



EQUINE DISEASE QUARTERLY

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COMMENTARY

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THE U.S. HORSE INDUSTRY IS BOTH DOMESTIC and international in scope, and horses are moved frequently for breeding, racing, showing, work, and recreation. They are routinely exported and imported on both a permanent and temporary basis. The ease with which owners are able to transport their horses interstate and internationally is one of the cornerstones of the U.S. equine industry. This cornerstone is built upon a foundation of policies and safeguards that protects both the welfare of our horses and the economic health of our industry.

The U.S. Department of Agriculture (USDA), state health authorities, and foreign countries regulate the interstate and international movement of horses. Disease outbreaks such as contagious equine metritis (CEM), equine piroplasmiasis (EP), vesicular stomatitis virus (VSV), and equine herpesvirus myeloencephalopathy (EHM), prompt authorities to restrict movement, which affects every segment of the horse industry.

For example, in the last decade alone the following disease outbreaks have had a significant impact on the horse industry: In 2004, a VSV outbreak in Texas threatened the Breeders' Cup and doubled operating costs required to satisfy enhanced protocols and safeguards. An outbreak of equine herpesvirus in Wellington, Florida, in 2006 forced officials to close a major Grand Prix Championship. The ongoing CEM outbreak began in December 2008 and has required testing and tracing of nearly 1,000 horses in 48 states, with testing and treatment ranging from \$1,500 to \$5,000 per horse. In October 2009, EP was identified in Texas, and thus far, over 1,500 horses have been tested at considerable cost.

Also, the industry incurs additional costs during disease outbreaks due to enhanced

testing requirements (e.g., for entrance to event venues and interstate movement). Owners and event sponsors are forced to invest additional time and resources in securing authorized interstate or international transportation. For those unfortunate enough to have a positive or exposed horse, there is often the cost of quarantine expenses (possibly for the duration of the horse's life), loss of use, possible permanent export expenses, or potential euthanasia and disposal expenses.

Disease outbreaks also expose the industry to a competitive disadvantage with foreign markets, and they threaten the biological and commercial health of the U.S. horse industry.

The horse industry can no longer afford to approach these devastating diseases on a purely reactionary level. Along with federal and state authorities, the industry must maintain an efficient and effective control, response, and management infrastructure for disease outbreaks and must advocate for a more informed equine industry, enhanced diagnostic testing and treatment, and a healthier horse economy and population.

While there are many different sectors within the equine industry, diseases are indifferent to the various interests and disciplines. The industry must be proactive and unified in protecting our horses and our economic viability from disease. The horse community must speak with one voice to federal, state, and international authorities, not only to protect our horses' welfare, but also to preserve the integrity of our operations and maintain our channels of commerce, both here and abroad.

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LLOYD'S



INTERNATIONAL Second Quarter 2010*

THE INTERNATIONAL COLLATING CENTER, Newmarket, UK, and other sources reported the following disease outbreaks.

Contagious equine metritis (CEM) was reported from Germany, Italy, and the USA. A single mare case was reported out of 1,183 animals tested in Germany. Italy recorded *T. equigenitalis* infection in one non-Thoroughbred mare and two non-Thoroughbred stallions and confirmed *T. asinigenitalis* in six donkey stallions. An Arabian stallion imported earlier in the year was confirmed a carrier in California, USA.

Outbreaks of equine herpesvirus-1 (EHV-1) infection were reported from France, Germany, Ireland, Japan, South Africa, Switzerland, the UK, and the USA. The main manifestation was abortion: France reported cases on two premises; Germany diagnosed 14 cases; Ireland, three cases; Japan, eight cases; South Africa, one case; the UK, nine cases and one foal death; the USA, four cases.

Outbreaks of EHV-1 neurologic disease were recorded in Ireland, Japan, Switzerland and the UK. In Ireland, Japan, and the UK these outbreaks were limited to one or two animals on individual premises. The outbreak in Switzerland was extensive, affecting 19 horses and one donkey on one premises; four horses were euthanized and one died.

Cases of respiratory disease related to equine herpesvirus-4 were confirmed in Argentina (four cases), Germany (six cases), and the UK (one case). The UK and Ireland reported single cases of abortion.

Equine influenza was recorded on four riding schools in France where none of the horses had been vaccinated. In the UK four outbreaks were reported, one involving more than 180 horses, ponies, and donkeys out of 274 equids. The majority were unvaccinated against influenza.

