

REPORT OF THE COMMITTEE ON EQUINE

Chair: Dr. Katie Flynn, CA

Vice Chair: Dr. Joe Fisch, FL

The Committee met on October 28, 2019 at the Providence Rhode Island Convention Center, from 1:00- 6:00pm. There were 34 members and 28 guests present. The meeting was chaired by Dr. Katie Flynn and Vice Chair Dr. Joe Fisch. The mission statement was reviewed. Responses to the 2018 resolutions were discussed.

Time Specific Paper

Managing the risk of EHV-1 infection- A new tool and strategy to prevent EHV-1 disease outbreaks in the United States

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Despite widely used vaccination equine herpesvirus type 1 (EHV-1) continues to cause outbreaks in the United States. EHV-1 is an alphaherpesvirus and endemic in the US horse population. The virus is transmitted by nose-to-nose contact of horses or by fomites [1, 2]. EHV-1 susceptible horses develop respiratory disease upon infection. In some horses, equine herpesvirus myeloencephalopathy (EHM) is a severe outcome of EHV-1 infection and can be lethal. In addition, EHV-1 infection during pregnancy can cause abortion [1-5]. Vaccination guidelines for EHV-1 and EHV-4 have been established [6]. Vaccines have been shown to decrease severity of respiratory disease and nasal shedding, and to reduce abortions storms [7-11]. However, abortions and neurological outbreaks still occur [1,2].

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

EHV-1 Pathogenesis of EHM and abortions

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

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

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

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

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

The EHV-1 risk evaluation test: a novel diagnostic tool to evaluate the risk of EHV-1 infection and clinical disease

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

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

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

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

Individual horse level:

Protective EHV-1 biomarker and risk evaluation testing can be used on an individual horse level to provide an informed measurement of protection against EHV-1 infection. Not all horses respond equally well to vaccination. The assay is able to identify low responders to EHV vaccination. For low responder horses, an individual vaccination strategy can be developed together with the veterinarian to improve EHV-1 immunity. This protects the low responder horse when traveling, showing or racing and reduces the risk from this horse of potentially reactivating EHV-1 during period of stress and infecting other susceptible horses. In addition, horses with an appropriate or high response to vaccination can be identified and a recommendation on timing of the next vaccination can be made based on the current biomarker values. This is especially applicable for horses with high responses that are showing side effects to frequent vaccination. In agreement with the required agencies or horse organization, a protective EHV-1 biomarker value could potentially replace a vaccine requirement to avoid over-vaccination of high responder horses.

Horse population level:

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

EHV-1 vaccination recommendations:

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

Sales, show or racing event requirements:

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

EHV-1 outbreaks:

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

Outlook

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

methods. The assay is currently validated for non-pregnant horses. It is available to obtain research data on pregnant mares for the purpose of improving protection against abortion in the future.

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Equine Influenza: A Resurgent Threat to Global Equid Populations in 2018/2019
Dr. Peter Timoney,
Gluck Equine Research Center, Department of Veterinary Science,
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Introduction

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

Global distribution

While the global distribution of EIV is difficult to establish with complete certainty, it is reasonable to assume that with the exception of Australia, New Zealand and Iceland that are confirmed virus free, EIV can be found in equine populations in many countries. It is a well-established fact that equine influenza (EI) has been and continues to be endemic in many

European countries and in North America. The status of particular countries/regions of the world remains uncertain however, because of an absence of or inadequate active surveillance for the disease.

Evolution/Characterisation of EIV

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

In the late 1980s, circulating strains of H3N8 continued to diverge to form two lineages, American and Eurasian. The American lineage further diverged into Argentina, Florida, and Kentucky sublineages. Strains of the Florida sublineage were subsequently classified as either clade 1 or clade 2 viruses. Based on isolation and characterisation of H3N8 viruses from outbreaks of EI in North and South America, Europe, and China over the past several years, it has become apparent that changes in lineages and sublineages have taken place. Recent surveillance studies have failed to demonstrate evidence of circulation not only of H7N7 strains but also H3N8 strains of the Eurasian lineage.

