REPORT OF THE COMMITTEE ON INFECTIOUS DISEASES OF HORSES

Chair: Andy Schwartz, TX
Vice Chair: Katherine Flynn, CA

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The Committee met on October 20, 2014 at the Sheraton Hotel in Kansas City, Missouri, from 1:00-6:00pm. There were 45 committee members and 28 guests present. The meeting was chaired by Dr. Andy Schwartz and vice chair Dr. Katie Flynn. The mission statement was reviewed and the Committee determined changes were not necessary. Responses to the 2013 resolutions were discussed.

Time-Specific Papers:

Dr. Don Knowles, USDA-ARS- Animal Disease Research Unit, Washington State University, presented a time-specific paper titled " Merging pathogen surveillance and research; stealth persistence of an Ema superfamily variant of Theileria equi." Additionally, Dr. Peter Timoney, Gluck Equine Research Center, University of Kentucky, presented a time-specific paper titled" How significant a threat is Surra as a disease in horses?" The papers, in their entirety, are included at the end of this report.

Presentations & Reports

Contagious Equine Metritis PCR Technology,
Juanita Grouse, National Veterinary Services Laboratory

The NVSL currently utilizes a real-time PCR for confirmation of Contagious Equine Metritis (CEM) suspect isolates. A recent evaluation of the PCR with CEM positive semen samples indicates the PCR is insufficiently sensitive compared to culture for use in diagnostic samples. The NVSL is currently at early stages of work on a new PCR for CEM including evaluation of extraction methods. In addition, the NVSL is actively acquiring and banking samples for later validation testing of either a new PCR or any other published or commercial PCRs that may have sensitivity that can approach that of culture and test breeding. Other laboratories and companies are also in various stages of test development and validation. The scarcity of positive samples from naturally infected horses with differing strains of *Taylorella* is a significant barrier to validating a PCR for testing of clinical samples. The time frame of this development and validation is likely to be several years.

Equine Piroplasmosis Strain Typing
Juanita Grouse, National Veterinary Services Laboratory

Drawing on previous experience in next-gen sequencing of other organisms, NVSL opted to use this approach to genotype *Theileria equi*. NVSL has successfully sequenced a cell culture derived isolate, and on the basis of that developed some "benchmarks" for sample preparation to optimize cost and efficiency of whole genome sequencing. Several challenges must be overcome, namely, concentrating *T. equi* organisms and/or depleting horse DNA in order to get sufficient target genetic material without

overwhelming the system with host DNA. NVSL has archived approximately 600 blood samples previously positive by nested PCR to be sequenced in order to build a database. Diversity in sequences will be compared to epidemiological data and other published studies.

EHV-1 Biosecurity at Rodeos: Lessons Learned
Carl Heckendorf, Colorado Department of Agriculture

During the spring of 2014 a number of horses involved with barrel racing events developed EHV-1 and EHM. Minnesota and Wisconsin were the first states to report these cases. Iowa and Kansas also reported cases that were related to barrel racing events. A number of barrel horses died or were euthanized.

At the same time many high school and junior rodeo contestants were competing in rodeos throughout the country to qualify for their National Finals. Colorado had two horses that were involved with these events develop EHM. One horse was euthanized and the other recovered. Colorado was scheduled to have the State High School Rodeo Finals eight days after the first EHM horse was euthanized.

The Board of Directors of the Colorado High School Rodeo Association voted to proceed with the Finals Rodeo. An EHV-1 Business Continuity Plan and the Biosecurity Tool Kit from Colorado and California respectively were implemented. The procedure for the rodeo horses was as follows:

- Communication prior to the event
    - All entries were electronic with contact information and emails
    - BID temps on horses one week prior to the rodeo were logged
    - Vet check in at rodeo (Local veterinarian and the rodeo veterinarian were heavily involved)
        - 2 day health certificate
        - Temps taken at the gate
        - Horse health declaration checked as well as contact information while at the rodeo
        - Temp log inspected
    - NO DOGS
    - Alternate Stalls and Trailer parks
    - Contestant instructions on biosecurity
    - BID temp and log with monitoring while at the event
    - Temp daily for one week following the event

The result of the rodeo was that there were no sick horses on arrival, at the rodeo, or one week after the rodeo. While we cannot say that we prevented any EHV-1 cases, we can say that we helped decrease the panic and hysteria with planning and education.

National EIA Situation Report
Angela Pelzel- McCluskey, USDA- APHIS- VS

In CY 2013 there were 38 EIA positives reported on 23 premises in 9 states. Of interest in 2013 was a fairly large number (12) of positives on one premises in Nebraska. The recent CY 2014 cluster of cases associated with iatrogenic transmission in unsanctioned race horses in CA is noted.

Current federal authority is limited to restricting movement of EIA reactors and providing laboratory approval to conduct EIA testing. There is a guidance document (2007 UM&R) outlining control measures and a document (VS memo 555.7) providing for approval of EIA research facilities and another (VS memo 555.16) provides for approval of EIA laboratories and their requirements. This last memo is currently under revision and the following changes are being considered: the removal of references to “economic need” as a basis for approval, inclusion of a requirement for all positives samples to be forwarded to NVSL for confirmation, definition of and requirement to use official forms, increased emphasis on reporting requirements and summary data submission, and clarification of inspection procedures and revision of the inspection checklist.

