EQUINE DISEASE QUARTERLY

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COMMENTARY

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LLOYD'S

The recent increased incidence of equine influenza in the United States and abroad necessitates implementation of prevention and control strategies to protect the health of the equine population. Although vaccination plays an important role, it should not be relied on as the sole preventative. Similar to other influenza viruses, equine influenza virus mutates over time and vaccines must be periodically updated to keep current with circulating viruses. Horses that have been vaccinated in accordance with manufacturer's label instructions and the recommendations of American Association of Equine Practitioners may be protected against equine influenza. Studies suggest the use of the modified live intranasal vaccine in previously unvaccinated horses can provide protection within five days of primary administration. However, no vaccine is 100% effective. Investigations into recent cases indicate that vaccinated horses can develop mild clinical signs of short duration, whereas unvaccinated horses are more severely affected and more likely to develop secondary pneumonia and pleuritis.

Implementation of biosecurity measures is essential to protecting the health of horses during influenza season. As influenza virus is spread most readily through nose-to-nose contact, it is critical to limit horse-to-horse contact and require strict isolation of new arrivals and sick horses. Infected animals should be kept at a minimum distance of 50 yards from healthy horses.

If no suitable permanent isolation stable is available, then designate an area on the property where a temporary isolation structure can be erected. When no appropriate onsite isolation areas are identified, consider appropriate off-site isolation facilities such as vacant barns, empty fair or event grounds, or veterinary clinics. To prevent virus transmission, designate personnel and equipment to the isolation area. Disposable coveralls, gloves, and boot covers should be used when handling horses in isolation. Personnel who must care for animals both in and outside of isolation should handle healthy animals first and isolated animals last. Individuals caring for exposed or infected horses should utilize alcohol-based hand sanitizers after handling all horses.

Influenza virus can be inactivated by exposure to sunlight or by use of disinfectants. The virus can remain viable for up to 2 days on contaminated surfaces, specifically solid surfaces of stall door latches. Thus, any shared equipment should be thoroughly cleaned and disinfected between uses.

The critical factor in controlling and preventing the spread of influenza virus is monitoring the health of all equids. Monitoring includes taking body temperatures twice daily and recording all clinical observations. Only healthy horses, which have been monitored, should be permitted to leave the premises. Any horse showing clinical signs of respiratory disease should be immediately isolated and examined by a veterinarian. Horses should remain isolated until they're clinically healthy and no longer shedding virus. As respiratory shedding of the influenza virus can persist for 7-10 days post-infection in a naïve animal, horses should remain isolated for a minimum of 14 days.

Appropriate use of vaccination and implementing biosecurity measures are critical to protecting the equine industry from highly contagious equine influenza virus.

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INTERNATIONAL

Fourth Quarter 2018

The International Collating Centre, Newmarket, United Kingdom, and other sources reported the following equine disease outbreaks.

The Republic of South Africa (RSA) reported isolated cases of African horse sickness in known infected areas that included the provinces of the Eastern Cape, Gauteng, and KwaZulu-Natal. Occurrence of the disease is as expected for this time of year.

Equine influenza was recorded in Ecuador (one outbreak), France (three outbreaks), and the UK which considers the disease to be endemic. The disease is also endemic in the USA, being confirmed in seven states, with some outbreaks characterized by multiple cases of the disease.

Canada, France, Germany, Ireland, Switzerland, the UK, and the USA reported multiple outbreaks of strangles. The number of confirmed outbreaks/cases included two in Canada, 28 in France, four in Germany, five in Ireland and four in Switzerland. The disease was reported to be endemic in the UK and in the USA, where 34 outbreaks were confirmed in 18 states involving at least 68 affected horses.

Equine herpesvirus 1 related diseases were recorded by France, Germany, Ireland, Japan, the RSA, the UK, and the USA. Febrile illness was reported by the RSA and the USA. Respiratory disease was confirmed in France (eight outbreaks), Germany (one outbreak), the RSA (one outbreak), and the UK (one outbreak). Abortion due to EHV-1 was recorded in France (two cases), Germany (single cases on two premises), Ireland (single cases on four premises), Japan (two cases on separate premises), and the USA (five cases). The RSA, UK, and USA reported outbreaks of EHV-1 myeloencephalopathy. The RSA and the UK each reported a single case of the disease, whereas the USA confirmed four cases involving premises in Arizona and California.

Equine herpesvirus 4 (EHV-4) respiratory disease was diagnosed in France (26 outbreaks), Germany (one outbreak involving four cases of the disease), the UK (seven outbreaks), and the USA (one case). One case of EHV-4 abortion was confirmed in the USA.