Outbreaks of strangles were confirmed on two farms in Victoria, Australia; seven premises in France (unvaccinated animals); and nine premises (single cases) in Ireland. Sporadic cases were confirmed in Italy, Germany, and Switzerland. South Africa reported strangles in both Thoroughbreds and non-Thoroughbreds. Several states in the USA reported fewer outbreaks than in recent years.

Equine infectious anemia (EIA) was reported from Argentina, Germany, and Italy. Multiple cases were diagnosed on a Thoroughbred farm in Buenos Aires Province, with 12 additional cases detected in a follow-up serological survey. Germany diagnosed EIA in two horses on one premises; both were euthanized. Of 26,150 equids tested in Italy, 184 were positive; none of the positives involved breeding, race, or sports horses.

Equine viral arteritis was reported from Argentina and Germany. The occurrence was limited to 12 premises in Buenos Aires Province and was associated with importation of frozen semen. With the exception of abortions in Thoroughbreds on the index premises, all of the cases were in sports horses. There was no evidence of spread to the three racetracks in Buenos Aires. Germany confirmed two cases.

South Africa reported outbreaks of African horse sickness, mainly in young, non-vaccinated equids.

In late May, the USA confirmed the reappearance of vesicular stomatitis (New Jersey serotype) on two Arizona premises involving four horses.

Eastern equine encephalomyelitis was reported from Florida (33 cases) and Georgia (two cases). One case of West Nile encephalitis was reported from California.

Outbreaks of equine piroplasmiasis were recorded in South Africa and the USA. The former diagnosed infection with *Babesia caballi* or/and *Theileria equi* in multiple breeds. The USA recorded 28 cases of *T. equi* in Texas, 10 in Georgia, and 19 in New Mexico (including two cases of *B. caballi*). There were several reports of *T. equi* positive horses in California, Colorado, Florida, Massachusetts, Ohio, and Oklahoma.

Other diseases reported for the second quarter were sporadic cases of coital exanthema (UK), salmonellosis (Ireland), grass sickness (Switzerland), proliferative enteropathy (USA), and neonatal clostridiosis (USA).

* First Quarter Report for Australia



Equine Disease Quarterly

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EVA Outbreak in Argentina

AN OUTBREAK OF ABORTION ASSOCIATED with equine arteritis virus (EAV) infection occurred on a Thoroughbred breeding farm in San Antonio de Areco, Buenos Aires Province, in March 2010. On March 31, EAV was detected by reverse-transcription polymerase chain reaction (RT-PCR) and virus isolation from an aborted equine fetus and placenta, which was the third abortion to have occurred on the premises. The finding was reported to the National Health Authorities (SENASA) in Argentina, and the farm was placed under quarantine.

Based on information provided by the veterinarian, the pregnancy losses associated with this virus reached approximately 50%. This total included abortions at around five to six months of gestation and also mares that had been previously identified as pregnant and were subsequently found to have lost their pregnancies.

The Thoroughbred mares (n=40) commingled in the same paddock with sports horse mares (n=16) that had been inseminated with semen from five stallions (four standing outside of the country and one domestic stallion). Imported semen from two of the four stallions' imported semen had been used on the farm for the first time this year. Evidence pointed to semen from one of these two stallions as the source of EAV infection in the sports horse mares, which in turn, were believed responsible for spreading the infection to the pregnant Thoroughbred mares on the premises. Based on serologic testing of mares on other farms inseminated with semen from the second stallion's imported semen, none of them were carriers of EAV.

On April 14, straws containing frozen semen from the five stallions were submitted for virological examination. Equine arteritis virus was detected and isolated from the semen of one of the stallions. This semen had been imported from the Netherlands; testing carried out by the Animal Health Authorities at time of entry had given negative results for EAV.

Three mares at this farm had been inseminated with semen from this stallion. The first was inseminated on January 7, and it appears that this inseminated mare was the index case.

On April 3, a 45-day-old foal showing weakness and incoordination of the hind limbs died within 48 hours of the onset of clinical signs. The foal had not exhibited any antemortem

evidence of pneumonia or enteritis. Samples of lung, liver, thymus, and spleen were collected and submitted for laboratory examination. EAV was isolated from all the tissues tested.

On April 5, blood samples were obtained from all the horses (n=140) on the farm. These consisted of 54 mares, 1 stallion, 34 yearlings, 14 foals, and 37 other (work) horses. Serological examination confirmed a very high prevalence of infection in the mares and foals and a very low prevalence in the yearlings that had been physically separated from the mares.

