

## REPORT OF THE COMMITTEE ON FOREIGN AND EMERGING DISEASES

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The Committee met on October 21<sup>st</sup>, 2014 at the Sheraton Hotel in Kansas City, Missouri, from 8:00 am to 5:30 PM. There were [x] members and [x] guests present. The committee began with a review of the committee mission and subsequently moved to a review of the 2013 resolution.

### **Time-Specific Paper Title.**

Dr. Markos Tibbo with the Food and Agriculture Organization of the United Nations presented a time-specific paper on Emerging Diseases of Global Concern, with a Focus on Middle East Respiratory Syndrome

. The paper, in its entirety, is included at the end of this report.

### **Emerging Diseases of Global Concern, with a Focus on Middle East Respiratory Syndrome**

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

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

Presentations & Reports (Example)

**Title**

Presenter and Affiliation

Summary of presentation, or complete text

## **DHS S&T'S AGRICULTURAL DEFENSE PROGRAM OVERVIEW**

*M. Colby<sup>1</sup>*

<sup>1</sup>*Department of Homeland Security, Science and Technology Directorate, Chemical and Biological Defense Division, Washington DC, USA*

**Narrative:** The Agricultural Defense Branch within the Department of Homeland Security consistent with the roles and responsibilities articulated in Defense of United States Agriculture and Food (Homeland Security Presidential Directive, HSPD-9). This includes a broad range of research in development efforts to enhance current capabilities and develop state-of-the-art countermeasures for high-consequence foreign animal diseases. This includes near- and long-term research and development for vaccines and diagnostics, in coordination with internal and external stakeholders. This consists of five main projects covering the breadth of an animal health response: Enhanced Passive Surveillance; Foreign Animal Disease Vaccines and Diagnostics; Foreign Animal Disease Modeling; Agricultural Screening Tools; and Livestock Decontamination, Depopulation and Disposal. The Agricultural Defense Branch funds most of their research through contracts, but there are multiple ways of working with agricultural defense projects within the Science and Technology Directorate including: 1) Grant; 2) Cooperative Research and Development Agreement (CRADA); and 3) Contract. The grant process is a competitive process with the deliverables to include publication, report, or completion of a project. The contract is also a competitive process in which the deliverable is a product or service. The CRADA is awarded by the Notice of CRADA

intent, and either party may approach the other to initiate. The deliverable is a product or services agreed to on both sides, but no money is awarded from the Federal Government to the collaborator. More information is available at: <http://www.dhs.gov/contract-opportunities>.

**Update: National Veterinary Services Laboratories**

Sarah Tomlinson, National Animal Health Laboratory Network Coordinator, USDA, APHIS, Veterinary Services, Fort Collins, Colorado

Dr. Fernando Torres, Director Foreign Animal Disease Diagnostic Laboratory, Plum Island, NY. USDA, APHIS, Veterinary Services, Orient Point, NY

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

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

**Update: National Animal Health Laboratory Network**

Sarah Tomlinson, National Animal Health Laboratory Network Coordinator, USDA, APHIS, Veterinary Services, Fort Collins, Colorado

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

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

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

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

Finally, the NAHLN Methods Technical Working Group continued to finalize assay development and validation processes, as well as review proposed studies and assay dossiers. The group met in April to discuss technical approaches to emerging diseases and review a proposal for multiplex assay development. Dossiers for RT-PCR for FMD virus in bulk tank milk and an FMD penside antigen assay were presented and reviewed. Other upcoming dossiers for review include the RT-PCRs for Lumpy Skin Disease and Contagious Bovine Pleuropneumonia, and two FMD serological negative cohorts.

