

Report of the Committee on Infectious Diseases of Horses
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Vice Chair: Katherine Flynn, CA

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The Committee met on Monday October 26, 2015 at the Rhode Island Convention Center in Providence, Rhode Island from 1:00pm to 6:00pm. There were 36 members and 28 guests present per the sign-in sheet, and numerous other attendees who may have not signed in. Chairperson Dr. Andy Schwartz made introductions, reviewed the Committee's mission statement, and presented a brief overview of final responses to 2014 resolutions.

The Committee recognized the ongoing contributions to the mission of the IDOHC by Dr. Kent Fowler. Dr. Fowler coordinates and leads the monthly National Equine Conference Call, focusing on current issues affecting equine and the equine industry.

The Committee also recognized the extensive contributions of Vice Chair Katie Flynn, who was not able to attend the meeting this year. Dr. Flynn led the efforts of the Equine Herpesvirus-1 (EHV-1) Subcommittee, and is to be credited for spearheading much of the work related to the accomplishments and activities of the IDOHC.

The Committee heard the EHV-1 Subcommittee report, and a presentation on "Equine Herpesvirus Myeloencephalopathy (EHM) Incident Guidelines for State Animal Health Officials." This 49 page document is a product of a two-year concentrated effort by the subcommittee. Its contributors are nationally recognized experts and leaders in equine disease issues, particularly with EHM. The Committee recommends this guideline document be shared widely with State Animal Health Officials, equine industry veterinarians, equine related event organizers, and other interested parties as a resource to be utilized in preparation for and response to EHM incidents.

The Committee heard a summary of the upcoming "Equine Diseases Forum", an event to be co-hosted by USAHA and National Institute for Animal Agriculture (NIAA). This forum is scheduled for January 19-21, 2016 in Denver, Colorado. State, federal, private veterinary practitioners, and equine industry organizations and leaders are invited to attend this forum. The facilitators of the discussion will present identified challenges in addressing equine health and proposed recommendations for advances in protecting equine health.

Time-Specific Paper:

Peter J. Timoney, Maxwell H. Gluck Equine Research Center, Kentucky, presented a time-specific paper on "Epizootic Lymphangitis: Potential to Significantly Impact the Health and Well-being of Equids." The paper, in its entirety, is included at the end of this report.

Committee Business:

The Committee approved reports from the EHV-1 Subcommittee, and the Equine Piroplasmiasis Subcommittee.

The Committee approved one resolution directed to USDA-APHIS-VS. The resolution urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) to require USDA border personnel to electronically capture and record adequate official animal identification on all equids imported into, or returning to, the United States from Mexico. Adequate official animal identification, at a minimum, is the equid's name and any permanent identification present, to include Radio Frequency Identification (RFID) microchip number, and breed, sex, age, color, and all markings. Record of this information should be on all border crossing laboratory testing paperwork and be captured electronically in a searchable database accessible to animal health officials for use during a disease investigation.

Committee Reports:

REPORT OF THE SUBCOMMITTEE ON EQUINE HERPESVIRUS-1 Dr. Katie Flynn, Chair California Department of Food and Agriculture Presented by Dr. Carl Heckendorf

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) by utilizing 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). The subcommittee concludes that there is no single protocol that can be applied to every EHM incident as there are multiple factors to be taken into consideration when determining the optimal disease containment response. The intent of this guidance document is to provide SAHOs, with the science based control options to be considered during an EHM incident.

The EHV-1 Subcommittee utilized latest field experience and scientific data to develop the most appropriate guidance to reduce disease agent spread while allowing for optimizing business continuity. In 2015, the Subcommittee completed the first version of the guidance document. However, the intent is for this to be a living document. It can be updated when there are relevant advances in science and technology and/or field based experiences.

Summary of topics addressed in this 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 availability of test results. To optimally assess the status of infection in a horse, it is recommended that a realtime PCR or a nested PCR test be performed on both a nasal swab and an unclotted blood sample. Differentiation of the neuropathogenic (G2254) from non-neuropathogenic (A2254) strains of EHV-1 based on DNA polymerase gene testing may be beneficial for outbreak response planning and the application of the most appropriate biosecurity measures. The optimal time for collection of nasal swab and blood samples is at onset of clinical signs e.g. onset of fever and/or neurologic signs. Since EHV-1 is considered endemic within the horse population, testing of clinically normal horses in the general population 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

considered sufficient to pose a significant risk of transmission of infection. There is a lack of consensus among regulatory veterinarians on the appropriateness of testing non-clinical exposed horses as part of an outbreak response. However, if testing of non-clinical exposed horses is being considered, then the response to the test results should be decided 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 collect samples from exposed horses for EHV-1 testing as part of the outbreak response should be based on evaluation of level of exposure, type and severity of clinical disease present, number of horses with disease consistent with EHV-1 infection and assessment of biosecurity measures in place.

2. **Quarantine Placement:** Science based criteria for quarantine protocols, adapted to a specific EHM incident, encourage compliance and minimize the impact on equine movement while controlling disease spread. No single protocol can be applied to the need for and scope of quarantine for every EHM incident as there are multiple factors that must be considered for an optimal disease containment response. A prompt on-site risk assessment by the person responsible for the oversight of the incident is critical in identifying the disease transmission risk factors for a given incident. Assessment of risks associated with the index case includes the index EHM case's level of viral shedding and its potential to transmit infection to 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 a clinical case of EHV-1 or those that shared transportation with the clinical case of EHV-1 but with no nose-to-nose contact, or that shared equipment or personnel with index EHM case. Disease transmission, as evidenced by newly identified clinical cases would warrant modification of the quarantined operation's biosecurity protocols. Additionally, if spread occurs beyond the index premises, then the quarantine should be extended to additional sites as indicated from the epidemiologic investigation.
3. **Quarantine Release:** Before placing a quarantine on an equine operation, the criteria for quarantine release should be established using science-based criteria. There is no single quarantine release protocol that is applicable to every EHM incident since there are multiple factors that must be considered when striving for optimal disease containment. Clinically affected horses should be assumed to be contagious and thus to pose a transmission risk, particularly via the respiratory route, for at least 14 days after resolution of fever or after the onset date of neurologic signs. At a minimum there should be monitoring or quarantine of exposed horses for at least 14 days after removal and isolation of the EHM case. If the EHM case cannot be isolated then further criteria need to be considered to allow for quarantine release. The scope of the quarantine can be amended to release a subpopulation of horses earlier if the 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 a quarantine should 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 without neurologic signs) 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 horse or the 21 days from the onset of the last horse with neurologic signs on the premises. Monitoring of the exposed horse population for any clinical signs compatible with EHV-1 infection includes twice daily temperature and 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 an acceptable level of monitoring of exposed horses. Testing of clinical horses for release from

quarantine may shorten the quarantine period. A confirmed EHM case or EHV-1 case with two subsequent PCR negative nasal swab and buffy coat samples obtained 7 days apart is considered to pose a minimal disease transmission risk, thus quarantine release is recommended.