The infective semen was traced, and all the straws still available from the stallion were confiscated. Since four other farms had also used this semen, they too were put under quarantine. Serological surveillance of the horses on these farms confirmed that all the mares inseminated with the infective semen were seropositive.

In addition, a very high prevalence of EAV infection (97 out of 120 horses) was found in an equestrian club located in downtown Buenos Aires, where two mares had earlier been inseminated with the infective semen. When the veterinarian to this facility became aware of the results, he indicated that a few months previously several horses had developed signs of respiratory disease accompanied by fever and limb edema; these signs were not associated with equine viral arteritis at the time.

Argentina's Department of Agriculture notified the Office International des Epizooties (OIE) on May 7 of confirmation of equine viral arteritis in the country. Furthermore, it declared a health alert for horses throughout the country. Movement of horses was prohibited in Buenos Aires Province, where all the major equestrian clubs, horse breeding farms, and racecourses are located.

Since there had been significant movement of horses off the five primary affected premises, all such movements were traced from early January to May 7, 2010. A statistically representative blood sampling was carried out at the main racecourses and equestrian clubs in the country, with approximately 10,000 horses of all breeds tested. Seven additional affected premises were identified as a result of this surveillance. Dissemination of EAV had occurred as a result of the movement of horses that were either incubating the infection or subclinically infected with the virus. All the 12 affected premises identified (five as a consequence of



COMMON WATER SENSE TIPS, OFTEN OVERLOOKED

- **CHECK** all automatic waterers and buckets/ troughs every day to ensure continuous water supply to horses.
- **EXAMINE** all watering equipment for buildup of filth, scum, algae growth, fecal contamination, etc.; clean as necessary.
- **DO NOT ALLOW** horses access to pasture areas with stagnant or contaminated water.
- **INSPECT DAILY** the gates between pastures that allow horses access to fresh water.
- **IF HORSES ARE WITHOUT** drinking water for more than a day, do not let them drink as much as they want. Excessive water consumption can result in a condition known as "water intoxication," which can be deadly. Consult your veterinarian about rehydrating horses.

the use of infective semen and seven because of the movement of infected horses) were located in Buenos Aires Province.

The serological survey revealed that apart from the involvement of Thoroughbred mares on the index premises, infection was limited to sports horses. Thoroughbred, polo, Criollo, Arabian, and other breeds evidently were not exposed to EAV infection during this occurrence of equine viral arteritis.

Approximately 30 stallions of a jumping breed (Silla Argentina) became seropositive during this outbreak. Investigations are ongoing to determine whether any of them are semen shedders and carriers of EAV. The genetic characterization of the isolates is also being undertaken. The feasibility of applying

preventive measures to protect the country's valuable horse industry against the possible risk of future introduction of this disease was considered, and on July 13 a vaccination program for Thoroughbred stallions was officially approved. To this point, approximately 100 Thoroughbred stallions have been vaccinated with a commercial modified live vaccine against EVA (Arvac®, Pfizer Animal Health). Consideration is also being given to the need to include other breeds in the vaccination program.

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NATIONAL

Water Quality Testing

PROVIDING HORSES A CONTINUOUS SUPPLY of clean water is part of the foundation of good husbandry. Several different sources of water might be found on a horse farm: ponds, streams, lakes, and automatic waterers or troughs supplied by well water or city water. (See sidebar.)

It is difficult to find guidelines specific to equine drinking water. Most often, they are lumped into the water quality guidelines for livestock. Following is information to help assure that water quality for your horses is of sufficient quality.

Water samples can be tested for physical and physiochemical properties, excessive nutrients, toxic compounds, and microbes.

Physiochemical properties include salinity, water hardness, and water pH. Salinity is the presence of dissolved substances. Hardness is determined by the water's concentration of calcium and magnesium. Excessive water hardness can create mineral deposits on water piping and affect the efficiency of certain disinfectants. Water pH is its level of acidity or alkalinity.

The presence of excessive nutrients, such as sulfates and nitrates, can also be determined by water testing, as can the presence of toxic compounds—arsenic, fluorine, lead, mercury, and many others.

In a recent issue of the *Canadian Veterinary Journal*,* a case of water sulfate toxicity was reported in horses. Of a herd of 19 horses, five were found dead, and 13 others had diarrhea. Extensive diagnostic testing of the horses was completed as well as surface water testing and examination of the pastures for toxic weeds. The authors concluded that excessive sulfate levels with high salinity of the surface water caused the illness and deaths.