APHIS has solicited and received feedback from States, Tribes, industry, and other stakeholders on the proposed rule’s concepts since 2011. At the June 2014 American Horse Council meeting and on a

subsequent National Assembly call, APHIS indicated it was reconsidering publishing the proposed EIA rule and wished to explore non-regulatory solutions to address States' needs. Since then, many State animal health officials have called for publication of the rule. The Stakeholders attending the September 2014 Equine Sector meeting had a robust discussion about the proposed EIA rule; there was general support to convene a working group or task force to discuss the goals of the EIA program and the proposed regulation and identify regulatory and non-regulatory options to achieve these goals. VS committed to receive additional input and feedback from stakeholders at this USAHA meeting and to convene the proposed working group.

Quarter Horse Racing EIA/EP Investigation Lessons Learned

Dr. Katie Flynn and Dr. Andy Schwartz
California Department of Food and Agriculture Animal Health Branch and Texas Animal Health Commission

The Animal Health Branch of the California Department of Food and Agriculture and the Texas Animal Health Commission continue to investigate Equine Infectious Anemia and Equine Piroplasmosis in the Quarter Horse Racing Population. In California since 2012, a total of thirty four (34) horses have been confirmed positive for EIA and twenty (20) horses have been confirmed positive for *Theilera equi* the causative agent of EP. A total of 10 horses were dually infected with EIA and EP.

The California investigation has involved a total of 24 premises and 353 exposed horses. The average age of infected positive horses was 4.6 years of age. Although difficult to verify, there is evidence suggesting some of the horses participated in unsanctioned racing. Cultural practices indicate that young horses run in unsanctioned races prior to racing at sanctioned tracks. Participation in sanctioned racing is documented for fourteen (14) of the positive horses. Sanctioned racing varies from graded stakes to claiming races to fair racing circuit. A review of the racing performance records via Equibase.com indicated a potential decrease in performance in recent starts for some of the positive horses. However, reduced performance may be due to many other factors. Racing history cannot be verified for six (6) horses due to challenges in verification of horse identity as a result of change of ownership and difficulty reading lip tattoos. Epidemiologic investigations indicate the majority of the positive had potential exposure to high risk practices such as sharing of needles and other medical equipment or the use of contaminated blood products. Additionally, field investigators identified a potential source of disease agent transmission as the common practice of inserting a contaminated needle into a multi dose vial (ie vitamins).

Texas has required a negative EIA test at change of ownership and for attendance at any equine event (including racetracks) since 1997, and a requirement for a negative T. equi test to enter a racing facility since 2011. In the period of 2012 – 2014, inclusive, we've found 18 racing QH's positive for EP, and 12 positive for EIA. Three were dual infections. Of the 18 positive for EP, treatment with imidocarb and subsequent negative retests allowed the quarantine release of 8 horses. A TAHC rule currently out for public comment would require a negative EP test at all horse racing events, not limited to facilities licensed by the Texas Racing Commission.

Challenges noted during the California and Texas Racing Quarter Horse investigations include animal identification, limited owner documentation, lack of records for fair racing circuit, illegal movements, language barriers, the lack of understanding of unsanctioned racing culture, and length of quarantine. Illegible tattoos and lack of registration papers made animal identification a challenge. Language barriers and hesitation to talk to government officials hindered animal identification and case investigations. Without a knowledge or insight into the illegal unsanctioned (bush track) racing culture, the movement of these horses and the biosecurity practices are unknown. For cases where tattoos were available, the AQHA Registry verifies tattoo and provides the registered name of horse. An Equibase.com search by official name provides the owner/trainer information and racing performance records which can be utilized to determine exposure links via trainers or premises. Shipping logs of horses entering and exiting sanctioned tracks provided by track officials assisted in tracing exposed horses. However, the California fair racing circuit had limited records for assistance and the majority of the positive horses raced on the fair circuit. Interstate movement records in California; specifically border crossing reports, assist in identifying racing quarter horses entering without required EIA tests. The unsanctioned racing population

has links to racing in Mexico and there is a likelihood that horses are moving across the Mexican border illegally. Quarantine of exposed racing quarter horses until the retest is difficult as owners and trainers rely on horse's racing to make a living.

Equine Infectious Anemia Discussion
Sara Ahola, Colorado Department of Agriculture

After providing an update of the Equine Infectious Anemia Subcommittee activities, Dr. Ahola led a discussion on EIA. Dr. Kent Fowler, summarized the EIA discussions at the September 18, 2014 Equine Industry APHIS stakeholder meeting. Key points discussed included current EIA positives in racing Quarter Horses, deficiencies in the current program and the desire for federal publication of an EIA rule for comments. Dr. Fowler mentioned that during the stakeholder meeting, the American Horse Council and American Association of Equine Practitioners agreed to review their respective 2012 position statements opposing publication of an EIA rule. Mr. R.J Layher from the American Horse Council provided an update on the AHC activities since the Stakeholder Meeting regarding the EIA rule. Mr. Layher stated that the AHC's Health and Regulatory Committee recently met to discuss the topic of EIA rule and the current position of AHC is " AHC is not opposed to USDA publishing an EIA rule." Dr. Ahola mentioned the proposed resolution of an EIA workgroup to discuss EIA disease control.

Equine Disease Communication Center Update,
Wendy Vaala, American Association of Equine Practitioners Board

This update gives the current status of the National Equine Health Plan and Equine Disease Communication Center task force. We have made progress toward making the EDCC a reality.

Linda Mittel and Peter Timoney are working on setting up the disease information page. This will likely require creating updated information for each of the listed diseases. They will need assistance of the task force to get this completed.

