007</td>
<td>Dr. Francois Elvinger</td>
<td>Dr. Bob Hillman</td>
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<td>2006</td>
<td>Dr. Terry McElwain; Dr. Willie Reed</td>
<td>Dr. Sam Holland</td>
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<td>2005</td>
<td>Dr. Bob Hillman</td>
<td>Dr. Richard D. Willer</td>
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<td>2004</td>
<td>Dr. Joan Arnoldi</td>
<td>Dr. Steven England</td>
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<td>2003</td>
<td>Ms. Martha Roberts</td>
<td>Dr. John Huntley</td>
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<td>2002</td>
<td>Mr. Gus Douglas</td>
<td>Dr. Ernest W. Zirkle</td>
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<td>Dr. Richard E. Breitmeyer</td>
<td>Dr. Richard E. Breitmeyer</td>
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<td>Dr. Mo Salmon</td>
<td>Dr. H. Wesley Towers, Jr</td>
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<td>1999</td>
<td>Dr. Terry Beals</td>
<td>Dr. Ralph Knowles</td>
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<td>Dr. Marvin Beeman</td>
<td>Dr. Larry L. Williams</td>
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<td>Dr. Elizabeth A. Lautner</td>
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<td>Dr. Paul B. Doby</td>
<td>Dr. J. Lee Alley</td>
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<td>1995</td>
<td>Mr. Philip E. Bradshaw</td>
<td>Dr. Lewis P. Thomas</td>
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<td>1994</td>
<td>Mr. Neal Black</td>
<td>Dr. J. C. Shook</td>
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### III. ORGANIZATIONAL MATTERS

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<thead>
<tr>
<th>Year</th>
<th>Chairperson</th>
<th>Vice Chairperson</th>
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<tr>
<td>1993</td>
<td>Mrs. Ella Blanton</td>
<td>Dr. Calvin W. S. Lum</td>
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<td>Dr. Pat Smith</td>
<td>Dr. Patton L. Smith</td>
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<td>Dr. C. L. Campbell</td>
<td>Dr. Paul B. Doby</td>
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<td>1990</td>
<td>Dr. David T. Berman</td>
<td>Dr. Clarence L. Campbell</td>
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<td>1989</td>
<td>Mr. John B. Armstrong</td>
<td>Ms. Mabel Owen</td>
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<td>1988</td>
<td>Dr. Frank A. Hayes</td>
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<td>Dr. Robert P. Hanson</td>
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<td>Dr. Benjamin s. Pomeroy</td>
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<td>1985</td>
<td>Dr. J. G. Flint</td>
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<td>1984</td>
<td>Dr. William C. Tobin</td>
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<td>1983</td>
<td>Dr. Harold E. Nadler</td>
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<td>1982</td>
<td>Dr. John L. O'Harra</td>
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<td>Dr. J. D. Lamont</td>
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<td>1977</td>
<td>Dr. Jay Arthur Myers</td>
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IV. APPENDIX
A. GLOSSARY OF COMMONLY USED ACRONYMS
<table>
<thead>
<tr>
<th>Acronym</th>
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<tbody>
<tr>
<td>AAAP</td>
<td>American Association of Avian Pathologist</td>
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<td>AAC</td>
<td>Animal Agriculture Coalition</td>
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<td>AAEP</td>
<td>American Association of Equine Practitioners</td>
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<tr>
<td>AASV</td>
<td>American Association of Swine Veterinarians</td>
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<tr>
<td>AAVLD</td>
<td>American Association of Veterinary Laboratory Diagnosticians</td>
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<td>ABADRU</td>
<td>Arthropod-Borne Animal Disease Research Unit</td>
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<td>AChE</td>
<td>Acetylcholinesterase</td>
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<td>AFWA</td>
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<td>AHS</td>
<td>African horse sickness</td>
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<td>ALHT</td>
<td>Asian longhorned tick</td>
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<td>AMA</td>
<td>Agricultural Marketing Act</td>
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<td>AMDUCA</td>
<td>Animal Medicinal Drug Use Clarification Act</td>
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<td>AmPV</td>
<td>Avian Metapneumovirus</td>
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<td>AMR</td>