4. Investigation and Biosecurity measures: An EHM incident investigation involves identification of the five "Ws"; 1) which suspect horse, 2) what agent, 3) where is the index horse, 4) when did clinical signs first appear and 5) why did the horse succumb to the disease. Once the basic information on the index horse is obtained, the investigation objective is to identify the disease transmission risk factors applicable to a particular operation.

Once the EHM incident investigation identifies the risk factors for exposure, control measures must be implemented to 1.) Limit the extent of spread and severity of clinical disease on the premises and 2.) Limit the spread of disease to adjacent or exposed premises. General biosecurity concepts for managing EHM exposed horses and those that are quarantined include; immediate isolation of clinical cases, application of quarantine restrictions, required temperature and health monitoring of all horses on the premises, restriction of human, pet and vehicle traffic access to the exposed horse areas, limit direct horse to horse contact, limit stress to exposed horses, eliminate the practice of sharing equipment and movement of personnel between clinical horses and other horses on the operation and implementation of strict cleaning and disinfection protocols with particular attention to areas where the index EHM horse and any other clinical horse may have been in the past 14 days such as tie rails, wash racks, starting gates etc.

5. Incident Communications: Communication during an EHM incident is critical to prompt response and disease control efforts. It is recommended that State Animal Health Officials establish a communication plan for an EHM incident well in advance of the occurrence of an incident. Drafting content for webpages, alerts and printed outreach materials prior to an incident will facilitate timely dissemination of accurate and useful information during the incident. State Animal Health Officials should explore all modes of communication and utilize effective resources for communicating information. State Animal Health Officials, the American Association of Equine Practitioners and the American Horse Council have developed a plan for a National Equine Disease Communication Center to assist dissemination of factual timely information at www.equinediseasecc.org.
6. Vaccination: Currently available vaccines against EHV-1 provide some protection against the respiratory form and in the case of two vaccines, against abortion due to the virus; however, none of the licensed vaccines have been shown to protect against EHM in a field setting. It has been suggested that some EHV vaccines may assist in limiting the spread of EHV-1 in outbreak situations by limiting nasal shedding of EHV-1 and thus dissemination of virus. For this reason some experts hold the opinion that there may be an advantage to vaccinating in the face of an outbreak. If this approach is pursued, only afebrile and asymptomatic horses should be vaccinated and protection against EHM should not be an expectation. The vaccines with the greatest ability to limit nasal shedding and viremia of the EHV-1 include the vaccines licensed as an aid in the control of abortion (Pneumabort-K®; & Prodigy®). It is important to note that there is some controversy associated with the practice of vaccination during an outbreak, as a recent case control study has shown that EHM may be associated with a history of frequent or recent vaccination. For additional vaccination guidance see the American Association of Equine Practitioners EHV-1 Vaccination Guidance for Private Practitioners at <http://www.aaep.org/info/vaccination-guidelines-265>
7. Appendix: The appendix section contains risk assessment tools for SAHOs to utilize during an EHM incident to assess horses that might be exposed, premises biosecurity, and quarantine placement and release parameters. Additional resources include epidemiologic investigation

report forms for index and exposed horses. The appendix section contains five flow charts including: 1) handling an EHM Suspect Index Case, 2) recommended biosecurity measures for an EHM affected premises, 3) communications during an EHM Incident, 4) exposed horse investigation, and 5) biosecurity recommendations for an EHV-1 exposed premises.

A special thanks to the hardworking EHV-1 Subcommittee members namely, Sara Ahola-formerly of Colorado Dept of Ag now with USDA APHIS VS CEAH, 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/Cliff Williamson- 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.

Questions or concerns regarding this document can be directed to the chair or vice chair of the Infectious Diseases of Horses Committee. For committee chair or vice chair contact information visit: <http://www.usaha.org/Committees.aspx>

REPORT OF THE SUBCOMMITTEE 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 through disease investigations and international export with some interstate testing occurring.
 - During the past year, the EP Subcommittee, met via conference calls. The primary discussion points and action items included:
- Ongoing surveillance
 - The Subcommittee is concerned that EP surveillance has been slowly decreasing since 2009. The majority of EP testing is being done through racetrack entry requirements, export requirements, or individual state entry requirements. The decrease in testing is primarily the result of the loss of testing at sanctioned racetracks and interstate movement requirements. Texas and New Mexico are the only states currently requiring testing for quarter horses entering a sanctioned racetrack. The Kentucky State Veterinarian's Office will be requiring testing of racing quarter horses for the 2016 fall meet. There are five states that currently have some type of regulatory interstate entry requirements, California, Georgia, Florida, Pennsylvania and Washington.
 - Dr. Katie Flynn attended the American Quarter Horse Association (AQHA) Annual Convention in March, where she presented at the Racing Committee on the current issues concerning Equine Infectious Anemia (EIA) and EP. A primary point of discussion was the need for increased EP surveillance. The Subcommittee will continue to meet with members of the AQHA to discuss the potential for an EP testing requirement at all AQHA-sponsored racing events.
 - In January 2015, the Texas Animal Health Commission (TAHC) instituted a rule requiring EP testing at **all** racing facilities, not just those licensed by the Texas Racing Commission. The requirement states that equine entering any racetrack facility must have a negative test for *Theileria equi*, within the past 12 months.
 - The TAHC continues South Texas EP surveillance. As reported to the Subcommittee, Brooks County has tested 95% of their equine premises for EP, with 711 blood draws and zero positive results. Kennedy and Kleberg counties have completed testing with 34 positives. The next counties to be tested by the TAHC will be Cameron and Willacy counties.

- Continued EP Introduction Risk
 - USDA and state officials continue to find EP positive horses illegally moved into the United States from Mexico. Discussed during the conference call was a recent shipment of Spanish Andalusians caught moving illegally from Mexico destined to California. The shipment contained ten adults and four young horses, all testing positive for *T. equi*.
- Tick Research and Surveillance
 - There is a need for more tick research, comprehensive tick surveys, and development of a tick submission reporting system and central repository for historical and ongoing tick collection information. Currently, there is no central database for the compilation of tick collection information in the U.S. There was significant discussion on the need for consolidation of information for a more comprehensive understanding of the current range and species of ticks within the U.S. The Subcommittee anticipates that the NAHMS 2015 study, with tick collection, will be a significant contribution to the current national tick data.
- The USDA added the Complement Fixation Test (CFT) as an official test requirement for the international importation of horses
 - An import alert was issued by the USDA on February 9, 2015, which specified that the CF test was being added to the official international import testing protocol. All internationally imported horses will now be tested by both the cELISA and CFT for both *B. caballi* and *T. equi*.