Up to 2018, viruses detected in Ireland and the UK were characterised as clade 2 viruses, and in the USA clade 1 viruses. This changed dramatically in 2018 and 2019 however, with all isolates of H3N8 virus from outbreaks in Argentina, Chile, China, France, Germany, Ireland, the Netherlands, Nigeria, Sweden, the UK, Uruguay and the USA characterised as clade 1, Florida sublineage, American lineage. Virus strains were shown to be very similar to the majority of clade 1 viruses identified in the USA in 2017. On antigenic cartography analysis, they were closely antigenically related to the recommended clade 1 vaccine viruses represented by A/eq/South Africa/04/2003-like or A/eq/Ohio/2003-like strains of EIV.

Global Influenza Virus Activity 2018/2019

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

South America

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

Africa

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

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

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

Europe

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

North America

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

Asia

Several outbreaks of EI were reported in P.R. China with the qualification that the disease was observed to be more prevalent in donkeys.

Summary and Conclusions

2018 and the first half of 2019 were witness to a surge in EIV activity in certain regions and countries of the world. While this was evident in a number of European countries, it was felt most keenly in parts of sub-Saharan Africa, in countries with large unvaccinated donkey populations that were totally vulnerable to the life-threatening effects of the virus. Although rough estimates of the losses attributable to EI varied by country, there is no doubt that they were highly significant overall. This has resulted in considerable hardship for the innumerable individuals whose livelihood is majorly dependent on this equid species.

Coincident with the unprecedented widespread occurrence of EI in sub-Saharan Africa, many European countries also experienced a significant increase in the frequency of outbreaks of the disease. It is reasonable to assume that this surge in EI can be attributed in major part to the fact that the virus strain(s) in circulation belonged to clade 1, Florida sublineage, that though endemic in the USA, had not been associated with significant disease in Europe since 2009/10.

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

Failure to achieve a greater level of protection in horses that were vaccinated in accordance with OIE recommendations, upon exposure to strains of clade 1 virus circulating in 2019, merits further investigation. Although there is some evidence to indicate that more recent clade 1 viruses have gradually diverged genetically from the OIE recommended strains, there is no recommendation to update the strain content of current vaccines that should contain appropriate representatives of both clade 1 and clade 2 viruses.

Presentations & Reports

**Committee on Equine Past, Present and Future
Dr. Katie Flynn**

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

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

In reviewing committee activities over the past fifteen years, it is notable that there were over 133 presentations on a variety of equine topics with equine piroplasmiasis, equine infectious anemia, equine herpesvirus, contagious equine metritis, equine disease communication center, equine viral arteritis, and equine import/export issues being most prevalent. Additionally, the

committee generated more than 40 resolutions. The majority of these resolutions sought USDA action related to some aspect of equine piroplasmiasis, equine infectious anemia, contagious equine metritis and equine identification issues.

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

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

The Equine Disease Communication Center: Past, Present and Future

Nathaniel A White DVM MS DACVS, EDCC Director

Katie McDaniel BA, MA, EDCC Communication Manager

Posting alerts on the website started in April of 2015 (<http://equinediseasecc.org>). As the number of disease alerts increased, it became clear that a better system of record keeping was needed. An EDCC database was created to record the alert information and create a formatted alert and to provide disease information in reports by disease, date, state, county, and any configuration from the other data points.

Once a disease is confirmed it is posted on the website. If the disease is infectious from horse to horse, email messages are sent to the EDCC email list and the information is posted on Facebook and Twitter. During the season of vector borne diseases alerts are posted but the email may be sent as a digest at the end of the day. From September 17, 2018 through September 17, 2019 the website had 163,221 visits and of those 106274 were to the alert page. The following is an example of the alert on the website:

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

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

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

disease reports are timely.

Currently the EDCC is supported by horse organizations including sponsorship from owners, breed associations and corporations. A fund-raising plan is being developed and will be implemented by the NEHP-EDCC Advisory Committee which is made up of representatives from all segments of the industry including State Veterinarians and USDA. The committee will be asking all involved in the horse industry to help support the EDCC.

Private Practitioner Perspective on Equine Regulatory Disease Events and Biosecurity
Dr. Barbara Jones,
Private Practitioner,

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

Challenges of Biosecurity and Regulatory Disease Control at Thoroughbred Racetracks
Karen Lopez, DVM, MPH, Dipl. ACVPM
Deputy State Veterinarian, Delaware Department of Agriculture

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

Challenges:

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

Many common equine caretakers exist on the backside of the track. In the course of their daily tasks, clothing, shoes, and/or hands will frequently become soiled with saliva,

respiratory secretions, blood, urine, and manure from multiple horses. Exercise riders and pony people may work for multiple different trainers, and thus with multiple groups of horses. Handwashing facilities outside of a restroom or office are an uncommon occurrence within the stables on the backside of a racetrack.