The draft of the communication protocol has been sent to the USEF. Once operational the EDCC number will be answered by the call center. Organizing the specific responses for the call center will require some on-site meetings to agree on the information that can be released by the call center operators for various scenarios.

Josie Traub-Dargatz has arranged to try an automated phishing software to search for cases of the neurologic form of equine herpes virus infection. If this works it may be a way to track the social media for chatter about disease outbreaks.

Those state veterinarians helping formulate the communication protocol have agreed in concept and support the EDCC as a way to help get out the facts about disease outbreaks. Proposal to beta test the system with a small number of state veterinarians. This will include the call center and posting of new information on the website but without any reporting to horse organizations or the media. To initiate the other functions of the EDCC will require hiring a communication specialist once funding becomes available.
The AAEP Foundation Board has accepted:

1) Formation of an advisory committee for the EDCC committee
2) It also requests having the communication specialist hired as an AAEP employee so there is direct oversight and the position can provide assistance to AAEP for communications to members. This is an important step to have AAEP assume some ownership of EDCC operations.

Members of the EDCC task force that attended the American Horse Council meeting met with a new AHC steering committee for EDCC fund raising. Various ideas about how to raise the needed funding were discussed (the goal to set up operations is $100,000 annually for a minimum of 3 years operations). It was considered important to the have financial support from all parts of the horse industry. Possible

mechanisms to raise funds include support from the various organizations based on the number of entries in shows and events as well as sponsorship from individuals or corporations.

Update on the National Animal Health Monitoring System (NAHMS) Equine 2015 Study
Josie Traub-Dargatz DVM, MS, DACVIM

In July 2015, the U.S. Department of Agriculture's (USDA) National Animal Health Monitoring System (NAHMS) will launch its third national equine study. Equine 2015 will take an in-depth look at U.S. equine operations and provide the industry with new and valuable information regarding trends in the equine industry from 1998 to 2015.

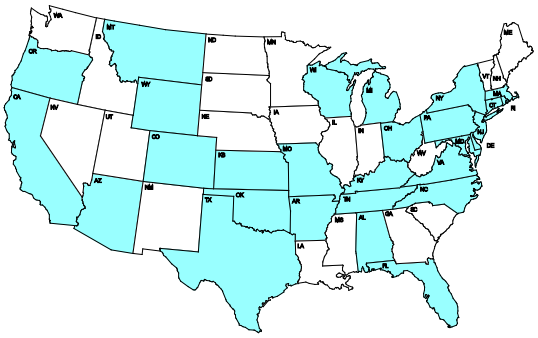
For the study, NAHMS asked equine owners, industry stakeholders, and government officials to provide input and define the information needs of the equine industry. During this process, seven study objectives were identified:

- Describe trends in equine care and health management for study years 1998, 2005, and 2015.
- Estimate the occurrence of owner-reported lameness and describe practices associated with the management of lameness.
- Describe health and management practices associated with important equine infectious diseases.
- Describe animal health related costs of equine ownership.
- Evaluate control practices for gastrointestinal parasites.
- Evaluate horses for presence of ticks and describe tick-control practices used on equine operations.
- Collect equine sera along with equine demographic information in order to create a serum bank for future studies.

In July 2015, representatives from the USDA's National Agricultural Statistics Service (NASS) will contact selected horse owners in 28 States (see map below). NASS representatives will conduct personal interviews with all participating operations that have one or more equids[1] and qualify as a farm, as defined by the 2012 Agricultural Census[2] conducted by NASS. For operations that choose to continue in the study and are eligible to do so, representatives from USDA's Veterinary Services (VMO) will visit from September through December 2015 to administer a second questionnaire, perform an on-site biosecurity assessment, collect blood and fecal samples, perform a tick exam, and collect tick specimens.

Through the fall of 2014 a working group consisting of a point of contact from each of the six USDA APHIS VS Districts and the NAHMS Equine Core team will be refining the plans for implementation of the study and data collection tools. Questionnaires and the plan for collection and testing of biologic samples should be finalized by the spring of 2015. Training of the NASS data collectors and the USDA's VMO's will be performed prior to start of data collection.

Equine 2015 Participating States



Vesicular Stomatitis 2014 Update
Angela Pelzel McCluskey, USDA- APHIS-VS

[1] Horses, ponies, donkeys, mules, and other domestic equine species.

[2] The current definition of a farm is a place that could or does actually sell $1,000 of agricultural products annually or that has five or more equids (other than commercial enterprises such as race tracks).

A summary of the ongoing 2014 vesicular stomatitis (VS) outbreak in Texas and Colorado was presented including background on the disease, statistics on the current situation, and next steps for determining future management of the disease in the U.S. in light of OIE's 2014 decision to remove the disease from the list of immediately notifiable animal diseases. To date, a total of three hundred eighty-eight (388) VSV-positive premises have been identified in two U.S. states, Colorado (326 premises) and Texas (62 premises). There have been 14 counties affected in Colorado (Adams, Arapahoe, Boulder, Broomfield, Douglas, El Paso, Fremont, Jefferson, Larimer, Logan, Morgan, Otero, Pueblo, and Weld Counties) and 13 counties affected in Texas (Bastrop, Falls, Guadalupe, Hidalgo, Jim Wells, Kinney, Lee, McLennan, Nueces, San Patricio, Travis, Val Verde, and Williamson Counties). Of the 388 total VSV-positive premises, 370 have been positive equine premises, 16 have been positive bovine premises, and 2 premises have had both cattle and horses positive. Positive premises are eligible for quarantine release 21 days after lesions have healed in all affected animals. At the time of this meeting, two hundred sixty-one (261) premises in Colorado have been released from quarantine and there are an additional forty-one (41) premises in Colorado on 21-day countdown to quarantine release. As of October 13, 2014, all confirmed VSV-positive premises in Texas have been released from quarantine. Weekly situation reports and maps from the incident are publically available on the USDA-APHIS website.