Fecal coliform measurements can help determine the presence of fecal matter and possible pathogens. Stagnant water can cause excessive growth of bacteria called cyanobacteria, or blue-green algae. In times of drought where surface water levels can become low and water flow decreases or ceases, overgrowth of this bacteria can occur, and cattle have been reported to become sick or die from drinking

water contaminated by it.

Floods are the number one costly disaster in the United States. Flood waters can contain sewage, gasoline, oil, petrochemicals, and many other contaminants and are not suitable for livestock as a water source. As soon as is safely possible, animals should be provided a clean source of water in flooded areas.

For advice on water testing, contact your local office of the Cooperative Extension Service (CES) for testing supplies, sample collection instructions, and handling procedures. State CES websites and www.eXtension.org are also

good sources of information on water quality and livestock.

**Burgess BA, Lohmann, KL, Blakley BR. (2010). Excessive sulfate and poor water quality as a cause of sudden deaths and an outbreak of diarrhea in horses. Can Vet J 51:277-282.*

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KENTUCKY

“Heart Attacks” and Heart Disease in Horses

THE CARDIOVASCULAR SYSTEM, WHICH IS composed of the heart and blood vessels, is essential for the distribution of oxygen, nutrients, and other critical components to all organs throughout the horse’s body. As the heart is the sole pump for the cardiovascular system, any disruption of its function can have critical consequences for the animal’s life.

The term “heart attack” has incorrectly evolved into common usage to refer to sudden death associated with heart disease. To medical professionals for people, this term is specifically reserved for myocardial infarction. In people, myocardial infarcts are commonly caused by clogged blood vessels that reduce blood flow to the heart and result in damage or death to the heart muscle.

Since horses do not routinely suffer from coronary artery disease, “heart attacks” in this sense rarely occur. Racehorses that unexpectedly drop dead due to sudden death syndrome (Swale syndrome) are frequently said to have died of a “heart attack.” This determination, however, is inaccurate, as heart lesions may not be present, so use of the term “heart attack” is imprecise.

Equine heart disease can develop rapidly (acute heart disease) or slowly (chronic heart disease). Speed of progression is dependent

upon the underlying cause and location of diseased tissue. Equine heart disease can be caused by heart malformation, direct insult to the heart or its electrical signaling system, or secondarily to disease in other organs. Horses with heart abnormalities may or may not show clinical signs.

Acute heart disease typically results from direct insult to the heart or disruption of its electrical signaling system. Examples in the horse include sudden death syndrome; disruption of blood flow to the heart; toxin- or drug-induced disruption of electrical signals; arrhythmias; snakebites; nutritional deficiencies; traumatic insult; and bacterial, hormonal, or toxic insult to the heart muscle. Because the heart is incapable of regenerating new muscle, acute dysfunction, regardless of the cause, can predispose the heart to chronic complications.

Chronic heart disease develops slowly due to the heart’s ability to temporarily compensate for abnormalities by increasing its size. In the horse, it can result from birth defects of the heart’s chambers, valves, or blood vessels; cancer; previous insult to the heart or valves; or disease in other organs that secondarily alter the systemic blood flow into and out of the heart. Chronic heart disease essentially inhibits efficient delivery of oxygen to the

body's tissues. Eventually, the heart becomes overworked and is unable to keep up with the body's oxygen needs, which eventually results in heart failure.

From 2000 to 2009, heart disease was identified in 261 horses that presented to the University of Kentucky necropsy service. Multiple heart abnormalities were commonly identified in individual animals.

Of the 261 horses, there were 174 cases of acute heart disease. These cases included traumatic insult (5 cases) and myocardial degeneration and necrosis (42 cases) and 127 inflammatory lesions that consisted of myocarditis (the heart muscle) (59 cases), endocarditis (the inner heart lining/valves) (29 cases), and pericarditis (the sac surrounding the heart) (39 cases).

Additionally, 107 cases of chronic heart disease were present and included cardiomegaly (enlarged heart) (11 cases), chronic valvular disease (1 case), congenital malformation (21 cases), cardiomyopathy (heart muscle disease) (31 cases), myocardial fibrosis (25 cases), and heart failure (18 cases).

Twenty cases had both acute and chronic lesions present.

In summary, equine heart disease is multifaceted and can be induced by multiple mechanisms. Although horses do not routinely suffer from traditional "heart attacks," they do frequently develop heart abnormalities that can negatively impact their health and longevity.

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