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

Implementing biosecurity:

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

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

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

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

Conclusions:

Though challenging, biosecurity at the thoroughbred racetrack can be established by starting with small implementations. Also, a steward or other staff member can be assigned as the biosecurity officer and an internal biosecurity accreditation program can be initiated at the

track. There must be a commitment to the program by management staff at the track, as meetings, signage, and media advisories will be needed to garner support for the initiative.

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Animal Health Australia. 2010. Horse Venue Biosecurity Workbook. Accessed October 15 2019 from <<https://www.farmbiosecurity.com.au/wp-content/uploads/2019/03/Horse-Venue-Biosecurity-Workbook.pdf>>.

Equine Disease Surveillance and Response: Successes and Challenges Angela Pelzel-McCluskey, DVM, MS USDA-APHIS-Veterinary Services

Over the past 15 years, state and federal animal health officials have jointly responded to many different outbreaks of equine regulatory diseases with valuable experiences gained and lessons learned in each incident. Some of the diseases/outbreaks encountered include: equine infectious anemia (EIA), equine piroplasmiasis (EP), contagious equine metritis (CEM), equine viral arteritis (EVA), equine herpesvirus myeloencephalopathy (EHM), eastern equine encephalitis (EEE), West Nile virus (WNV), and vesicular stomatitis (VS). While future incidents involving these diseases will occur, it is important for our continued efforts to recognize the successes achieved in the battle against these diseases, the improvements in surveillance and response measures that have been developed, and challenges that remain to be conquered.

While EIA prevalence in the U.S. has declined over the years to an overall prevalence estimated at 0.004%, the epidemiology of the cases has shifted in the past few years revealing Quarter Horse racehorses as the predominant high-risk group and iatrogenic transmission among this population as the primary method of spread. The involvement of some of these horses in unsanctioned racing and the identification of illegal movements of exposed and infected horses from Mexico into this population has been a new challenge. Additionally, the recent retirement of a collective group of EIA researchers in the U.S. has left a gap that has yet to be filled.

Equine piroplasmiasis cases being found in the U.S. share the same high-risk population and iatrogenic transmission route as the EIA cases with the same inherent challenges in associated illegal activities. While eradication has been successfully completed on our only finding of natural tick-borne transmission of *T. equi* in the U.S. from a Texas ranch identified in 2009, the risk remains that iatrogenic transmission cases in Quarter Horse racehorses could lead to another instance of tick-borne transmission in the future if those animals remain unknown and untreated. The most significant success against EP in the past 10 years has been the development and implementation of the EP treatment program in which a published high-dose imidocarb dipropionate protocol is used to permanently clear the organism from the affected

horse. Even with that important achievement through research in the past, our future in EP research looks limited and unknown at this time.

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

biosecurity practices at breeding operations and semen collection centers in the U.S. is also a gap that has yet to be fully addressed.

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

The response to VS outbreaks in the U.S. underwent significant changes in 2015 in light of the World Organization for Animal Health's (OIE's) delisting of the disease. USDA-APHIS and the historically-affected VS states jointly developed response improvements which included a reduction in quarantine period to more closely match the risk of viral shed from the lesions of affected animals, the use of accredited veterinarians to manage equine cases, the option to designate suspect equine cases in known positive counties without further testing required, and the activation of NAHLN laboratories to assist in the response. These changes significantly reduced the strain on state and federal resources during an outbreak while still maintaining disease control and an appropriate response. The new multi-disciplinary approach to VS research through USDA-Agriculture Research Service's "VSV Grand Challenge Project" insures that the use of a big data approach to VSV research will yield more information on predictability and epidemiology of the disease for response purposes in the future. Challenges in VS response still remain in the broad variability of interstate movement restrictions imposed during an outbreak, the severe impact of international movement restrictions, and the limitations in available vector mitigation strategies.

Overall, a great deal of improvements have been made and successes achieved in these and other equine disease responses in just the past few years. Continued collaboration between state and federal animal health officials, the laboratories, academia, and the equine industry are needed to address the remaining and future challenges in equine disease surveillance and response.