Committee Business:

Committee Business session included discussions on the USDA-APHIS- VS Equine Health Business Plan, the Concept Paper for National Reportable Animal Disease List, and the Equine Regulatory Disease Forum.

Four Resolution were brought before the committee for discussion, resolutions passed and forwarded to the Committee on Nominations and Resolutions. One Recommendation was presented and approved by the Committee:

BACKGROUND INFORMATION:

Recent equine disease events in the United States highlighted the limited knowledge of the equine industry regarding equine regulatory diseases; specifically the scientific laboratory advances and changes in understanding of disease epidemiology related to equine herpesvirus myeloencephalopathy (EHM), equine infectious anemia (EIA), equine piroplasmosis (EP), equine viral arteritis (EVA) contagious equine metritis (CEM) and other regulatory diseases. Continued education and outreach to the equine industry on equine regulatory diseases is critical to protecting the health of US equid population.

RECOMMENDATION:

The Infectious Diseases of Horses Committee requests the United States Animal Health Association (USAHA) Executive Committee host an Equine Infectious Disease Forum for equine industry stakeholders. Additionally, the IDOHC encourages USAHA to consider requesting National Institute of Animal Agriculture to co-host the meeting.

Addendums to the committee report

REPORT OF THE SUBCOMMITEE ON CONTAGIOUS EQUINE METRITIS

Rusty Ford, Chair
Kentucky Department of Agriculture

The USAHA's Infectious Diseases of Horses Committee did, on the direction of then chairman Dr. Kent Fowler, establish a subcommittee to focus on the specific topic of Contagious Equine Metritis.

BACKGROUND

Rusty Ford (KY Department of Agriculture) was asked to chair the newly created subcommittee.

1. The subcommittee was charged with defining the current status of the recommendations made to USDA following completion of the 2007 CEM Program Review, as well as facilitating development of a reliable PCR assay for detecting *Taylorella*
2. Volunteers serving on the CEM subcommittee are: Andy Schwartz TAHC, Katie Flynn CDFA, Kent Fowler CDFA, Peter Timoney – University KY-Gluck, Adam Eichelberger Clemson University, Angela Pelzel-McCluskey USDA Western Region, Linda Schlater – USDA NVSL – Bacteriology, Mike Short FL Dept Agr, Ellen Buck USDA NIES, and Terry Hensley – Texas A&M Laboratory

PROGRAMMATIC RECOMMENDATION SUMMARY

FINDINGS

The committee conducted business via email, individual conversation, and structured teleconference calls. Regarding the status of the recommendations made by the program review team:

1. USDA has adopted the vast majority of the recommendations made.
2. The Laboratory and Diagnostic recommendations have been adopted and fully implemented by NVSL via mandatory laboratory training and proficiency testing.
3. Programmatic recommendations were adopted by incorporating the recommendation into the CEM Guidance Document that each approved state agrees to abide by when seeking USDA's approval, or through amendment in the applicable Code of Federal Regulations. Implementation of the programmatic recommendations is generally the responsibility of the approved state and more specifically the individual (regulatory official) identified as the program manager. There is concern that a means or system of determining, measuring and validating accountability that the program is managed and operates in full accordance with the guidelines isn't functional today.
4. USDA has initiated a reporting system whereby states provide specific information to USDA's NIES staff quarterly; the data provided is relative to the importation, quarantine, and testing of each mare/stallion completing CEM Quarantine during the preceding quarter.
5. The USDA's National Veterinary Services Laboratory and the University of Kentucky's Gluck Equine Research Center do have PCR assays in different phases of developmental research and the laboratories are sharing their comments, concerns, and findings with each other.

COMMENTS

Direct and indirect results of the committee's findings give evidence that:

1. USDA does need to have a defined uniformed method of insuring each state approved to receive, quarantine, and determine the CEM disease status of equine imported from CEM Affected countries is following the defined guidelines to include receiving of the horses, identification, quarantine, sample collection, handling and submission, testing procedures and interpretation of results, post culture treatments, releasing quarantines, and a sufficient meaningful level of monitoring and supervision occurs associated with each individual activity.
2. While USDA has for over a year required approved states to submit reports (first monthly and then quarterly), the data is not made available to stakeholders in a useful or beneficial manner.
3. The committee's understanding today is that USDA has begun devoting IT resources to resolve this data management issue. It has been suggested that USDA revise the specific data being requested to include only data that will be beneficial and utilized in reporting.
4. It isn't yet clearly understood by committee members what process USDA utilizes to define or determine a country is not CEM Affected. Many committee members expressed concern that horses from CEM Affected countries might be exported to third countries and subsequently imported into the United States without being subjected to completing post arrival CEM testing. Committee members believe this may be occurring with warmblood sport horses exporting to South America from EU Member States, and then importing into U.S.
5. The Committee would like USDA to advise how a country is determined as not being affected with CEM. The subcommittee does believe consideration must be given that if a country doesn't have CEM import requirements equivalent to or exceeding our own, then equine importing into the U.S. from those countries should not be considered as originating from a Non-CEM Affected countries.