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<td>Animal Pest, Disease and Disaster Prevention and Response Program</td>
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<td>ASAR</td>
<td>Animal search and rescue</td>
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<td>Aquaculture, Swine, Equine and Poultry</td>
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<td>ASF</td>
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<td>AU-IBAR</td>
<td>African Union Inter-African Bureau for Animal Resources</td>
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<td>AVBP</td>
<td>American Board of Veterinary Practitioners</td>
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<td>AVBP</td>
<td>Association of Veterinarians in Broiler Production</td>
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<td>AVEP</td>
<td>Association of Veterinarians in Egg Production</td>
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<td>AVIC</td>
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<td>AVMA</td>
<td>American Veterinary Medical Association</td>
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<td>AWA</td>
<td>Animal Welfare Act</td>
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<tr>
<td>BB</td>
<td>Bovine Babesiosis</td>
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<td>BCO</td>
<td>Bacterial Chondronecrosis with Osteomyelitis</td>
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<tr>
<td>BLV</td>
<td>Bovine leukosis</td>
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<td>BRD</td>
<td>Bovine respiratory disease</td>
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<td>BRI</td>
<td>Biosecurity Research Institute</td>
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<tr>
<td>BSL4</td>
<td>Biosafety Level 4</td>
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<tr>
<td>C&amp;D</td>
<td>Cleaning and disinfection</td>
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</tbody>
</table>
**CAEV**  |  Caprine Arthritis Encephalitis Virus  
**CAHO**  |  Chief Animal Health Official  
**CAHPS**  |  Commercial Aquaculture Health Program Standards  
**CCC**  |  Commodity Credit Corporation  
**CCT**  |  Cervical Tuberculin  
**CD**  |  Clostridial Dermatitis  
**CDC**  |  U.S. Centers for Disease Control and Prevention  
**CEAH**  |  Center for Epidemiology and Animal Health  
**cELISA**  |  Competitive Enzyme Linked Immunosorbent Assay  
**CEM**  |  Contagious equine metritis  
**CFIA**  |  Canadian Food Inspection Agency  
**CFR**  |  Code of Federal Regulations  
**CFT**  |  Caudal fold test  
**CFTEP**  |  Cattle Fever Tick Eradication Program  
**CGAHR**  |  Center for Grain and Animal Health Research  
**CHP**  |  Cervid Health Program  
**CNOG**  |  National Confederation of Livestock Unions, Mexico  
**CPCVM**  |  Center for Public and Corporate Veterinary Medicine  
**CSF**  |  Classical Swine Fever  
**CT**  |  Cycle threshold  
**CVB**  |  Center for Veterinary Biologics  
**CVI**  |  Certificate of Veterinary Inspection  
**CVM**  |  Center for Veterinary Medicine  
**DACVPM**  |  American College of Veterinary Preventive Medicine  
**DG-SANTE**  |  Directorate-General for Health and Food Safety  
**DIGEGA**  |  General Directorate for Livestock  
**DIVA**  |  Differentiating infected from vaccinated animals  
**DMV**  |  Delmarva  
**DNA**  |  Deoxyribonucleic acid  
**DNR**  |  Department of Natural Resources  
**DPP**  |  Dual Path Platform  
**DRIT**  |  Direct rapid immunohistochemical test  
**DSA**  |  Designated Surveillance Area  
**DSHS**  |  Texas Department of State Health Services  
**DTF**  |  Defend the Flock  
**DVD**  |  Digital versatile disc  
**ECDC**  |  European Centre for Disease Prevention and Control  
**ECTAD**  |  Emergency Centre for Transboundary Animal Disease  
**eCVI**  |  Electronic Certificate of Veterinary Inspection
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>EEE</td>
<td>Eastern Equine Encephalitis</td>
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<td>EHM</td>
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<td>ELISA</td>
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<td>Enzyme-linked immunosorbent assay</td>
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<td>END</td>
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<td>ERS</td>
<td>Enhanced rabies surveillance</td>
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<td>EU</td>
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<td>EUFMD</td>
<td>European Commission for the Control of Foot-and-Mouth Disease</td>
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<td>EVA</td>
<td>Equine Viral Arteritis</td>
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<td>FAD</td>
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<td>FAD SAFE</td>
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<td>FAO</td>
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<td>Foreign Analytics and Operations</td>
