EQUINE DISEASE QUARTERLY

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COMMENTARY

IT IS TIME FOR EQUINE VETERINARIANS, owners, and other stakeholders to become effectively engaged in preventing the catastrophic and heartbreaking losses of human and animal life associated with disasters. We can no longer continue to play the odds of "it probably won't happen to me." The truth is "wanna bet?"

As the day (May 13, 2011) ends here in Louisiana State University's (LSU) School of Veterinary Medicine, approximately 100 yards—a mere football field's length—separates a flagship university from a rising and mighty Mississippi River, presently at major flood levels. Even with this imminent situation, a naïve public and horse-owning population across this region play the odds on whether the river will cause catastrophic damage to the land and its inhabitants, possibly resulting in immense human, animal, and property loss.

It is prudent that we learn by our mistakes and misfortunes and those of others in terms of disaster response. By joining with our colleagues and neighbors towards building an effective all-hazards disaster plan, we will become stronger and more resilient communities, thus building stronger states with the ultimate goal of building a healthier nation and planet. If we turn large-scale natural and human-induced disasters such as hurricanes, oil spills, tornado outbreaks, wildfires, earthquakes, and massive flooding into substantial training exercises, we can engage with our community leaders and emergency managers and become empowered to take responsible control for the well-being of ourselves and the animals that provide us companionship, service, and enjoyment.

Since the fall of 2005, members of the Louisiana State Animal Response Team (LSART) have worked diligently to build solid and effective community engagement involving both government and non-government organizations, including humane groups, agriculture extension agents, government officials, veterinarians, and other first responders, in order to develop effective community disaster animal response and mitigation planning. Because of this planning, in 2008 all 12 coastal parishes were successfully evacuated to safe shelter when Hurricane Gustav hit. The team demonstrated that people and their animals can evacuate safely and that preparation is vital preceding a disaster of such magnitude.

State animal response groups such as LSART require a willing team of strong leaders and volunteers. Coordination of these trained and experienced resource groups is vital for an effective disaster response; these groups also must dovetail their efforts with state and federal plans and infrastructure. They can also assist with identification of resources, organization of animal evacuation, and animal sheltering.

With the number of federally declared disasters doubling and even tripling in some cases in the United States since the 1960s, it is not a matter of "if" but "when." We can either be prepared …or we can ask ourselves why we weren't prepared. The time is now for us to work together in our home communities for disaster planning that includes an effective plan for our horses.

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INTERNATIONAL

First Quarter 2011

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

Contagious equine metritis was reported from France (one case) and Germany (four cases).

Reports of equine influenza were received from France and Sweden. Eight premises were affected in France; seven were epidemiologically linked. The virus involved was a H3N8 strain of the Florida clade 2 sublineage. Isolated cases of the disease were confirmed in Sweden.

Extensive outbreaks of African horsesickness occurred in the north and eastern parts of South Africa, where the disease is endemic, primarily in young, unvaccinated horses. Cases were also reported in the surveillance zone of the Western Cape.

Strangles was reported from France (six premises), Germany (four cases), South Africa, Sweden, Switzerland (two cases), the UK (endemic), and the USA (six cases in Kentucky).

Reports of equine infectious anemia were received from Germany (five outbreaks) and Japan (one case).

In northeastern Argentina, five mares on one premise died from rabies; exposure to infected vampire bats was presumed.

In the USA, two cases of Eastern equine encephalomyelitis were diagnosed in Louisiana; both were fatal.

Outbreaks of equine herpesvirus-1 (EHV-1) related disease (respiratory, abortion, and/or myeloencephalopathy) were reported by numerous countries. France reported isolated cases of EHV-1 respiratory disease on three premises; Germany reported one case.

EHV-1 respiratory disease with myeloencephalopathy was confirmed on four additional premises in France; three were epidemiologically linked. Of 100 resident horses on one premises, 68 developed fevers, and 16 also exhibited signs of neurologic disease; one had to be euthanized. The remaining three affected premises had one, two, and seven cases, respectively.

EHV-1 abortions were confirmed in Argentina (one case) and France (single cases on four premises and two cases on each of three premises).

France also reported EHV-1 neurologic disease and abortion involving five Trotters on an additional premises. Abortion was also recorded in Germany (10 cases), Japan (11 cases involving eight premises), Turkey (15 cases on two premises), the UK (three cases and an additional two cases of abortion on another premises following signs of neurologic disease; a final case diagnosed in a neonatal foal), the USA (four cases in Thoroughbreds and a case of fulminant pneumonia in a neonatal foal).

Outbreaks of EHV-1 myeloencephalopathy not associated with respiratory disease or abortion were reported from France (four premises), Germany (one case), the UK (isolated cases), and the USA (two premises).

Outbreaks of equine herpesvirus-4 respiratory disease were confirmed in Germany (five cases), Sweden (six cases), and the UK (one abortion).

Other equine herpesvirus outbreaks recorded were one case of multi-nodular pulmonary disease in a donkey in Switzerland attributed to EHV-5 and one case of equine coital exanthema (EHV-3) in a zebra in the UK.