FACILITATING DEVELOPMENT/ADOPTION OF PCR

FINDINGS

1. Both the National Veterinary Services Laboratory and the University of Kentucky's Gluck Equine Research Center have teams assigned and continue their work towards developing a PCR assay for direct examination and detection of Taylorella equigenitalis and other CEM like organisms from swabs.
2. Neither the NVSL team or the Gluck team is able to give a time frame as to when development may be complete and the assays becoming routinely available through their laboratories
3. A challenge the development teams face with development of the assay is limited availability of positive specimens.
4. In addition to development of their own assays, both laboratories have and are willing to evaluate other comparable PCRs be it commercial, published or unpublished against their own developments.

COMMENTS

1. States that have operational CEM Programs can assist in this developmental research by providing swabs to the laboratories from equine found to be positive or thought to be an elevated risk of being infected.
2. USAHA's IDOHC can assist by facilitating the researching labs efforts to be able to acquire swabs from known positive horses and horses in endemic areas of the world.

2015

SUBCOMMITTEE'S FUTURE

1. The subcommittee was created, its' members assigned, and has functioned with specific goals defined.
2. Is there need, benefit or purpose for this committee to remain in place for calendar year 2015?

REPORT OF THE SUBCOMMITEE ON EQUINE PIROPLASMOSIS

Dr. Mike Short, Chair
Florida Department of Agriculture and Consumer Services

Equine Piroplasmosis (EP) continues to be a disease of concern in the United States with continued efforts in surveillance and research. EP testing of horses continues to be driven primarily by industry but some regulatory testing is occurring as well. The majority of regulatory testing is being done though disease investigations and international export with some interstate testing occurring.

According to the March 2014, National EP Situation Report, there have been more than 247,000 U.S. horses tested for EP since November 2009, with approximately 41,000 tested in 2013-2014. Since 2009 there have been 219 horses determined to be positive for EP, with 30 detected in the past 12 months, (excludes the horses detected as positive during the investigation of the 2009 Texas ranch outbreak). All but two of the positive EP horses have been in one of three high risk categories; illegally imported horses, horses legally imported prior to August 2005 using the CF test and those involved in racing, primarily Quarter Horse racing.

During the past year the EP Subcommittee held two meetings which took place via conference calls. The primary discussion points included the information above and continued areas of interest and concern below:

- Ongoing surveillance
  - There is some concern that surveillance has been slowly decreasing since 2009. The majority of EP testing is being done through race track entry requirements, export requirements or individual state entry requirements. The states that currently have some type of regulatory interstate entry requirements are Georgia, Florida, North Carolina, Michigan, Pennsylvania and Washington. Race tracks that require some form of entry testing for EP are located in California, Texas and New Mexico.

- Texas is considering implementing EP testing requirements on non-sanctioned tracks and training facilities. Many of the positive EP horses have been detected in association with these premises. Several other states indicated interest in the proposed Texas rule, with consideration of implementing similar requirements.

❖ Tick Research and Surveillance

- There is a need for more tick research, comprehensive tick surveys and development of a tick submission reporting system and central repository for historical and ongoing tick collection information. Currently, there is no central database for the compilation of tick collection information in the US. There was significant discussion on the need for consolidation of information for a more comprehensive understanding of the current range and species of ticks within the US.
- Dr. Angela James presented a recent publication concerning the *T. equi* competent vector, *Amblyomma cajennense.* While *A. cajennense* is currently documented to be established in South Texas the publication titled *Current and Potential Distribution Of the Cayenne Tick, Amblyomma cajennense, in the Continental United States,* indicates that the potential range of "highly suitable" habit for *A. cajennense* includes all or part of South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Texas, California and Arizona.

❖ Strain Typing of *Theileria equi*

- Research is ongoing at USDA, ARS, Pullman and NVSL to develop strain typing of the *T. equi* organisms to assist with understanding of the organism as well as epidemiological investigations.

❖ New strain of *T. equi* detected

- USDA, ARS, Pullman, has found a novel, Mexican strain of *T. equi*. The new strain is less virulent than the current strain detected in the US. The significance of the new strain is unknown and research is continuing.

REPORT OF THE SUBCOMMITEE ON EQUINE HERPESVIRUS -1

Dr. Katie Flynn, Chair
California Department of Food and Agriculture

Executive Summary of the EHM Incident Guidance Document
In 2014, the United States Animal Health Association, Infectious Disease of Horses Committee established an EHV-1 subcommittee to develop a guidance document based on the relevant current scientific information and field experience of the committee members related to the EHV-1 regulatory mitigation.

During Equine Herpesvirus Myeloencephalopathy (EHM) incidents, the State Animal Health Official's goal is to prevent the spread of the disease agent, specifically Equine Herpesvirus- 1 (EHV-1). Science-based disease control protocols, adapted to the specific incident, ensure compliance and minimize the impact on equine movement while controlling disease spread. In 2014, the EHV-1 Subcommittee began development of the EHM Incident Guidance Document for State Animal Health Officials (SAHO). A conclusion of the subcommittee was that there is no single protocol that can be applied to all EHM incidents as there are multiple factors that must be considered when determining the optimal disease containment response.

The intent of the consensus document is to provide SAHOs, with the science based control options to be considered during an EHM incident. To date, four sections related to definitions, testing guidance, quarantine placement and quarantine release have been completed. The subcommittee plans to complete four additional sections, including the use of EHV-1 vaccination, biosecurity, reporting of

investigation findings and use of communication during and after at EHV-1 incident. The intent is to modify the guidance document; as the remaining 4 sections are completed and/or as new scientific research is available.