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<td>FBS</td>
<td>Fetal bovine serum</td>
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<td>FCMs</td>
<td>Fecal corticosterone metabolites</td>
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<td>FMI</td>
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<td>glucocorticoids</td>
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<td>GLLP</td>
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<td>GWAS</td>
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<td>Infectious bronchitis</td>
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<td>IBDv</td>
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<td>IGRA</td>
<td>Interferon gamma release assay</td>
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<td>IHC</td>
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<td>Institute for Infectious Animal Diseases</td>
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<td>IT</td>
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<td>JEV</td>
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<td>KEGG</td>
<td>Kyoto Encyclopedia of Genes and Genomes</td>
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<td>LAIV</td>
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<td>LBMS</td>
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<td>LIMS</td>
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<td>LPAI</td>
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<td>MAK</td>
<td>Modified Atmosphere Killing</td>
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<td>Modified Accredited Zone</td>
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<td>MDNR</td>
<td>Michigan Department of Natural Resources</td>
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<td>MERS</td>
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<tr>
<td>MG</td>
<td>Mycoplasma gallisepticum</td>
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<td>MIM</td>
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<td>MM</td>
<td><em>M. meleagridis</em></td>
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<td>MRLN</td>
<td>Medial retropharyngeal lymph node</td>
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<td>MS</td>
<td>Mycoplasma synoviae</td>
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<td>MSP</td>
<td>Multi-States Partnership</td>
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<td>MUMS</td>
<td>Minor Use and Minor Species</td>
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<td>MUMS</td>
<td>Minor Use in Major Species</td>
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<td>MVV</td>
<td>Maedi Visna Virus</td>
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<td>NADA</td>
<td>New Animal Drug Application</td>
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<td>NADC</td>
<td>National Animal Disease Center</td>
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<td>NADPRP</td>
<td>National Animal Disease Preparedness and Response Program</td>
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<tr>
<td>NAE</td>
<td>No Antibiotics Ever</td>
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<tr>
<td>NAFF</td>
<td>National Association of Federal Veterinarians</td>
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<td>NAHLN</td>
<td>National Animal Health Laboratory Network</td>
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<td>National Animal Health Monitoring System</td>
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<td>NAMI</td>
<td>North American Meat Institute</td>
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<td>NARMS</td>
<td>National Antimicrobial Resistance Monitoring System</td>
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<td>NASAHO</td>
<td>National Assembly of State Animal Health Officials</td>
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<td>NASS</td>
<td>National Agricultural Statistics Service</td>
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<td>NAVVCB</td>
<td>National Animal Vaccine and Veterinary Countermeasures Bank</td>
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<td>NBAF</td>
<td>National Bio and Agro-Defense Facility</td>
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<td>National Centers for Animal Health</td>
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<td>National Focal Point for Wildlife</td>
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<tr>
<td>NLTP</td>
<td>NBAF Laboratorian Training Program</td>
</tr>
<tr>
<td>NOAA</td>
<td>National Oceanic and Atmospheric Administration</td>
</tr>
<tr>
<td>NP103</td>
<td>Animal Health National Program</td>
</tr>
<tr>
<td>NP103</td>
<td>National Program 103</td>
</tr>
<tr>
<td>NPB</td>
<td>National Pork Board</td>
</tr>
<tr>
<td>NPIC</td>
<td>National Preparedness and Incident Coordination Center</td>
</tr>
<tr>
<td>NPIP</td>