#### **Update: Foreign Animal Disease Diagnostic Laboratory**

Dr. Fernando Torres, Director Foreign Animal Disease Diagnostic Laboratory, Plum Island, NY. USDA, APHIS, Veterinary Services, Orient Point, NY

The Foreign Animal Disease Diagnostic Laboratory (FADDL) is one of the National Veterinary Services Laboratories (NVSL), where many foreign animal disease (FAD) agents are diagnosed and studied. The FADDL is composed of 2 sections, Diagnostic Services (DSS) and the Reagents and Vaccine Services (RVSS). The DSS is an OIE Reference Laboratory with the capacity to diagnose more than 30 exotic and endemic animal diseases. During FY14 the FADDL received 180 submissions associated to Foreign Animal Disease (FAD) investigations. Epizootic Hemorrhagic Disease (EHD) and Bovine Papular Stomatitis (BPS) were frequently diagnosed in these cases. During this year the DSS conducted over 7,000 CSF serologic tests as part of the CSF surveillance program. The RVSS is responsible for the production and quality testing of novel and routine diagnostic reagents, including the proficiency testing program for the NAHLN. During FY14 RVSS produced and shipped PCR proficiency panels for FMDV, CSFV, and ASF to 43 NAHLN laboratories. In addition, 13 laboratories received serology panels for FMD. The FADDL is the custodian of the North American Foot-and-Mouth Disease Vaccine Bank (NAFMDVB), a trilateral agreement between the USA, Mexico and Canada. The Bank stores concentrated FMD antigen that can be formulated into vaccines if an FMD introduction occurs. During FY14, the NAFMDVB conducted safety and potency testing of 3 new antigens and improved and standardized SOPs for antigen quality testing and assurance. Training is an integral part of FADDL's mission and this is accomplished to a great extent in synergy with the Professional Development Staff. During FY14 125 new Foreign Animal Disease Diagnosticians were trained at FADDL; 108 State and Federal VMOs received continuing education credits through FAD refresher courses conducted in California, New York, and New Mexico.

#### **Foreign Animal Disease Research Updates From USDA ARS Plum Island Luis L. Rodriguez DVM, PhD. Research Leader**

During the past year the Foreign Animal Disease Research Unit at PIADC has continued to focus research efforts on foreign animal diseases; foot-and-mouth disease (FMD), classical swine fever (CSF) and African swine fever (ASF). Also research continued on emergence of vesicular stomatitis (VS) in the US. FMD research focused on countermeasure discovery (vaccines, biotherapeutics), virus host

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

**UPDATE: CENTER of EXCELLENCE FOR EMERGING AND ZOO NOTIC ANIMAL DISEASES (CEEZAD)**

**Steven Ellsworth, Center of Excellence for Emerging and Zoonotic Animal Diseases, Kansas State University**

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

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

**UPDATE: Institute for Infectious Animal Diseases (IIAD)**

**Melissa Berquist, Institute for Infectious Animal Diseases, Texas A&M Agrilife Research**

The Institute for Infectious Animal Diseases (IIAD) was awarded as a Department of Homeland Security Science and Technology Center of Excellence in 2004, with Texas A&M University as the lead institution and renewed as a co-lead with Kansas State University's Center of Excellence for Emerging Zoonotic and

Animal Diseases (CEEZAD) in 2010. The mission of IIAD is to conduct research and education to protect the nation's agriculture and public health sectors against high consequence transboundary, emerging, and/or zoonotic diseases. To accomplish this mission, IIAD leverages leading experts, researchers, and resources within major universities, minority serving institutions (MSIs), national laboratories, federal agencies, international organizations, industry, and other Centers of Excellence (COEs). IIAD's multidisciplinary teams address complex problems and challenges and are capable of rapidly addressing emerging issues and current gaps in the nation's ability to protect our agricultural and public health sectors.