The EHV-1 Subcommittee focused on latest field experience and scientific data to develop the most appropriate guidance to reduce disease agent spread while allowing for as much business continuity as can safely be in place. Summary of topics addressed in the Guidance Document:

1. Diagnostic Testing: Due to advances in diagnostic technologies PCR has become the diagnostic test of choice due to its high analytical sensitivity and specificity as well as rapid test result availability. To optimally assess the state of infection in the horse, a Realtime PCR or a Nested PCR tests is recommended on both nasal swabs and uncoagulated blood samples. Differentiation of the neuropathogenic (G2254) from non-neuropathogenic (A2254) strains based on DNA polymerase gene testing may be beneficial tool for planning for outbreak response and the application of appropriate biosecurity measures. The optimal window for nasal swab sampling is at onset of clinical signs e.g. onset of fever and/or neurologic signs. Since EHV-1 is considered to be endemic within the horse population, random testing of normal horses for EHV-1 by PCR assay can and likely will detect horses positive for EHV-1 and may represent transient presence of virus; or viral levels that are not sufficient to pose a significant risk of transmission of infection. In general, testing of non-clinical horses is not recommended during an investigation of an EHM Incident. However, if testing of non-clinical horses is being considered then the response to the test results should be considered before initiating the testing. Non-clinical EHV-1 infected horses based on nasal swab and/or buffy coat testing, currently represent a non-quantifiable but potential risk of transmitting virus to horses to which they are exposed. This is arguably more important if the viral DNA detected is of the neuropathogenic (G2254) genotype. Ultimately, the decision to test a population of horses should be based on evaluation of exposure risk, type and severity of clinical disease present, number of animals with disease and assessment of biosecurity measures in place.

2. Quarantine Placement: Science based criteria for quarantine protocols adapted to the specific EHM incident ensure compliance and minimize the impact on equine movement while controlling disease spread. No single quarantine protocol can be applied to all EHM incidents as there are multiple factors that must be considered for optimal disease containment response. A risk assessment is critical to identify current disease transmission risk factors on the property. Assessment of risks associated with the index case includes the index EHM case's amount of viral shedding and its ability to potentially expose other horses. An exposed horse is one which had direct or indirect contact with an EHM case within the previous 14 days. Highest risk among exposed horses are those with or recent history of direct nose to nose contact and moderate risk are those horses stabled within 30 feet of clinical case or shared transportation but with no nose to nose contact, or shared equipment or personnel with index EHM case. Disease transmission, as evidenced by newly identified clinical cases would warrant modification of the quarantine-site biosecurity protocols. Additionally, if spread occurs beyond index premises, then the quarantine should be extended to further sites.

3. Quarantine Release: Before implementing a quarantine, the criteria for quarantine release should be established using science- based criteria. There is no single quarantine release protocol that is applicable to all EHM incidents since there are multiple factors that must be considered when striving for optimal disease containment. Clinically affected horses should be assumed to be contagious, particularly via the respiratory route, for at least 14 days after resolution of fever or after the onset date of neurologic signs. Minimal monitoring or quarantine of exposed horses should be for a minimum of 14 days after removal and isolation of the EHM horse. If the EHM case cannot be isolated then further criteria need to be assessed when considering quarantine release. Quarantines can be amended to release subpopulations of animals earlier if epidemiologic investigation, biosecurity assessment and or diagnostic testing indicate the risk is minimal from the release of a horse or group of horses. Release of quarantine shall be based on limited potential for spread of the disease agent. Quarantine release is recommended, if adequate biosecurity and monitoring has been maintained and if no new clinical cases (EHM or

EHV-1 cases) are identified in the 21 days from the date of removal of EHM case or the 21 days from the resolution of the last febrile case or the 21 days from the onset of the last neurologic signs in a horse on the premises. Monitoring of the exposed population for any clinical signs compatible with EHV-1 infection includes twice daily temperature monitoring and direct observation for compatible clinical signs. Note, a 14 day quarantine release for exposed horses may be considered when there is immediate removal of the index EHM case and there is evidence of limited potential for disease agent spread due to adequate biosecurity and monitoring of horses. Testing of clinical horses for release of quarantine may shorten the quarantine period. A confirmed EHM case or EHV-1 case with two subsequent PCR negative nasal swab and/or buffy coat samples obtained 7 days apart is considered to pose a minimal disease transmission risk, thus quarantine release is recommended.

4. Appendix: To date, the appendix section contains risk assessment tools for SAHOs to utilize during an EHM incident to assess exposed horses, premises biosecurity, and quarantine placement and release parameters.

The subcommittee reviewed current guidance documents for EHV-1 including the 2009 ACVIM EHV consensus statement and the American Association of Equine Practitioners EHV-1 Infection Control Guidelines (Revised in March 2013). The subcommittee's drafted document is relatively consistent with both of the aforementioned documents. The most notable variation is in the number of days for quarantine release without testing. The AAEP's recommendation is 28 days from the last clinical case and ACVIM references the AAEP guidance. However, the latest opinion of experts queried by subcommittee is the referenced 21 day time frame is most appropriate. Other minor variations include fever cutoff temperature (101 vs 101.5) and the requirement of testing of both nasal swab and whole uncoagulated blood samples.

In 2015, the EHV-1 Subcommittee will complete the remaining 4 sections of guidance document (use of EHV-1 vaccination, biosecurity, reporting of investigation findings and use of communication during and after at EHV-1 incident).