<td>National Poultry Improvement Plan</td>
</tr>
<tr>
<td>NRMP</td>
<td>National Rabies Management Program</td>
</tr>
<tr>
<td>NSTP</td>
<td>NBAF Scientist Training Program</td>
</tr>
<tr>
<td>NUES</td>
<td>National Uniform Eartagging System</td>
</tr>
<tr>
<td>NVS</td>
<td>National Veterinary Stockpile</td>
</tr>
<tr>
<td>NVSL</td>
<td>National Veterinary Services Laboratories</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Full Form</td>
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<tr>
<td>NVSL</td>
<td>National Veterinary Services Laboratories</td>
</tr>
<tr>
<td>NWCO</td>
<td>Nuisance Wildlife Control Operator</td>
</tr>
<tr>
<td>NWHC</td>
<td>National Wildlife Health Center</td>
</tr>
<tr>
<td>NWHC</td>
<td>National Wildlife Health Center</td>
</tr>
<tr>
<td>NWRC</td>
<td>National Wildlife Research Center</td>
</tr>
<tr>
<td>OIE</td>
<td>World Organization for Animal Health</td>
</tr>
<tr>
<td>OM</td>
<td>Osteomyelitis</td>
</tr>
<tr>
<td>ONRAB</td>
<td>Ontario Rabies Vaccine Bait</td>
</tr>
<tr>
<td>OPP</td>
<td>Ovine Progressive Pneumonia</td>
</tr>
<tr>
<td>ORT</td>
<td>Ornithobacterium Infection</td>
</tr>
<tr>
<td>ORV</td>
<td>Oral rabies vaccination</td>
</tr>
<tr>
<td>OSA</td>
<td>Official State Agency</td>
</tr>
<tr>
<td>OTC</td>
<td>Over-the-counter</td>
</tr>
<tr>
<td>PANVAC</td>
<td>Pan African Veterinary Center of the African Union</td>
</tr>
<tr>
<td>PART</td>
<td>Pipestone Antibiotic Resistance Tracker</td>
</tr>
<tr>
<td>PCP</td>
<td>Progressive Control Programmes</td>
</tr>
<tr>
<td>PCR</td>
<td>Polymerase chain reaction</td>
</tr>
<tr>
<td>PEDV</td>
<td>Porcine Epidemic Diarrhea Virus</td>
</tr>
<tr>
<td>PEMS</td>
<td>Poult Enteritis and Mortality Syndrome</td>
</tr>
<tr>
<td>PEP</td>
<td>Rabies Postexposure Prophylaxis</td>
</tr>
<tr>
<td>PIADC</td>
<td>Plum Island Animal Disease Center</td>
</tr>
<tr>
<td>PMRA</td>
<td>Pest Management Regulatory Agency</td>
</tr>
<tr>
<td>POI</td>
<td>Point-of-Interest</td>
</tr>
<tr>
<td>PPD</td>
<td>Purified protein derivative</td>
</tr>
<tr>
<td>PPE</td>
<td>Personal Protective Equipment</td>
</tr>
<tr>
<td>PPIA</td>
<td>Poultry Products Inspection Act</td>
</tr>
<tr>
<td>PPR</td>
<td>Peste des petits ruminants</td>
</tr>
<tr>
<td>PQZ</td>
<td>Permanent Quarantine Zone</td>
</tr>
<tr>
<td>PReP</td>
<td>Preparedness and Response Plan</td>
</tr>
<tr>
<td>PRP</td>
<td>Platelet-rich plasma</td>
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<tr>
<td>PRV</td>
<td>Pseudorabies virus</td>
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<tr>
<td>PT</td>
<td>Proficiency Test</td>
</tr>
<tr>
<td>PTS</td>
<td>Proficiency testing scheme</td>
</tr>
<tr>
<td>QA</td>
<td>Quality Assurance</td>
</tr>
<tr>
<td>RCC</td>
<td>Regulatory Cooperation Council</td>
</tr>
<tr>
<td>RFIDs</td>
<td>Radio-frequency identification</td>
</tr>
<tr>
<td>RITA</td>
<td>Rabies in the Americas</td>
</tr>
<tr>
<td>RMALT</td>
<td>Recto-anal mucosa associated lymphoid tissue</td>
</tr>
<tr>
<td>RNA</td>
<td>Ribonucleic acid</td>
</tr>
<tr>
<td>RRA</td>
<td>Rapid risk assessment</td>
</tr>
<tr>
<td>Acronym</td>
<td>Definition</td>
</tr>
<tr>
<td>---------</td>
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</tr>
<tr>
<td>rRT-PCR</td>
<td>Real-time reverse transcription polymerase chain reaction</td>
</tr>
<tr>
<td>RSSS</td>
<td>Regulatory Scrapie Slaughter Surveillance</td>
</tr>
<tr>
<td>RT-PCR</td>
<td>Reverse transcriptase-polymerase chain reaction</td>
</tr>
<tr>
<td>RT-QuIC</td>
<td>Real-time quaking-induced conversion</td>
</tr>
<tr>
<td>RVF</td>
<td>Rift Valley Fever</td>
</tr>
<tr>
<td>RWA</td>
<td>Raised without antibiotics</td>
</tr>
<tr>
<td>Rx</td>
<td>Medical prescription</td>
</tr>
<tr>
<td>S&amp;P</td>
<td>Strategy &amp; Policy</td>
</tr>
<tr>
<td>SAADRA</td>
<td>Southern Agriculture and Animal Disaster Response Alliance</td>
</tr>
<tr>
<td>SADER</td>
<td>Secretariat of Agriculture and Rural Development</td>
</tr>
<tr>
<td>SAHO</td>
<td>State Animal Health Official</td>
</tr>
<tr>
<td>SBP</td>
<td>Smart batch-processing protocol</td>
</tr>
<tr>
<td>SCFT</td>
<td>Southern cattle fever tick</td>
</tr>
<tr>
<td>SCT</td>
<td>Single cervical test</td>
</tr>
<tr>
<td>SDWG</td>
<td>Swine Disease Working Group</td>
</tr>
<tr>
<td>SE</td>
<td>Salmonella Enteritidis</td>
</tr>
<tr>
<td>SEPRL</td>
<td>Southeast Poultry Research Laboratory</td>
</tr>
<tr>
<td>SFCP</td>
<td>Scrapie Flock Certification</td>
</tr>
<tr>
<td>SFS</td>
<td>Secure Food Supply</td>
</tr>
<tr>
<td>SHIC</td>
<td>Swine Health Information Center</td>
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<tr>
<td>SLD</td>
<td>Spotty Liver Disease</td>
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<tr>
<td>SMEs</td>
<td>Subject matter experts</td>
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<tr>
<td>SMS</td>
<td>Secure Milk Supply</td>
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<tr>
<td>SNOMED CT</td>