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

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

### **SECD: Reporting on a Transboundary Disease from a State's Perspective**

Beth S. Thompson, JD, DVM, Assistant Director, Minnesota Board of Animal Health

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

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

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

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

### **Veterinary Services Emerging Disease Framework and National List of Reportable Animal Diseases (NLRAD)**

Dr. Beth Lautner, Associate Deputy Administrator, USDA, APHIS, VS, Science, Technology, and Analysis Services

Dr. T.J. Myers, Associate Deputy Administrator, USDA APHIS, VS, Surveillance, Preparedness, and Response Services

APHIS Veterinary Services has developed two documents for which it is seeking stakeholder input: a concept paper for a United States National List of Reportable Animal Diseases (NLRAD) and a proposed

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

### **Response Planning & Management of Producer Data in the U.S. Pork Industry for Emerging Swine Production Diseases**

Dr. Patrick Webb

Director, Swine Health Programs, National Pork Board

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

### **Emerging Swine Disease Matrix**

Dr. Harry Snelson, Director of Communications, American Association of Swine Veterinarians

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

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

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

### **Development of the Animal Agriculture Emergency Response Education and Training Framework, Animal Emergency FRAME**

Dr. Jimmy Tickel, North Carolina Emergency Management

An update on the National Center for Food Protection and Defense's Animal Agriculture Emergency Response Education and Training Framework, Animal Emergency FRAME

## **USDA's support for FMD eradication in Latin America: History, Current Status, and Future Challenges**

Historic US Support to Control & Eradicate FMD in Latin America, Dr. Conrad Estrada, USDA APHIS International Services

FMD in Latin America: A Status Report and Next Steps, Dr. Cesar Orozco, USDA APHIS, USDA APHIS International Services

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

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

During the 1990s, APHIS, the Colombian Agricultural Institute (ICA), and the Colombian Federation of Cattle Raisers (FEDEGAN) revolutionized the relationship between the public and private sector in the fight against FMD in Latin America achieving the first free zone without vaccination in the department of Chocó in Colombia. This cooperative relationship at that time allowed Colombia to remarkably reduce the number of FMD foci of 500 per year to less than 10.

In 2000, APHIS and Bolivia initiated the eradication program in the departments of Beni and Pando. The USDA's economic investment was 3 million USD, coming from the PL480 Program. After 3 years of intensive vaccination and surveillance, no cases have been reported in that region since 2003.

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

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

### **Rift Valley Fever Research at the Arthropod-Borne Animal Disease Research Unit**

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

#### **Swine Enteric Coronavirus Diseases International Meeting (SECD International Meeting)**

Dr. Randall L. Levings, Scientific Advisor, Science, Technology, and Analysis Services (STAS), Veterinary Services (VS), APHIS, USDA

Dr. Levings provided a summary of the SECD International Meeting held September 23-25<sup>th</sup> in Chicago, Illinois.

#### **FMD Epidemiology: Results from a Modeling study of a Minnesota FMD Outbreak**

Susan Gale and Gay Miller

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

#### **FMD Vaccination: Results from a Modeling study of a MN FMD Outbreak**

Gay Miller and Susan Gale

The objective of this study was to evaluate emergency vaccination control strategies. The North American Animal Disease Spread Model (NAADSM Version 3.2.18) was used to simulate an FMD outbreak in MN. Large scale (1500 herds per day) emergency vaccination diminished the size of the modeled FMD outbreak in MN for both production type scenarios. The parameter estimates provided by MN experts knowledgeable about MN herds and FMD found that aspects of the way MN dairies are managed make these herds more likely to spread FMD than swine herds. As a consequence, the model results found that outbreaks beginning in large swine herds were associated with smaller outbreaks.

Herds vaccinated per day, vaccination delivery delays, and time to develop immunity were components of the modeled outbreak. Only herds vaccinated per day influenced size and duration of an outbreak.

### **INFLUENZA VACCINATION AND FMD PREPAREDNESS: WHAT IS THE LINK?**

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

### **USDA, APHIS, VETERINARY SERVICES EMERGENCY PREPAREDNESS AND RESPONSE TRAINING/EXERCISE STRATEGY AND PLAN**

Liz Clark and Paula Cowen, Professional Development Staff, USDA, APHIS, VS

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

### **Committee Business:**

The FED committee considered and passed one resolution on the Need for APHIS Risk Assessment and Rulemaking prior to Allowing Imports from Countries with African Swine Fever.