Presentations to the Committee:

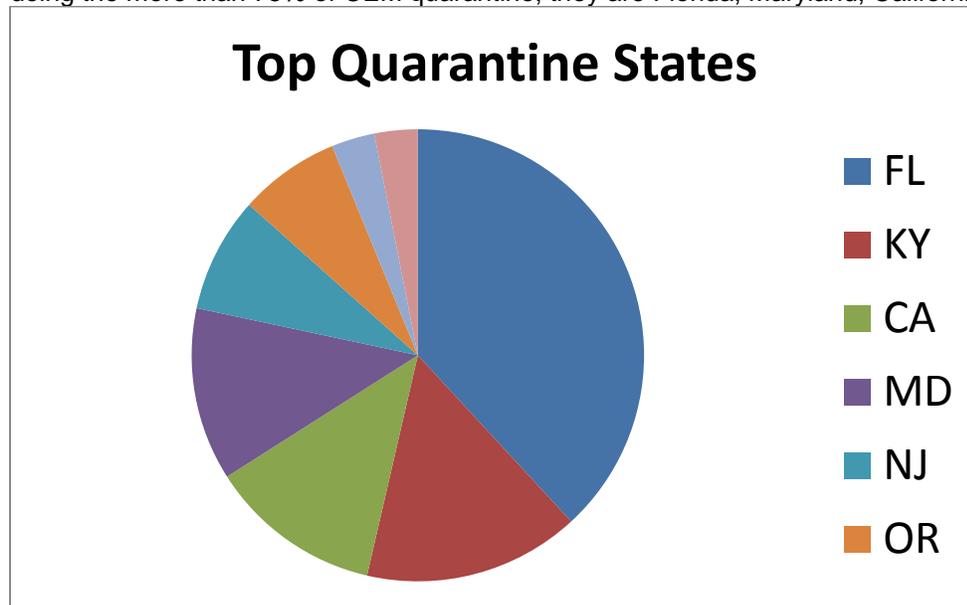
2014 and 2015 CEM Report Summary

Joyce Bowling-Heyward DVM, MS

National Director, Import-Export Animals Staff, National Import-Export Services

This is the first CEM report that has been done, based on information submitted from State CEM coordinators. Data being presented covers FY 2014 and the first three quarters of FY 2015 (Oct 2014-June 2015).

Currently there are 21 States approved to have CEM quarantine facilities. Seven of these states are inactive, and another three states receive horses sporadically (less than 10 per year). Four States are doing the more than 75% of CEM quarantine; they are Florida, Maryland, California, and Kentucky.



There are currently 39 countries considered affected with CEM. The top 10 countries exporting horses that require CEM treatment are: Germany, the Netherlands, Belgium, the United Kingdom, Ireland, France, Spain, Poland, Denmark, and Japan.

Numbers of Mares and Stallions that go to CEM quarantine

Year	Number of mares	Number of Stallions	Total
2014	1336	147	1483
2015	1035	160	1195

APHIS received a 5 part resolution in 2014 relating to CEM issues, and has been working hard to address these issues. This includes:

- Requesting input on CEM program from stakeholders through industry meetings, contact with individual State CEM coordinators, and conference calls with the IDOHC CEM subcommittee, to determine if there is need for amendments to CEM program.
- Offering a CEM training course, that was held in October 2015, with approximately 30 participants.
- Modifying the initial spreadsheet used for reporting by the CEM coordinators.
- Manually collating the CEM reports provided for 2014 and 2015 in order to gather the data for this report.
- Completion of a new database for CEM information that is currently being tested with a plan of being implemented for FY 2016 reporting.
- Plans for Animal Import Centers to improve responses from States upon receipt of a CEM horse from an AIC facility.
- Amending the current VSPS import tracking database to allow for reporting of where CEM horses are sent to CEM quarantine.

APHIS plans to offer CEM training on a more regular basis in the future as well as organizing conference calls for CEM coordinators to share information once or twice a year as needed.

USAHA 2015 Equine Infectious Anemia Discussion Group Findings

Alecia Naugle, Director Sheep, Goat, Equine and Cervid Health Center, SPRS, VS, USDA

State and Federal cooperative Equine Infectious Anemia (EIA) control efforts have existed for over 40 years. Reactors have declined in the tested population from 3.8 percent in 1972 to 0.00004 percent in 2014. State Animal Health officials regulate most aspects of EIA control. Federal authority is limited to interstate movement and disposition of reactors and approval for testing laboratories and research facilities.

APHIS VS convened the EIA Discussion Group in 2015. The group was composed of State, Federal and industry representatives. It was tasked to discuss the goals for addressing EIA in the U.S, examine current EIA strategies and regulations, identify gaps, and propose non-regulatory and regulatory options (or both) to address these gaps and to achieve the goals. The purpose of this group was to gain information or viewpoints from individual attendees. This group could not provide a collective recommendation or consensus statement since it was not an official Federal Advisory Committee.

Key observations of the discussion group included the following:

- There was considerable enthusiasm among many group members to strengthen EIA control efforts in order to capitalize on existing successes.
- Many group members believed that the goal should be eradication of EIA; however, they expressed concerns about the feasibility and ability to fully implement this goal.
- Several group members felt that the foundation of any increased EIA control or eradication effort should include Federal regulations.
- Although there is room for improvement, group members did not view current equine identification and documentation of EIA test status as barriers to EIA control.

- The group identified that reservoirs of infection exist in untested animals in the U.S. and that targeted surveillance in these populations is needed. Stray animals and illegal movement of animals or blood products from Mexico may serve as potential sources of infection.
- Several group members supported a targeted approach to both surveillance and disease control. Members proposed a State-level status or regionalization as options to target resources and EIA control activities.
- Group members accepted current EIA testing paradigms as sufficient for control of the disease.
- Group members felt that limited Federal authority, variable State regulations and inconsistent enforcement have resulted in confusion, misinformation, and opportunities for avoiding regulations or fraud.
- To be successful, any increased efforts for EIA control or eradication will need to include an education campaign that builds broad industry support. Group members viewed industry support as lacking.
- New, cooperative funding streams, from Federal, State, and industry sources, will be required to proceed with any enhanced control or eradication efforts.