<td>Systematized Nomenclature of Medicine - Clinical Terms</td>
</tr>
<tr>
<td>SNV</td>
<td>Sin Nombre Virus</td>
</tr>
<tr>
<td>sPMCA</td>
<td>Sensitivity of protein misfolding cyclic amplification</td>
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<tr>
<td>SPS</td>
<td>Sanitary and phytosanitary</td>
</tr>
<tr>
<td>STAS</td>
<td>Science, Technology, and Analysis Services</td>
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<tr>
<td>SUVs</td>
<td>Spontaneous Unaffiliated Volunteers</td>
</tr>
<tr>
<td>SVA</td>
<td>Senecavirus A</td>
</tr>
<tr>
<td>TAD</td>
<td>Transboundary animal disease</td>
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<tr>
<td>TAMU</td>
<td>Texas A&amp;M University</td>
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<tr>
<td>TARV</td>
<td>Turkey Arthritis Reovirus</td>
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<tr>
<td>TCV</td>
<td>Turkey Coronavirus</td>
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<tr>
<td>TDC</td>
<td>Tibial Dyschondroplasia</td>
</tr>
<tr>
<td>ToM</td>
<td>Training of Mentors</td>
</tr>
<tr>
<td>ToT</td>
<td>Training of Trainers</td>
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<tr>
<td>TR-DFT</td>
<td>Turkey Reovirus Digital Flexor Tendon Rupture</td>
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<tr>
<td>TRIG</td>
<td>Triple reassortant internal gene</td>
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<tr>
<td>Acronym</td>
<td>Description</td>
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<td>---------</td>
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<tr>
<td>TTC</td>
<td>Traceability and Technology Committee</td>
</tr>
<tr>
<td>UM&amp;R</td>
<td>Uniform Methods and Rules</td>
</tr>
<tr>
<td>UNHCR</td>
<td>United Nations High Commissioner for Refugees</td>
</tr>
<tr>
<td>USEF</td>
<td>United States Equestrian Federation</td>
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<tr>
<td>USGS</td>
<td>United States Geological Survey</td>
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<tr>
<td>USP</td>
<td>United States Pharmacopeia</td>
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<tr>
<td>VDD</td>
<td>Veterinary Drugs Directorate</td>
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<tr>
<td>VDL</td>
<td>Veterinary Diagnostic Laboratory</td>
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<tr>
<td>VEHCS</td>
<td>Veterinary Export Health Certification System</td>
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<tr>
<td>Vet-LIRN</td>
<td>Veterinary Laboratory Investigation and Response Network</td>
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<tr>
<td>VFD</td>
<td>Veterinary Feed Directive</td>
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<td>VHPs</td>
<td>Veterinary Health Products</td>
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<td>VMA</td>
<td>Veterinary Medical Association</td>
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<tr>
<td>vND</td>
<td>Virulent Newcastle Disease</td>
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<tr>
<td>VPP</td>
<td>Veterinary paraprofessionals</td>
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<tr>
<td>VS</td>
<td>Veterinary Services</td>
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<tr>
<td>VS</td>
<td>Vesicular Stomatitis</td>
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<tr>
<td>VSPS</td>
<td>Veterinary Services Process Streamlining</td>
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<tr>
<td>VSTA</td>
<td>Virus Serum Toxin Act</td>
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<td>VSTEP</td>
<td>Veterinary Services Training and Exercise Plan</td>
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<tr>
<td>WAHIS</td>
<td>Wild Animal Health Information System</td>
</tr>
<tr>
<td>WAVLD</td>
<td>World Association of Veterinary Laboratory Diagnosticians</td>
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<tr>
<td>WGFD</td>
<td>Wyoming Game and Fish Department</td>
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<tr>
<td>WGS</td>
<td>Whole genome sequence</td>
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<tr>
<td>WHISPers</td>
<td>Wildlife Health Information Sharing Partnership</td>
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<td>WHO</td>
<td>World Health Organization</td>
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<td>WHT</td>
<td>Whole-herd test</td>
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<tr>
<td>WNV</td>
<td>West Nile Virus</td>
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<td>WS</td>
<td>Wildlife Services</td>
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<tr>
<td>WTD</td>
<td>White tailed deer</td>
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<tr>
<td>ZEIDS</td>
<td>Zoonotic and Emerging Infectious Diseases</td>
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</tbody>
</table>