A special thanks to the hardworking EHV-1 Subcommittee members namely, Sara Ahola- Colorado Dept of Ag, Rory Carolan – USDA:APHIS:VS:SPRS, Ann Dwyer- American Association of Equine Practitioners, Katie Flynn- California Dept of Ag, Rusty Ford- Kentucky Dept of Ag, Kent Fowler- California Dept of Ag, Carl Heckendorf- Colorado Dept of Ag, Mike Herrin- Oklahoma Dept of Ag, RJ Layher- American Horse Council, Eileen Ostlund-USDA:APHIS:VS: NVSL, Angela Pelzel-McCluskey- USDA:APHIS:VS:SPRS, Keith Roehr- Colorado Dept of Ag, Mike Short- Florida Dept of Ag, Andy Schwartz- Texas Animal Health Commission, Peter Timoney- Gluck Equine Research Center, and Josie Traub- Dargatz USDA APHIS VS CEAH and Colorado State University.

REPORT OF THE SUBCOMMITEE ON EQUINE INFECTIOUS ANEMIA

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This past year the committee worked primarily on encouraging USDA to publish a proposed rule on EIA as requested in previous USAHA IDOHC resolutions. In July of 2014, USDA signaled that it was putting the publication of the proposed rule on hold and seeking non-regulatory solutions to such issues as EIA. As a result, the EIA subcommittee will bring forth a resolution to the IDOHC this year to create an EIA working group to address such issues as lack of standardization in laboratory oversight, testing of new populations previously untested, lack of regulation in interstate movement with regards to testing, and lack of oversight in sample submission. The working group would be comprised of state animal health officials, academia (EIA subject matter experts), national and private laboratory representatives, and industry stakeholders and be convened by USDA-APHIS-VS.

Current federal EIA regulations are limited to interstate movement of an EIA test-reactor and approval, denial, and withdrawal of EIA laboratories and diagnostic or research facilities. The USDA provides guidance to the States in a Uniform Methods and Rules (UMR) document. However, the UMR has no regulatory authority and as such are merely recommendations. Therefore the major regulatory actions to control EIA are carried out by the States. States' rules, while encompassing a much broader scope of EIA concerns, vary considerably and lack uniformity among individual State control programs.

In addition to the above issues, there is a national concern with increased EIA case incidence in racing horses, especially in the unsanctioned racing sector. While historically prevalence has been low, an increase in cases in the last few years among “bush track” horses that ultimately may travel extensively during and beyond their racing careers, should be of concern to all states and trading partners. In addition to the proposed resolution, this committee is working on an issues paper to be approved by the IDOHC and USAHA for sharing with industry partners to elucidate the current situation and garner support for the ultimate goal of a proposed rule from USDA.

TIME SPECIFIC PAPERS

Merging pathogen surveillance and research; Stealth persistence of an Ema superfamily variant of Theileria equi

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Summary:

Theileria equi is a tick-borne infection of equids. Animal reservoirs for transmission include all equid species. Similarly to *Babesia caballi*, *T. equi* infection in equids leads to fever, malaise and anemia in the acute phase and life-long persistence (1, 2). Persistence of *T. equi* in the horse provides a reservoir for tick-borne transmission and is characterized by a parasitemia of between 10^3 to 10^6 merozoites per ml of blood (3, 4). A characteristic of theileria is the lack of transovarial transmission; therefore ticks are not a generational reservoir. Although U. S. horses are considered free of theileria/babesia, recent detection of *T. equi* infections has increased efforts to assure control. Discerning how *T. equi* persists and emerges is a mandatory component of controlling infection and disease. Pathogens capable of life-long persistence in mammalian hosts are a notable challenge. Examples include arthropod-borne apicomplexan malaria, babesiosis in humans and cattle, and theileriosis in cattle and equids. Persistence and replication of causal pathogens within mammalian hosts, which in some cases include wildlife, provide opportunity for genomic evolution leading to changes in virulence, host range and detectability. In collaboration with the Animal Plant Health Inspection Service (APHIS), surveillance and research were combined and a new variant of *T. equi* was detected. Through evolutionary change this variant is undetectable by current surveillance tools. The discovery, evolutionary changes and variant characterization of this *T. equi* variant provides clues to the persistence and emergence of this globally important pathogen of equids.

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HOW SIGNIFICANT A THREAT IS SURRA AS A DISEASE IN HORSES?

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Introduction:

Surra is a non-contagious infectious disease that was first described in horses and camels in India as far back as 1880 (Evans, 1880). The causal agent has the widest geographical range of all the pathogenic trypanosome species, infecting domestic livestock and certain companion animal and mammalian wildlife species (Luckins, 1988; 1994). It is known to occur in many countries in Africa, Asia, the Middle East, as well as in certain countries in South and Central America. In general, surra tends to occur in tropical and sub-tropical areas of the world (Luckins, 1994). There is one report, however, of an outbreak involving camels in France. Since surra has never been recorded in the United States, USDA, APHIS, VS consider it a transboundary disease.

Surra is frequently not regarded as a disease of significance in countries in which it is non-endemic or in which it has never been known to occur. Contrary to this perception however, was the conclusion arrived at an OIE Regional Workshop for Asia, Far East and Oceania that was held in early 2014. Some 16 of the 20 participating countries that were surveyed considered surra the disease of greatest concern of the OIE non-listed equine diseases. Significant economic loss was attributed to this disease by countries in which the disease is endemic or has been recently introduced.