APHIS VS plans to make the discussion group summary available on the VS webpage and to ask for feedback from stakeholders. Based on the observations from the discussion group and additional comments, APHIS VS will identify options and make a decision about regulatory and non-regulatory actions to support EIA control efforts in the future.

APHIS VS is in the final stages of approval for a revision to the EIA guidance document (formerly VS Memo 555.16). APHIS VS expects to issue VS Guidance Document 15201.1 by the end of CY2015 and conduct webinars for approved laboratories and State and Federal animal health officials to highlight key changes, including:

- A requirement that non-negative (positive, discrepant, suspect or equivocal) samples be confirmed at NVSL.
- A definition of and requirement to use of official EIA test forms.
- Enhanced inspection requirements and a revised inspection checklist.
- Increased emphasis on reporting requirements and submission of summary data.
- Clarifies approval requirements and remove references to economic needs for lab approval.

**New Approach to Vesicular Stomatitis and the 2015 Outbreak
2015 USAHA-Infectious Diseases of Horses Committee
Angela Pelzel-McCluskey, USDA-APHIS-VS**

A summary of the ongoing 2015 vesicular stomatitis (VS) outbreak was presented with emphasis on the new national approach to control of VS in light of OIE de-listing of the disease, which took effect January 1, 2015. The 2015 VS outbreak in the United States began April 29, 2015 and surpassed the 2014 VS outbreak in both number of affected premises and geographic scope. To date, a total of five hundred twenty-seven (527) VSV-affected premises (New Jersey serotype) have been confirmed or suspected in eight (8) U.S. states; Arizona (36 premises in 3 counties), Colorado (270 premises in 27 counties), Nebraska (21 premises in 3 counties), New Mexico (48 premises in 12 counties), South Dakota (44 premises in 5 counties), Texas (3 premises in 3 counties), Utah (24 premises in 5 counties), and Wyoming (81 premises in 9 counties). At the time of this writing, there were 104 premises remaining under quarantine in 6 states (Colorado, Nebraska, New Mexico, South Dakota, Utah, and Wyoming). Weekly situation reports and maps from the incident are publically available on the USDA-APHIS website.

The World Organization for Animal Health (OIE) removed vesicular stomatitis from the international list of reportable diseases as of January 1, 2015. VS held a national-level VSV after-action review in January 2015 to review the response to the 2014 outbreak and to examine future VSV response actions in light of OIE's delisting of the disease. Overall conclusions from the meeting included: 1) a VSV control strategy is still needed to prevent movement of infectious animals and to secure both interstate and international trade during an outbreak; 2) VSV must remain reportable to State and Federal officials to implement this control strategy; and 3) while existing regulatory response protocols in cloven-hooved species must be

maintained to rule out other diseases such as foot-and-mouth disease, response to equine cases can be appropriately modified to reduce the impact on State and Federal resources.

Based on these conclusions and other recommendations, USDA-APHIS-Veterinary Services and State Animal Health Officials employed a modified response in the 2015 outbreak. New measures included a reduction in the quarantine period based on viral shed from affected animals, activation of VSV-approved NAHLN laboratories to assist in testing of affected equine species, and flexibility to use accredited veterinarians for sample collection in equine species and management of affected premises. Feedback from affected States on the modified approach was positive, especially with regard to the reduced quarantine period and the use of accredited veterinarians, both of which significantly reduced the impact on State and Federal resources while maintaining the necessary infection control strategy.

Use of Diagnostic Laboratory Accessions as Part of Enhanced Surveillance

Carolyn Johnson DVM, USDA APHIS VS Center for Epidemiology and Animal Health

APHIS-Veterinary Services has been moving beyond traditional disease control programs and developing comprehensive, integrated surveillance systems. A comprehensive system utilizes multiple data sources, and provides information about animal health beyond the presence or absence of a specific disease. Analysts at the Center for Epidemiology and Animal Health conduct regular monitoring of several data streams, and continue to evaluate new data sources, looking for potential value in regular monitoring of existing data that may characterize the health of animal populations. A pilot project was initiated that explored the feasibility of monitoring laboratory accessions for health trends in horses in Colorado. Retrospective laboratory data was provided by Colorado State University Veterinary Diagnostic Laboratory; the data did not contain any identifiable information on the horse or horse owner. Equine tests were categorized into syndromes using expertise from the laboratory personnel and equine disease specialists, testing protocols, and literature on similar efforts. Syndrome categories that could provide a baseline when evaluated were included in the monitoring system. Experts on biosurveillance monitoring from Johns-Hopkins University Applied Physics Laboratory provided subject matter expertise on the selection of monitoring algorithms for each syndromic category. The algorithms were tested to identify the best alerting method for the syndrome. Signals in the data were explored, but it was not always possible to clarify the signal cause. Further refinement will be done as the system is run on a real-time basis, and signals can be investigated in real-time.

OIE Recommendations for High Health Status Horse Subpopulation, October, 2015

Joyce Bowling-Heyward DVM, MS
National Director, Import-Export Animal Staff, Veterinary Services

The OIE is the World Organization for Animal Health, with 178 member countries. They work with member countries to set the standard for international movement and testing of live animals. APHIS represents the United States in OIE. The OIE has been working with the International Equestrian Federation (FEI) and the International Federation of Horseracing Authorities (IFHA) to create standards for temporary movements of high health, high performance horses (HHP) to international competitions. The process involves convening groups of equine experts to work on different phases of the project to develop draft documents. These documents are then normally circulated to the OIE member countries for comment, and are then revised based on these comments.

At this time, the main diseases of concern that have been agreed upon by various ad hoc groups are African horse sickness, equine infectious anemia, equine influenza, equine piroplasmiasis, glanders, and Venezuelan equine encephalomyelitis. The protocols require participating horse to have a passport defined as a unique identification document with harmonized information, records of vaccinations and results of laboratory tests. In addition to the passport, a separate veterinary certificate may be required by the importing country. These HHP horses must be registered in an international database. Standards have been developed for routine testing and vaccination of these horses, based on the disease status of the country of origin. This information must be recorded in the passport that accompanies the horse.

The HHP horse concept is based on the maintenance of strict biosecurity control at all premises where they are kept, including the usual place of residence and venues of international competitions, as well as during transport by road and air. The establishment of an Equine Disease Free Zone (EDFZ) for an international equine event requires a plan for effective biosecurity. Guidelines for biosecurity have also been developed by OIE.