Multiple cases of equine herpesvirus 2 and/or 5 infection were reported by the USA, some associated with evidence of respiratory disease.

France recorded one case of subclinical equine arteritis virus infection and two cases of abortion caused by the virus. Germany confirmed the carrier state in one stallion.

Equine infectious anemia was diagnosed in Canada (three cases), France (one case), and the USA (three cases in Colorado and two in Texas).

The RSA and Switzerland reported cases of equine piroplasmosis. The disease is endemic in the RSA with cases confirmed in six provinces. One case of *Theileria equi* was diagnosed in Switzerland.

Contagious equine metritis was recorded by Germany (two stallions on separate premises) and South Korea (13 positive venereal swabs from 2,236 stallions and broodmares tested as part of a national survey).

The USA confirmed four cases of leptospiral abortion and two cases of equine neorickettsiosis abortion in Kentucky.

Germany reported one case of salmonellosis (serogroup not specified).

An outbreak of rotaviral enteritis was recorded by Argentina; a total of ten 2- to 4-month-old foals were affected on one premises, all of which had been vaccinated.

The USA reported eight cases of infection with *Lawsonia intracellularis* in Kentucky.

The fourth quarter of 2018 saw a sharp decline in the number of cases of Eastern equine encephalomyelitis confirmed in the USA, with only three cases recorded, all in New York State.

West Nile virus activity was reported in Canada (3 cases), France (3 case), Portugal (1 case), Tunisia (7 cases), Turkey (1 case), and the USA (70 cases).

Rhodococcal-related disease is endemic in the USA. Even though only three outbreaks were recorded in the fourth quarter, this is not reflective of the true incidence of the disease.

Singapore confirmed one case of Old world screwworm infection in a horse, and Switzerland reported more than four cases of Atypical Myopathy during October 2018.

Equine Disease Quarterly

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Sarcoids

Sarcoids are believed to be the most common skin tumor of the horse and affect about 2% of horses worldwide. Although they do not metastasize (spread to distant locations), they undoubtedly cause welfare concerns, especially in the ulcerated "fibroblastic" form. This may be through discomfort from the lesions themselves, from fly interference with the lesions, and also from administered treatments. In their most extreme forms, they can affect eyelid function and lead to secondary ulceration of the eye's surface (Figure 1). Clearly, they are not a "benign" lesion, despite their benign classification, and they should never be ignored. The presence of sarcoids also has financial implications not only due to the (sometimes very high) cost of treatment, but also due to reduced resale value.

There is compelling evidence that sarcoids are caused by a bovine papillomavirus which is believed to be transmitted by flies, most likely from infected cattle, but possibly also from infected horses. It remains unclear exactly how the virus leads to neoplastic (cancerous) change, or why the virus is able to cause disease in more than one species. Interestingly, a (human) papillomavirus also is responsible for the vast majority of cases of cervical cancer and an increasingly large proportion of tumors of the head and neck in humans; clearly there is much to be learned about the implications of infection with papillomaviruses in all species.

There is little doubt that there is a heritable component to the disease. In warmbloods, the heritability has been well demonstrated: Breeding two sarcoid-affected horses vastly increases the risk of producing a horse that develops sarcoids at some stage in its life. There also appear to be breed-related differences in sarcoid risk: Thoroughbreds are more likely to develop sarcoids than Standardbreds, and Lipizzaners seem more resistant to sarcoid development. Unlike melanomas, there is no color predisposition and gender doesn't affect the chance of developing the disease. Specific gene variations, noted in horses with sarcoids, are also associated with virally induced cancers in humans. The reasons for this association are unclear, but it is likely due to differences in immune function and may explain the apparent breed-specific variation in sarcoid risk.

Treatment options for sarcoids are numerous, with no one option being suitable for every case. Traditionally, sarcoids were often left without treatment, but as they almost invariably become larger and more difficult to treat, early intervention is strongly recommended to avoid long-term sequelae. Treatment may involve topical or intra-lesional chemotherapy or immune modulators, surgical procedures, or radiotherapy. Electrochemotherapy is a relatively new alternative treatment option with apparently very good results, but it unfortunately necessitates the use of multiple general anaesthetics, so the risks must be carefully considered.