USDA 2019 Summary of Advances in Equine Import
Dr. Rachel Cezar Martinez,
Director of Live Animal Imports, USDA APHIS Veterinary Services

The USDA has made many advancements to promote the international movement of equine while protecting the domestic equine population and decreasing the risk of foreign disease introduction. The USDA has worked with industry to address many of the current import and animal health concerns which include consistency amongst the quarantine facilities, standardization of import procedures at the ports and evaluating the import process and requirements for U.S. horses returning from CEM affected countries.

USDA continues to work both internally and with industry to ensure all requests for temporary quarantine facilities are processed and held to the same standards for approval. Horses permitted to complete quarantine in these approved facilities pose the same disease risk as those horses which are imported and complete quarantine at a federal or permanent private quarantine facility. Therefore, it is pertinent we uphold the temporary quarantine to standards that mitigate risk of disease and include adequate biosecurity measures. Through the partnership with the equine industry APHIS-VS has been able to provide services for multiple temporary quarantine facilities and CEM and Piroplasmosis monitoring for equine special events this year.

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

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

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

the domestic population. USDA is committed to facilitate the growth in international movement of equine by staying engaged with the our stakeholders and working to find solutions.

Export of Horses and Equine Germplasm: Accomplishments and Updates
Shanna Siegel, DVM, MPH
Director of Live Animal Exports, USDA APHIS Veterinary Services

FY2019 Export Trade Accomplishments:

[Export requirements found on APHIS' International Regulations \(IRegs\) Website](#)

- 5 New (Opened) Markets
 - Horses to Serbia
 - Competition horses to Peru
 - Equine embryos to Argentina
 - Equine semen to Guatemala
 - Equine semen to Barbados
- 6 Re-opened and/ or Retained Markets
 - Horses to Mexico
 - Horses to Chile
 - Horses to Australia
 - Horses to Taiwan (transits)
 - Horses to Brazil
 - Equine semen to Brazil
- 2 Expanded Markets
 - Horses to Japan
 - Horses to Canada

Vesicular Stomatitis (VS):

- [Vesicular Stomatitis](#) has been confirmed in 7 states in 2019: Colorado, Nebraska, New Mexico, Oklahoma, Texas, Utah, and Wyoming
- Check [IRegs](#) to determine if there is an impact to country-specific export requirements/ protocols

Veterinary Export Health Certification System (VEHCS)

- Online system for the electronic creation, issuance, and endorsement of U.S. export health certificates
 - Paper health certificates must accompany the shipment
- [VEHCS](#) is currently accepted by 33 countries- more to come!
- Check color banners on country-specific pages of the [IRegs](#) to determine a country's acceptance

Color-coded banner summary chart:

	RED	ORANGE	GREEN	YELLOW	PURPLE
Accredited Veterinarian Signature	Original signature	Digital signature	Digital signature	Digital signature for SOME commodities only (Please refer to IREGs)	Digital signature
APHIS VMO Signature	Original signature and apply embossed seal	Original signature and apply embossed seal	Digital signature DO NOT APPLY EMBOSSED SEAL	Digital signature for SOME commodities only (Please refer to IREGs)	Digital signature for SOME commodities only (Please refer to IREGs)

- Online resources:

- [Information about VEHCS for USDA Accredited Veterinarians](#)
[Information about VEHCS for Owners and Exporters \(Brokers\)](#)

Contagious Equine Metritis: Past, Present and Future
Dr. Katie Flynn
Equine Staff Veterinarian, California Department of Food and Agriculture

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

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

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

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

The USDA's current method of assessing the infrastructure and relevance of approved state CEM programs remains unclear. Thus, the review team's report recommends that the USDA's CEM Coordinator devise a more coherent system of review of states approved for the CEM Import Quarantine Program. To date, no reviews are reported to have been conducted by the USDA regarding state CEM programs. Furthermore, state CEM coordinators agree that in order to accurately identify CEM carrier stallions, it is crucial that all stallion breedings be observed by regulatory personnel. In order to intercept and prevent any additional deficits in the CEM program that could put the domestic equine populations at an increased risk of disease, it is

imperative to implement a credible and measurable means of periodically ensuring that all facilities in approved states conform and remain compliant to the established standards.

Working Group Report Reports

Associated Health Risks of Equine International Movement Working Group Report

Chair: Dr. Rachel Lacey,

Equine Programs Veterinary Manager, Florida Department of Agriculture and Consumer Services

The recent closure of the USDA Miami Animal Import Center, in conjunction with previous disease outbreaks associated with imported horses, have raised concerns amongst animal health officials and the overall equine industry. As a result, the USAHA Committee on Equine has formed a working group tasked with identifying and evaluating disease risks and concerns and making recommendations surrounding international equine importation to the United States.