The current proposals are somewhat cumbersome, and there may not be a benefit for horses originating in zones that have already have good equine health status. It remains to be seen if there is going to be substantial international acceptance of proposals. Some of the explanatory documents are just being made available to member countries. Some concepts incorporated into the documents are not yet ready for complete implementation, such as African Horse Sickness PCR testing (test has not yet been completely validated).

APHIS will continue to provide updates as stakeholders and get feedback on proposals are they are made available.

Equine Disease Center Update Cliff Williamson, American Horse Council

The Equine Disease Communication Center (EDCC) is being created to protect horses and the horse industry from the threat of infectious diseases in North America. The communication center is designed to seek and report information about disease outbreaks similar to how the Centers for Disease Control and Prevention (CDC) alerts the human population about diseases in people.

In 2010 the USDA approached the American Horse Council to help the industry prepare an industry response to disease outbreaks. The American Horse Council working with the USDA initiated a draft of a National Equine Health Plan. Part of the plan addressed the need for communications within the industry to help in locating and preventing disease outbreaks. The plan remained a draft until April of 2011 when an outbreak of Equine Herpesvirus-1 (EHV-1), the neurologic form of the disease, occurred at a large cutting horse show in Ogden, Utah. Overall 2000 horses were potentially exposed with 90 testing positive.

Quick work by veterinarians and State Animal Health Officials (SAHO) helped to keep the disease from spreading further, but because there was no effective communication system, horses left the show grounds without any knowledge of the problem or, more troublingly, owners left the grounds out of fear for horse safety once the problem was announced on social media. As a result there were 242 exposed premises in 19 states. In California, of the 520 registered shows and events that year there were 142 canceled. During the outbreak the rumors via Facebook and Twitter caused panic and shut down horse movement and events across the nation although most were not actually threatened by the disease. It is hard to estimate the economic impact from this outbreak, but suffice it to say there was a multimillion-dollar impact from loss of horses, horse use and the shutdown of industry activity.

Following the 2011 outbreak in Utah, an American Association of Equine Practitioners (AAEP) task force was convened to work on the communication and biosecurity components of the National Equine Health Plan. The recommendations from the task force included:

- Establish an Equine Disease Communications Center (EDCC).
- Obtain industry funding for on-call personnel to staff the EDCC seven days a week.
- Create an equine disease website for posting of information collected by the EDCC.
- Collect information about equine contagious disease and biosecurity to be placed on the EDCC website.
- Create links to state and USDA-APHIS-Veterinary Services websites to improve public access.
- Develop a system at the EDCC to advise all state animal health officials and horse organizations of confirmed infectious disease outbreaks.

The AAEP Board of Directors and the Trustees of the AHC accepted these recommendations. Subsequent meetings with state and federal animal health officials and the leaders of numerous associations helped develop a plan for how the EDCC would be set up to respond to disease outbreaks as well as serve as a reliable resource about diseases, biosecurity, and disease prevention.

To this end the United States Equestrian Federation (USEF) has committed their call center to act as the hub for receiving and communicating information to the EDCC. USEF has also created and is hosting the EDCC website. Additionally, AAEP has donated an office for the EDCC communication specialist and will administrate donations and use of funds through the AAEP Foundation. Furthermore, the EDCC will have access to subject matter experts from AAEP member clinicians and scientists. These contributions are a significant commitment of time and resources and will make the EDCC functional and reliable.

State Animal Health Officials (SAHO) have acknowledged there are challenges in communicating within their state and across the country. State departments of agriculture do not ordinarily provide information to other states and although they may share information, the list of reportable diseases is not the same in all states. A disease occurrence is frequently not shared with bordering states, as there is no protocol or directive to do so. Because the horse industry relies on horse movement, lack of information sharing creates a significant risk for the spread of disease during an outbreak. Real time information about current disease outbreaks will help prevent the spread of disease and allow unaffected segments of the industry to continue to function.

In response to this need for better communication State Animal Health Officials working with the American Horse Council and the American Association of Equine Practitioners established protocols for communications with EDCC that will allow rapid release of critical information about disease outbreaks so the industry does not have to rely on the media outlets or social media to get the information.

The EDCC business plan allows for a full-time communication specialist with equine experience and a veterinarian to serve as a consultant. The veterinarians and State Animal Health Officials know how to handle the medical aspect of outbreaks, but there is currently no local or national communication system to help with dissemination of real time information needed by horse owners and event managers. Because the EDCC will have a full time communicator and support from subject matter experts from AAEP, information from the EDCC will be up-to-date and reliable.

In conjunction with reports of outbreaks, the EDCC will “phish” social media as well as national and international media looking for evidence of diseases or disease transmission and attempt to locate the source. If information about a disease outbreak is not confirmed, necessary communications will be sent to horse organizations to refute rumors that can cause panic and unnecessarily shut down horse activities.

The call center will be available to direct callers to information and to communicate questions to subject matter experts. The EDCC will communicate directly with SAHO and USDA to provide and receive information about current disease risks. Ultimately, timely and accurate information about disease outbreaks will improve horse welfare and help prevent movement restrictions or decreased horse use due to a fear of spreading infection.

EHV-1 was used earlier in my presentation as a potential outbreak, but it is only one of the infectious diseases that can adversely affect the industry. The EDCC is prepared with information about all infectious diseases including foreign diseases. Since April, the EDCC website has issued alerts on Equine Herpesvirus, Equine Infectious Anemia, Vesicular Stomatitis, Strangles, Eastern Equine Encephalitis, Equine Influenza, West Nile Virus, and Anthrax. The EDCC has posted reports of disease in 24 states in just the last 6 months.

In addition to the Disease Outbreak Alerts for which the website was created, it also has dedicated pages that provide links to disease, vaccination, and biosecurity information, including videos and relevant links. The EDCC website also includes an interactive map of the United States with contact information for State Animal Health Officials and the mission statement for APHIS with a link to their website.

and in-person efforts to make contact with the operation; and 66 operations (1.7%) were on a NASS office hold list. Data from Phase I questionnaires are currently being reviewed by NASS and will be provided to NAHMS by the end of September 2015.

A total of 908 equine operations across the 28 participating States agreed to have VS contact them about participating in Phase II of the study, which was planned to begin in August 2015; however, VS leadership was forced to postpone Phase II of the study because of VS's ongoing and anticipated resource commitment to the highly pathogenic avian influenza outbreak. A memo from the director of the USDA-APHIS-VS Center for Epidemiology and Animal Health regarding the postponement of Phase II was sent to a point of contact at the American Horse Council, the American Association of Equine Practitioners, the Coalition of State Horse Councils, and the National Assembly of State Animal Health Officials. A letter explaining the postponement of the study was mailed to all equine operations that had agreed to be contacted about Phase II.