Appropriate treatment selection is largely dictated by the location and type of the lesion (Figure 2). Laser surgical excision is the author's treatment of choice for the majority of lesions in locations other than around the eye; periocular lesions are treated via radiotherapy with great success. Reported success rates for laser surgical excision are in the order of 83% and for radiotherapy are around 90%; compared to other treatment options they represent the least risk to the horse and lead to the best results. However, not every lesion—or horse—is a suitable candidate for these treatments, and the key is to select the method most likely to be successful in the first instance. Recurrent sarcoids become increasingly difficult to manage and convey a far worse prognosis than those appropriately treated in the first place.

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Figure 1.
Horse with sarcoid lesion before treatment.

Figure 2.
Horse 2½ years after treatment.

Equine Influenza

Equine influenza (EI) is considered endemic in both the USA and Europe, but the viruses causing EI differ slightly. For many years, the viruses in circulation in the USA have been 'Florida clade 1' (FC1) whereas in Europe they have been 'Florida clade 2' (FC2). These clades split apart in 2003; circulation of FC2 ceased in the USA around 2005, and by 2010 there was no evidence of FC1 in circulation in Europe. Because of the extensive movement of horses between North America and Europe, the international panel of EI experts has recommended for the last ten years that EI vaccines contain representatives of both FC1 and FC2. Some (not all) available EI vaccines meet this recommendation.

EI virus activity has recently increased in the USA, Europe, and Nigeria. Normally, the virus circulates at a variable, but fairly low, level in the USA, but virus activity surged in the last three months of 2018 with outbreaks in 12 states. An extensive EI event occurred in a donkey sanctuary in Nigeria. For the first time since 2015, multiple outbreaks of EI were reported during January and February of 2019 in France, Belgium, the Netherlands, Germany, Ireland, England, and Scotland. In England, it resulted in a temporary lockdown of at least 174 premises and cancellation of racing for 6 days in February. Outbreaks were also reported in California, Arizona, Ohio, Indiana, and Washington State.

Some of the horses in these outbreaks, in both the USA and Europe, had been vaccinated for EI, raising the question: Is this a new strain that is not in the vaccines? The answer appears to be *no*. While the virus causing the Nigerian EI event is still uncharacterized, genetic analysis of isolates from both England and the USA confirms these as FC1. There are two mutations that make them different from the recommended vaccines strains, but are these important? That is still under investigation. The absence of FC1 from European circulation means their horses have no natural immunity and are dependent on vaccination for protection. The reports from England indicate that the clinical disease is of shorter duration and less severe in vaccinated horses; this would indicate the vaccines are working, at least partially. Milder disease in vaccinated horses may reflect an inadequate level of protective immunity following exposure to unvaccinated horses shedding large quantities of virus.

What should owners and veterinarians do to protect their horses from EI?

1. Familiarize yourself with the clinical signs of EI. Often the very first sign is a harsh cough. Other signs include fever and nasal discharge, which is usually watery (serous) at first and then turns thick and yellow (mucopurulent). The horse may show unusually rapid breathing (tachypnea) or lose its appetite (anorexia). Sometimes there may be enlarged submandibular lymph nodes or dependent limb edema. Keep in mind that not all these signs may be present. Horses can be infected and still appear normal (subclinical infection), especially if they have been previously vaccinated. Other infectious agents can produce clinical signs that look like EI, but aren't. EHV-1/4 or strangles (*Streptococcus equi*) are examples. Have your veterinarian collect a nasal swab, or ideally a nasopharyngeal swab (which goes beyond the nostrils into the back of the throat), and send it to a veterinary diagnostic laboratory to confirm a diagnosis. Information on nasal-swabbing can be found at http://vetsci.ca.uky.edu/services. If your horse does develop clinical signs of EI, then the rule of thumb is that for every day of fever, it should be stall-rested for a week.
2. Vaccinate your horses using a vaccine that protects against both FC1 and FC2 viruses. Horses' antibody responses to vaccination do not last indefinitely, so if your horse has not been vaccinated for six months or more, then it is due for a booster. If it has been three months or less since the last booster, then hopefully your horse's immunity should be at its peak. Consult your veterinarian and refer to the AAEP Guidelines (https://aaep.org/guidelines/vaccination-guidelines/risk-based-vaccination-guidelines/equine-influenza). In the event of an EI outbreak, where your horse may potentially be exposed, vaccination in the immediate face of the event might help if there is sufficient time—at least a week—for the horse's immune system to start making antibodies.