Etiology

The etiological agent of surra is *Trypanosoma evansi*, a hemoprotozoan parasite that is closely related to and possibly evolved from *T. brucei*, the cause of the tsetse fly transmitted disease of humans, “sleeping sickness” (Hoare, 1972). It has the distinction of being the first pathogenic trypanosome to be discovered (Evans, 1880). *T. evansi* is also closely related to *T. equiperdum*, the cause of dourine, a contagious venereally transmissible disease of horses.

Host Range

Surra can affect a range of species including but not necessarily exclusive of horses, donkeys, cattle, buffalo, sheep, goats, camels, llamas, dogs, cats and elephants (Sellon, 2007). The disease is seen most frequently in horses and camels, in which species it tends to occur in its most severe form.

Modes of Transmission

Surra is primarily transmitted in nature by bloodsucking insects and ticks, especially biting flies of the genera *Tabanus* and *Stomoxys* (Sellon, 2007). Transmission is also postulated to occur by vampire bats in regions/countries of the world in which these can be found. *Trypanosoma evansi* is transmitted mechanically not biologically from an infected to a naïve host through blood contamination of the mouthparts of the hematophagous insect or tick vector (Luckins, 1994). Conditions under which livestock or especially horses are congregated in close proximity to one another are conducive for transmission of the disease. The opportunities for spread of surra are significantly greater in regions or areas of the world with a hot, humid climatic environment in which the biting fly population is likely to be abundant and reservoir hosts are present (da Silva, 2014). There is the potential for surra also to be transmitted iatrogenically, through the use of blood contaminated syringes, needles, surgical instruments or via the administration of a transfusion of blood or a blood product from an infected animal. It is believed that certain wildlife species e.g. capybaras or coatis, may act as reservoir hosts of *T. evansi*.

Clinical Signs

The incubation period of surra in horses is 1-2 weeks. Large numbers of *T. evansi* are initially present in the blood but are more difficult to detect at a later stage in the infection (Luckins, 1994). It is been recognized for many years that aside from camels, horses can experience disease of greater clinical severity than other species susceptible to infection with this parasite. It is known that introducing naïve horses into surra endemic areas often results in high case-fatality rates. Similarly, epidemics of the disease can result from the introduction of *T. evansi* into a previously free region through the movement of infected animals (Luckins, 1988). Three forms or phases of infection have been described in horses, subacute, acute and chronic (Sellon, 2007; Luckins, 1994). The principal clinical signs are fever, progressive anemia, anorexia, dehydration, lethargy, wasting in bodily condition, and evidence of neurologic involvement by way of hind limb ataxia, often leading to paralysis. Although infected horses frequently develop the acute form of the disease, some affected animals will evolve into the chronic form of the infection. Such individuals have intermittent fevers and may develop urticarial lesions on the ventral abdomen, dependent limb enema, petechial hemorrhages on mucous membranes, chronic

wasting, progressive weakness and frequently, neurological signs and limb paralysis (Sellon, 2007; da Silva, 2014). High rates of abortion have been reported in some outbreaks of surra in naïve pregnant mares.

Diagnosis

Diagnosis of cases of *T. evansi* infection can be problematic since it can easily be mistaken for other causes of systemic and neurologic disease in the horse. In the early stages of surra, laboratory confirmation can be achieved by the microscopic observation of morphologically typical trypanosomes in blood or tissue fluids by means of the micro-hematocrit centrifugation test (Luckins, 1994; Sellon, 2007; Wernery *et al.*, 2001). Presently available diagnostic tests include the PCR assay, card agglutination test (CATT), latex agglutination test, antigen and antibody-ELISA, complement fixation and the mouse inoculation test (Sellon 2007; da Silva, 2014; Wernery *et al.*, 2001). The PCR testing of blood is a specific and sensitive means of diagnosis but it may not always be reliable, especially in chronic cases of infection where the parasite is only present in the tissues (da Silva, 2014).

Treatment

Consistent with other infectious agents that can infect the horse, *T. evansi* stimulates an immune response in an infected individual. However, this response while it is unable to clear the parasite, controls and maintains the parasitemia at low levels, resulting in the infection becoming chronic (da Silva, 2014). A range of trypanocidal drugs have been used to treat horses affected with surra, with variable results (Luckins, 1994). Although some treatments are successful in mitigating the clinical severity of the disease, in many cases, they had not been found to effect clearance of *T. evansi* in infected animals (da Silva, 2014). Certain drugs e.g. quinapyramine, have been used prophylactically in endemic regions but their efficacy in preventing this infection remains to be established.

Prevention and Control

No vaccine is currently available against surra. Prevention and control of this disease is very difficult in countries/regions in which there are reservoir hosts to maintain the causal parasite. Control of surra essentially depends on identification and treatment of infected horses with the best available trypanocidal drugs, attempted reduction of vector populations through the use of appropriate insecticides and through the provision of vector-proof accommodation for horses, and the practice of good hygiene in horse stables (Luckins, 1994). It remains to be seen whether the prophylactic use of certain drugs offers a safe and economically feasible means of reducing the incidence of surra in countries/regions where the disease is endemic.

Summary

Surra is an insidious disease that can be readily confused with a range of other equine diseases, infectious and non-infectious, with which it can share many clinical similarities. The disease is known to be endemic in certain countries in the Western hemisphere. Since movement of horses takes place between the US and some of those countries and vice versa, there is and will continue to be the potential risk of the introduction of surra as a result of one or more of these exchanges. Accordingly, it behooves federal and state regulatory officials, and equine veterinarians to become knowledgeable of this disease and the threat it continues to represent to the highly important US equine industry. By being “forewarned and forearmed” hopefully, we will be able to maintain this country’s freedom from surra for the foreseeable future.

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