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

USDA Sick Horse Protocol:

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

If a horse is referred to an approved equine hospital, the group recommends extending the time between qualifying rectal temperatures from 3 normal (>101.5F) temperatures in a 24-hour period to 3 normal temperatures in a 48-hour period. For all horses with abnormal health events, including but not limited to a rectal temperature greater than 101.5F and/or the display of clinical signs of a potentially infectious disease as well as for all potentially exposed horses, the USDA Quarantine personnel should complete a “Report of Abnormal Health Event in a USDA Quarantine” form and/or complete a “Compliance Agreement for Potentially Exposed Imported

Horses.” The compliance agreement form should be signed by the horse’s owner or agent, should accompany the horse upon release, and be sent to the SAHO in the state of destination.

Private Quarantine Agreement:

Recommendations regarding the Facility Owner section of the agreement:

The working group recommends quantifying “adequate personnel” to a person-per-number of horses who are responsible for the daily inspection and care while under quarantine. These personnel should maintain a minimal daily assessment log for each horse outlining the individual’s well-being and level of health. This log should include but not be limited to feed and water intake, fecal and urine output, overall attitude and comfort level, and pain assessments. Prior to admission into the quarantine storage location, the group recommends inspecting all hay and feed for signs of spoilage, mold and/or tampering. A log of inspection dates and source of feed should be maintained and retained for a minimum of one year. Additionally, the group recommends a wastewater risk analysis with emphasis on the risk of pathogen release into the environment or community water systems.

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

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

Recommendations regarding the APHIS section of the agreement:

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

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

Data Review:

The working group recommends the USDA to collect, maintain, and distribute, as necessary, data for horses with abnormal health events to include but not limited to quarantine location, broker, arrival date, country origin, horse ID number or name, health observations, diagnostic testing with results, diagnosis, destination address, and result (release, euthanasia, death, etc.). The group also recommends that data for all cohorts or potentially exposed horses be maintained in the same manner

Subcommittee Reports

Equine Viral Arteritis Subcommittee Report

Chair: Dr. Terry Hensley

Assistant Director, Texas A&M Veterinary Medical Diagnostic Laboratory

The Equine Viral Arteritis (EVA) subcommittee has been working on several items pertaining to this disease over the past year. These items and a brief description are listed below:

1. Equine Viral Arteritis Uniform Methods and Rules, Effective April 19, 2004.
 - a. The subcommittee is working to update this version of the UM&R. The sections have been divided among the members to edit and provide the edits and comments back to the chairman. Edits will be compiled and sent to the entire committee for discussion.
 - b. The updated UM&R will then be sent to USDA for consideration. The updated version will include new knowledge pertaining the testing for this disease, outbreak procedures, movement of stallions and semen.
 - c. An EVA positive stallion compliance agreement will be added for use by SAHO's, if desired.

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

2. Development of Bullet Points for use by breeders and veterinarians. There will be a separate document for each of these two groups.
3. Contact universities that offer equine breeding short courses about including information pertaining to EVA in the course curriculum. Texas A&M University and Colorado State University have been contacted and are willing to add this to their short course curriculum. The positive responses from these universities, hopefully, is an indicator that others will also be receptive.
4. Review of the USDA/APHIS Fact Sheet and provide feedback to USDA for any needed edits or updates.
5. Draft and submit to the Equine Committee resolutions concerning both international importation of equine semen and interstate shipping of equine semen.

Businesses Meeting

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

RECOMMENDATION**SOURCE: COMMITTEE ON EQUINE****SUBJECT MATTER: EQUINE FORUM FOR EQUINE INDUSTRY STAKEHOLDERS**

BACKGROUND INFORMATION:

In light of recent disease outbreaks and industry traceability challenges, equine identification and traceability has been the topic of industry interest. During the 2016 and 2017 Equine Disease Forum, co hosted by the USAHA and the National Institute for Animal Agriculture, the audience of industry stakeholders proposed a follow- up forum in 5 years. Additionally, a forum to obtain industry insights and direction on equine regulatory issues is warranted due to minimal participation of the equine industry in the USAHA.

RECOMMENDATION:

The Committee on Equine requests the United States Animal Health Association (USAHA) Executive Committee co-host with the National Institute of Animal Agriculture an Equine Forum for equine industry stakeholders.