3. Communicate with your veterinarian and with the manager or resident veterinarian at any facility to which you are taking your horse. Is there an outbreak situation? If so, re-evaluate your horse's vaccination status, and re-evaluate exposing your horse to flu.
4. Biosecurity from infectious diseases is best enforced by avoiding exposure whenever possible. For farms, the best biosecurity is obtained by quarantining newly arriving horses away from the general herd for sufficient time to assure that the new arrivals are not bringing diseases with them. EI is transmitted through the air by coughing and indirectly on hands or clothing/equipment (fomites) that have been in contact with an infected horse.

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KENTUCKY

Equine Neorickettsiosis: Incidence in Kentucky in 2018

Equine neorickettsiosis (EN), more commonly known as Potomac horse fever, is an equine-specific bacterial disease caused by *Neorickettsia risticii.* The disease was first reported in the USA in 1979 as a sporadic condition observed in horses pastured in proximity to the Potomac River. Current distribution is now known to extend far beyond the northeastern United States and has been reported in 43 states in the USA; three provinces in Canada; Uruguay and Brazil in South America; France and the Netherlands in Europe; and in India. The disease is often associated with horses grazing pastures bordering creeks or rivers. Equine neorickettsiosis is seasonal in occurrence, with the majority of outbreaks in Kentucky reported in July through September.

The disease is not contagious per se; infection is naturally acquired by horses accidentally ingesting aquatic insects harboring metacercariae (fluke larvae) infected with *N. risticii*.

The life cycle of the bacterium involves operculate freshwater snails and aquatic insects viz mayflies and caddisflies, the latter being the source of infection for horses.

Outbreaks of EN comprise isolated or multiple cases of the disease on a premises. Experience has shown that the disease once confirmed on a premises or in a particular area, tends to recur in subsequent years.

Neorickettsia risticii can cause an acute enterocolitis in susceptible horses that is clinically manifest by fever, colic of variable severity and profuse diarrhea. All ages and breeds of horses are at risk of developing the disease. Infections in pregnant mares can give rise to abortion immediately following infection or months after the resolution of clinical signs.

Equine neorickettsiosis has been recorded in Kentucky for a significant number of years. Incidence of the disease can be very variable with increased case numbers frequently seen in years with high rainfalls in the spring followed by above average temperatures in late spring/early summer.

In 2018, the disease was first confirmed in Kentucky on June 1st. Over the period extending through the week of 25th August, 26 cases were diagnosed. This figure is probably under-representative of the true incidence of the disease. The case definition for EN was based on presence of characteristic clinical signs together with a positive polymerase chain reaction (PCR) test result for the causal bacterium.

A breakdown of the total number of cases revealed that the disease was confirmed in nine counties, the majority in central Kentucky (Figure 1). Affected horses ranged from one to 17 years of age. The preponderance of cases (20) was seen in mares. Although the majority of cases were in Thoroughbreds (18), the disease was recorded in six other breeds. Of the 26 reported cases in the state, six died and the remainder survived.

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To minimize losses from EN, horsemen were encouraged to review the environment in which they kept their horses and to consult with their veterinarian on strategies that might be used to mitigate disease risk. Recommendation was also given to minimize the opportunity for horses to ingest aquatic insects by turning off lighting in and around barns and other areas at nighttime.

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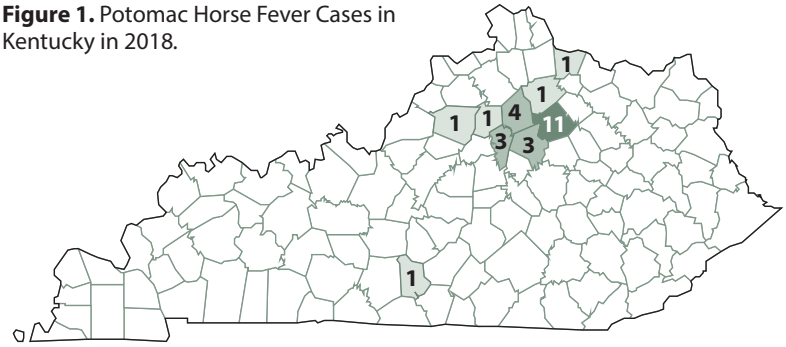
Figure 1. Potomac Horse Fever Cases in Kentucky in 2018.



26 Confirmed Cases:
1 case each.....Bracken, Franklin, Harrison, Shelby, and Metcalfe
3 cases each.....Fayette and Woodford
4 cases .....Scott
11 cases.....Bourbon

Office of the Kentucky State Veterinarian, Updated August 25, 2018

Figure 1.
Horse with sarcoid lesion before treatment.

Figure 2.
Horse 2½ years after treatment.