Phase II includes a second, more in-depth questionnaire; a biologics component; and the option to have a veterinary medical officer perform an operation-level biosecurity assessment. In addition, Phase II will collect data on equine inventory, parasite management, vaccination, lameness, tick management, and the cost of equine health care. The biologics component includes testing for internal parasites, a tick examination of equids with collection of ticks for identification, collection and banking of serum samples for future research and, for a subset of operations, the collection of feces from equids to be used to culture for *Salmonella* and *E. coli*, with subsequent testing of these isolates for their susceptibility to a panel of antimicrobial drugs.

Although VS postponed most parts of Phase II of the study, the 908 operations that had agreed to participate in Phase II were offered the option to participate in the parasite-testing portion of Phase II. As of September 23, 2015, 103 equine operations had completed the operation level internal parasite management questionnaire and were shipped kits for shipping of fecal samples for parasite testing. These operations are collecting a fecal sample on up to six equine on the day of deworming and then collecting a post-deworming sample 10 to 14 days after deworming. A fecal egg-count reduction test (FECRT) is being performed to determine efficacy of the anthelmintic administered.

NAHMS currently plans to begin the remaining components of Phase II in spring 2016, contingent on the availability of adequate VS personnel to conduct Phase II of the study at that time.

Update on Enforcement of EP Test at Bush Tracks

T.R. Lansford, Assistant Executive Director for Animal Health Programs
Texas Animal Health Commission

Equine piroplasmiasis (EP) was first diagnosed in Kleberg County, Texas in October 2009, as part of the diagnostic work-up on a clinically ill horse. Since that time, based on the high level presence of competent tick vectors and common equine movement practices of equine in counties around Kleberg County, the Texas Animal Health Commission has been conducting county-wide testing of equine in an effort to disclose positive equine. Most recently, Brooks County was designated as a high risk county for equine piroplasmiasis in October 2014 and a county-wide test of all equine was conducted in late 2014/early 2015. A total of 689 equine on 218 premises were tested for both *Theileria equi* and *Babesia caballi*. The county-wide testing disclosed no positive equine.

The Texas Animal Health Commission (TAHC), through collaboration with the Texas Racing Commission, implemented required piroplasmiasis testing of all equine entering sanctioned racing facilities in 2010.

Testing between 2010 and 2014 disclosed 118 positive horses. To date in 2015, testing requirements have disclosed eight (8) positive racing Quarter Horses, many with links to racing in other States.

Epidemiological investigations of positive horses showed infected horses are almost exclusively racing Quarter Horses. In January 2015, the TAHC amended the rule requiring EP testing to include all racing facilities, regardless of status with the Texas Racing Commission. Concurrently, the TAHC held the requirement for testing Thoroughbred horses in abeyance. Since enforcement of the rule began, TAHC has cited owners of 86 horses that did not meet testing requirements.

2016 Equine Disease Forum Update

Dr. Katie Flynn, Planning Committee Chair

Presented by Dr. Carl Heckendorf

Over the last few years, animal health officials have been involved in an unprecedented number of equine disease incidents in the United States. These recent equine disease events highlighted the limited knowledge of the equine industry regarding equine regulatory diseases; specifically the scientific laboratory advances and changes in disease epidemiology related to equine herpes virus -1 (EHV-1), equine infectious anemia (EIA), equine piroplasmiasis (EP), equine viral arteritis (EVA), and contagious equine metritis (CEM). Additionally, the diversity and segmentation of the equine industry led to challenges as regulatory officials utilized traditional animal disease control methodologies. As demonstrated by the 2011 multistate EHV-1 outbreak, state animal health officials struggled with quickly controlling the disease while communicating with the segmented diverse industry. Protecting the future health of the US equid population will require implementation of new disease control technologies and enhanced communications and collaborations with all aspects of the equine industry at local, state and national levels.

To address these challenges, the United States Animal Health Association (USAHA), Infectious Disease of Horses Committee requested the USAHA in partnership with the National Institute of Animal Agriculture host an Equine Infectious Disease Forum for Equine Industry Stakeholders. In 2015, a planning committee was formed with members from the IDOHC and the Equine Committee of NIAA to move forward in the planning a 2016 Equine Disease Forum.

The intent of this forum is to bring together industry leaders to specifically discuss the equine health issues currently facing the industry. The objective of this unique forum is to provide latest updates on disease threats to equine health, to identify potential solutions for addressing current risks to equine health and to enhance equine industry communications regarding equine health issues. Through participation in this forum, State and federal animal health officials will gain unique insight into the views of the equine industry related to equine health which will ultimately enhance communications and future collaborations on equine disease control.

The proposed agenda includes an overview of the roles of federal animal health officials, state animal health officials, and private practitioners in protecting equine health; overview of the diseases of regulatory importance and diseases of industry importance; highlights of diseases of international threat; disease risks of international equine movement; role of equine traceability in protecting equine health; and the advances in equine biosecurity over the last 10 years. Upon completion of the presentations, participants will rotate through three breakout discussion sessions, specifically regulatory diseases of Equine Infectious Anemia, Equine Piroplasmiasis, and Equine Herpesvirus-1, domestic diseases of influenza, strangles and pigeon fever and biosecurity and equine movement. The facilitators of the discussions will summarize and present identified challenges in addressing equine health and proposed recommendations for advances in protecting equine health.

The forum is planned for January 19-21 at the Double Tree Hotel in Denver, Colorado. A complete report of the forum will be presented to the IDOHC at the 2016 Convention.

A special thanks to the hardworking Equine Disease Forum Subcommittee members namely, Ellen Buck –USDA: APHIS:VS: NIES, Rory Carolan – USDA:APHIS:VS:SPRS, Max Dow- Texas Animal Health Commission, Katie Flynn- California Dept of Ag, Joe Fisch- Florida Dept of Ag, Jessica Greene- NIAA, Carl Heckendorf- Colorado Dept of Ag, Don Knowles, ARS, Pullman Washington, Lucas Pantaleon— Ogena Solutions, Angela Pelzel-McCluskey- USDA:APHIS:VS:SPRS, Kenton Morgan- Zoetis; Grant Rezabek- Oklahoma Animal Disease Diagnostic Laboratory, Peter Timoney- Gluck Equine Research Center and Cliff Williamson- American Horse Council.

Review of Significant Equine Disease Events – 2015
Dr. Peter Timoney, Maxwell H. Gluck Equine Research Center
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Endemic Diseases

Equine herpesvirus 1 myeloencephalopathy:

- In early 2015, outbreaks reported in Ohio, Minnesota, Virginia, and Michigan.
Late spring/early summer further outbreaks in California, Iowa, Illinois, Maryland, Oregon, Pennsylvania, Virginia and most recently, again in Pennsylvania.
- Disease tended to be seasonal in occurrence.
- Quarter horses primary breed involved.
- Majority of outbreaks associated with non-neuropathogenic strains of EHV-1.

Influenza:

- Disease endemic in USA.
- No evidence of seasonality in occurrence.
- Outbreaks recorded on premises in Indiana, Kentucky, Massachusetts, Michigan, Ohio, Oregon, South Dakota, Tennessee, Minnesota and most recently again in Oregon.
- Virus strains belonged to equine-2 (H3N8) American lineage, clade 1 Florida sublineage.
- Practice of regular vaccination variable; varies with breed.

Strangles:

- Disease endemic in USA.
- No evidence of seasonality in occurrence.
- Number of confirmed outbreaks reported so far in 2015 ranged from 11 to 18 per quarter.
- Disease of wide geographic distribution.

Eastern Equine Encephalomyelitis:

- Disease recurs annually in the USA.
- Climate-related factors major influence on incidence of disease.
- Total of cases so far in 2015, 49 less than in recent years.
- Majority of cases in 2015 reported in Florida.
- Most cases of disease confirmed in unvaccinated horses.

West Nile Encephalitis:

- Significant reduction in number of cases diagnosed during 10 month review period.
- Interim total of 66 cases in 8 states. Highest totals Texas (22), Washington (18), Colorado (11), and Kentucky (8).
- Most cases of the disease recorded in unvaccinated horses.

Equine Infectious Anemia:

- Disease diagnosed at a low prevalence level in USA.
- Outbreaks frequently involved closed horse herds.
- Four cases in Tennessee and four in W. Kentucky.
- Prevalence of disease highest in certain southern states.

Rhodococcal Related Diseases:

- Disease endemic and geographically widespread in USA.
- Numerous outbreaks recorded.
- Most frequently encountered as pneumonic form in young foals.
- Some outbreaks also associated with joint, gastrointestinal involvement.

Corynebacterium pseudotuberculosis Infection:

- Disease endemic and becoming much more widely distributed in the USA.
- Source of increasing economic concern to US horse industry.

Epizootic Lymphangitis: Potential to Significantly Impact the Health and Well-being of Equids

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Introduction

Epizootic lymphangitis is a contagious fungal disease principally of horses and other equids, which is responsible for significant morbidity and debilitating illness in affected populations of horses, mules and to a lesser extent, donkeys (26). The disease is most frequently characterized by a cord-like appearance of affected subcutaneous lymphatics and cutaneous pyogranulomas (2). Initial descriptions of the disease trace back to the 19th century when it was reported in horses returning from military campaigns in countries in which it was present (21). The causal agent was first observed in pus from lesions in an affected horse in 1873 (24).

Epizootic lymphangitis tends to occur in tropical and subtropical regions of the world. It is a common disease in various parts of Africa, the Middle East, Russia and the Far East (2). The infection rate varies with geographic region and age of the at-risk animal population. Historically, the disease was far more widely distributed than it is today, having been introduced into many European countries in which it was subsequently eradicated through implementation of a compulsory slaughter policy (26).

The importance of epizootic lymphangitis is very considerable in countries in which it is prevalent, not only with respect to the chronic debilitating effects of the disease on the health and welfare of affected animals but also on its socio-economic impact on their owners who are entirely dependent on these animals for their livelihood and the support of their families. It is ranked as the most important infectious disease of equids in countries/regions where it is endemic (20, 25, 35).

Etiology

The causal agent of epizootic lymphangitis is a dimorphic fungus *Histoplasma capsulatum* var. *farciminosum* (5, 6). It is a variety of *H. capsulatum* var. *capsulatum* and *H. capsulatum* var. *duboisii* with which it shares various morphological and antigenic characteristics (26). *H. capsulatum* var. *farciminosum* and *H. capsulatum* var. *capsulatum* have common H and M antigens. It has been postulated that *H. capsulatum* var. *farciminosum* is a variant of *H. capsulatum* var. *capsulatum* (18).

Being a dimorphic fungus, *H. capsulatum* var. *farciminosum* has two phases, a mycelial or saprophytic form that exists in nature, and a yeast or pathogenic phase which exists in animal tissues (2). Given suitable media and conditions of incubation, both forms can be cultivated in the laboratory (6, 36). The organism is highly resistant to the effects of physical and chemical agents (12, 31). Not surprisingly, it can survive in the environment for extended periods of time, at least as long as a month in dust or dirt and up to 10 weeks in non-sterile water (12). Warm, moist conditions are believed to favor its survival (26). The most likely source of environmental contamination is pus discharging from cutaneous lesions primarily on the limbs of affected animals.

Epidemiology

Epizootic lymphangitis is a contagious disease that mainly affects horses, mules and donkeys. The host range of the disease may extend to camels, cattle and dogs (34). Rare cases of human infection have been known to occur (22). Mice, guinea pigs and rabbits can be experimentally infected with the fungus (29). Horses under six years of age are considered more susceptible to infection (22).

The primary mode of transmission of *H. capsulatum* var. *farciminosum* is by entry of the organism through skin wounds or abrasions (23, 28). The source may be the yeast form in infective discharge or the mycelial form from the environment. Indirect spread of infection can also occur through the use of contaminated fomites, e.g. water buckets, harnesses, etc (17). Experimentally, the disease can be transmitted by biting flies, e.g. *Musca* and *Stomoxys* spp that feed on open, discharging lesions (28). Ticks may also be involved in transmission. In certain endemic areas of the world, horses may be exposed through inhalation of fungal spores during dust storms; this can lead to the development of pneumonia (8). The risk of transmission of the disease is enhanced when large numbers of horses are congregated together (15).

Pathogenesis

The incubation period of epizootic lymphangitis is variable, ranging from a few weeks to as long as six months (29). Following introduction of the yeast or mycelial form through the broken or abraded skin, the organism spreads via the lymphatics to the regional lymph nodes, eventually involving the internal organs (19). Nodules and suppurating lesions develop along affected lymphatic vessels and nodes. In cases of mucosal involvement, lesions are frequently localised to the eyes and upper respiratory tract (3, 30). Nasal infection is characterised by mucopurulent discharge containing large numbers of fungal spores. *H. capsulatum* var. *farciminosum* has infrequently been associated with pneumonia and the development of granulomatous lung lesions (7, 8).

Clinical Signs

Four different forms of epizootic lymphangitis have been described: cutaneous, ocular, respiratory and inapparent carriers (3). They are not necessarily distinct entities and two or more forms of the disease can occur concurrently in the same animal (26). The cutaneous is the most commonly encountered form of epizootic lymphangitis (4, 16, 19). The initial lesion is usually an indolent chancre-like papule that develops along the course of a lymphatic vessel, eventually becoming an irregular pyogranulomatous nodule that ulcerates (26). The lesion undergoes alternate periods of discharging and partial healing before finally healing over with scar formation. This can take about two to three months. The cutaneous form of the disease can best be described as a chronic suppurative, ulcerative pyogranulomatous dermatitis and lymphangitis. The most common sites of lesions are the forelimb, neck and chest (2). In advanced cases, lesions may be distributed over the whole body. Severely affected animals become anorexic, deteriorate in condition and where there is joint involvement, lame (26). The mortality rate is considered not to exceed 10 to 15%, depending on the bodily condition of affected animals and whether they experience secondary bacterial infection (2).

The ocular form of epizootic lymphangitis is less frequently observed and very rarely becomes generalized (2, 26). Initially, infection is characterized by a watery ocular discharge that may be unilateral or bilateral and variable swelling of the eyelids. This leads to the appearance of papules and button-like growths on the conjunctivae and nictitating membranes. The infection may extend to the periorbital tissues with formation of a granulomatous reaction. The secondary complications of the ocular form of the disease include corneal ulceration, panophthalmitis and myiasis.

In the respiratory form of epizootic lymphangitis, lesions tend to be confined to the upper respiratory tract (8). They commence as papules or nodules on the nasal mucosa. As the disease progresses these ulcerate and form granulating ulcers that tend to bleed (2). Lesions are frequently found close to the external nares. They may extend to the trachea and even into the lungs (5, 7, 8). Affected animals develop a viscous mucopurulent nasal discharge and may exhibit dyspnea. Advanced cases exhibit progressive weakness, coughing and loss of bodily condition.

The fourth form of epizootic lymphangitis described by Al-Ani (1999) is the asymptomatic carrier state. These are animals that have had the disease and have recovered spontaneously or following treatment (3). They can be identified by fibrocalcified skin lesions at previous sites of infection. Such cases are reputed to react positively to the intradermal sensitivity test and in serological tests. The role of these animals in the epidemiology of the disease has not yet been confirmed (26).

Diagnosis

Diagnosis of epizootic lymphangitis is based on microscopic visualization of the yeast form of the causal agent in pus collected preferably from an unruptured lesion, followed by culture to confirm the infection (3, 27, 29). Growth of the organism is relatively slow, frequently taking four to eight weeks for development of colonies (36). There is reference to the usefulness of the fluorescent antibody test for detection of this infection, especially in cases where isolation on culture has been unsuccessful (11).

A number of serological tests have been evaluated for the diagnosis of epizootic lymphangitis (13, 14). These include the ELISA, indirect fluorescent antibody test, agar gel immunodiffusion test and the passive hemagglutination test; while some of these tests have given promising results, none have been shown to be sufficiently sensitive or specific to confirm a diagnosis of the disease (2, 32). Additionally, none of the tests are as yet commercially available (26). There is also a skin test known as the "Histofarcin Test" which provides a sensitivity of 90%, but only a specificity of 69% when evaluated under field conditions in endemic areas (33).

Differential Diagnosis

A number of infectious diseases can be confused on clinical grounds with epizootic lymphangitis, the most important of which is glanders, especially "farcy" or the skin form of the disease (2, 26). Other diseases that clinically resemble the cutaneous form of epizootic lymphangitis include ulcerative lymphangitis caused by *Corynebacterium pseudotuberculosis*, sporothricosis caused by *Sporothrix schenckii*, skin lesions caused by *H. capsulatum* var. *capsulatum*, strangles, sarcoids, fungal granulomata and cutaneous lymphosarcoma.

Treatment

Accepting that epizootic lymphangitis is a chronic disease, treatment can be an extended process and not always with a guarantee of success (26). Some cases are reputed to heal spontaneously a few weeks after development of clinical signs (22). However, recurrence of the disease has been reported in some such cases up to a year after apparent clearance of the infection (26).

Intravenous sodium iodide or oral potassium iodide have been used with considerable success in treating the disease in endemic areas (1, 26). Amphotericin B and nystatin are very effective in the treatment of cases of epizootic lymphangitis (10). Their use in endemic areas of the disease is problematic however, because of the expense involved. Surgical excision and firing of lesions has been tried with limited success (9). It should be emphasized that treatment of epizootic lymphangitis can be labor-intensive, prolonged and without a guarantee of success unless applied in the early stages of the disease (26).

Prevention and Control

The control of epizootic lymphangitis according to the World Organisation for Animal Health (OIE) is usually through elimination of infection. This can only be achieved by culling infected equids and applying strict biosecurity measures to prevent spread of the infectious agent (26). This has proven successful in countries in which the disease has been introduced and has not become widely established. In endemic countries however, culling of infected animals is frequently impractical and control is predicated on basic hygiene, wound management, infection control and treatment when available (2). The methods used to control epizootic lymphangitis in large endemic regions will depend on disease prevalence, methods of husbandry, attitude, and the economic capacity of the horse-owning community to bear the costs involved. Cleaning and disinfection will help in preventing the disease from spreading (1). Owners need to be aware of the importance of preventing indirect transmission of the infection via contaminated fomites. Immunisation has become another option for the control of epizootic lymphangitis in endemic countries (2). Killed and a live attenuated vaccine developed from the yeast form of the fungus have been tried with some success (1, 37). However, vaccinated equids that become seropositive will be a complication in any control or eradication program (1).

Summary

Epizootic lymphangitis is a contagious fungal disease principally of equids that is caused by *H. capsulatum* var. *farciminosum*. It is a chronic debilitating disease that can manifest itself in one of three clinical forms, cutaneous, ocular and respiratory. The disease is commonly characterized by a chronic, ulcerative pyogranulomatous dermatitis and lymphangitis. Epizootic lymphangitis is prevalent in certain areas/regions of the world. The disease has the potential to significantly impact the health and welfare of equids in countries in which it is endemic. It can also have a significant socio-economic effect on the owners of affected animals. Diagnosis is possible by direct visualisation of the yeast form of the fungus in pus from infected lymphatic nodules and by culture or histopathologic examination of tissues from clinically affected cases. Serological tests and a skin hypersensitivity test have been described. Various treatment modalities are available some of which are successful in treating early cases of the disease. Effective prevention and control of epizootic lymphangitis is based on culling infected equids and the application of strict biosecurity measures.

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