Equine piroplasmosis (EP) was reported to be endemic in France, South Africa, Spain, and the United Arab Emirates. Korea had one subclinical case. Cases primarily of *Babesia equi* infection continue to be diagnosed in the USA, the majority in racing Quarter horses. Of over 100,000 horses tested to date, 74 have been found seropositive in a total of 18 states. A significant percentage of the positive horses had been imported from EP-endemic countries. Evidence would indicate transmission occurred by iatrogenic means in most cases. Eleven states require EP testing of horses competing in sanctioned races/other equine events.

Lawsonia intracellularis infection was reported in the USA. The prevalence of infection, although very high on particular premises, was infrequently associated with an increased incidence of disease. The first quarter of 2011 saw an increase in the incidence of nocardioform placentitis and abortion in Kentucky, USA, with the greatest number of cases diagnosed in January and February.

Equine encephalosis was reported to be endemic in South Africa, where extensive outbreaks occur annually in the summer months.

Outbreaks of clostridial enterocolitis were recorded in the USA, the vast majority attributed to *Clostridium perfringens*. Switzerland confirmed a case of botulism.

Equine Disease Quarterly

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Glanders

GLANDERS, CAUSED BY *BURKHOLDERIA mallei*, is a highly contagious bacterial disease in equids and widely regarded as a very important zoonosis. It is notifiable to the World Organisation of Animal Health (OIE, Paris, France). The disease is still endemic in various parts of the world including, but not exclusive to, the Middle East, Asia, and South America. The occurrence and distribution of glanders in Africa is unknown. Glanders has re-emerged in Brazil, Pakistan, India, and Turkey, and outbreaks have been reported from Iraq, Iran, Mongolia, and China; in more recent years, glanders has been recorded in the United Arab Emirates (UAE), Kuwait, and Bahrain.

Glanders was detected for the first time in the UAE in 2004, occurring in an official UAE quarantine facility in Dubai. The OIE was immediately notified, and the infection was controlled and eliminated by euthanizing 75 horses. A total of 10 glanders-positive horses were identified in a shipment that originated in Syria. This finding resulted in a total embargo on the movement of horses from Syria into Dubai. Research that followed the outbreak of glanders in Dubai resulted in the adoption of serological tests in addition to the complement-fixation test (CFT) recommended by the OIE. By way of acknowledgement of these contributions, the OIE designated the Central Veterinary Research Laboratory (CVRL) in Dubai as an OIE reference laboratory for glanders.

In spite of the export of glanders-positive horses to Dubai, horses continue to be exported from Syria to other Gulf Cooperation Council (GCC) countries. Some years ago, ministers of the countries involved agreed to prevent the entry of horses with notifiable diseases entering any of the GCC States. All testing of horses for evidence of glanders was to be carried out at CVRL.

Between 2009 and 2010, more than 30 horses that were to travel to Kuwait tested positive for glanders using the CFT. These findings were reported to the OIE, the appropriate regulatory authorities in Kuwait, and the UAE. These results provided additional justification for the UAE not to lift the ban on the import of horses from either Syria or Kuwait.

At the end of 2010, the first glanders-positive horse was reported from Bahrain. The diagnosis was confirmed by the CVRL. The European Union was also informed of the result. Later, Kuwait and Bahrain notified occurrence of the disease to the OIE. Bahrainians subsequently requested help from CVRL experts. On several occasions, necropsies were performed on numerous glanderous horses in Bahrain, and several isolations of the pathogen were made. During one of the visits, it was found that the disease had spread to dromedaries, from which the pathogen was also isolated. Molecular biological investigations carried out in Munich confirmed that the bacteria isolated from the dromedary was similar to an isolate cultured in Dubai in 2004. In the course of these investigations, it was found that a stallion necropsied in Bahrain with severe signs and lesions of glanders had tested CFT positive in Kuwait eight months previously. No further information was available on this particular case.

In Bahrain, where in excess of 4,000 horse sera were tested by the CVRL, more than 50 horses affected with glanders were identified and euthanized. A second round of testing is under way, and already several horses have been found positive, with classical clinical signs and lesions of glanders as well as positive serology.

The CRVL has submitted several requests to the OIE and to the European Union to investigate the source(s) of glanders in the Middle East in an effort to restrict further spread of the infection, especially in view of the expanding horse industry in the region. From a scientific point of view, disease events over the past several years have significantly increased our knowledge and concern about glanders and the risk of more global distribution of the disease.

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NATIONAL

A Distribution Model for an Equine Piroplasmosis Vector, the American Dog Tick

EQUINE PIROPLASMOSIS (EP) IS A TICK-borne disease detected in isolated outbreaks in the United States within the last few years. Predicting where and when equines have a greater chance of becoming infected is difficult because of the complex interactions among the environment, tick vectors, and equine populations. For this reason, the U.S. Department of Agriculture's (USDA) Animal and Plant Health Inspection Service (APHIS) Veterinary Services (VS) Center for Epidemiology and Animal Health (CEAH) analysts are using geospatial methods to determine the potential distribution of the American dog tick (*Dermacentor variabilis*), a natural and experimental vector of EP within the continental United States. The objective is to establish correlations between tick presence and environmental factors to help identify areas where tick transmission of EP to horses could occur.

CEAH developed a distribution model for the American dog tick using the MaxEnt program. This free software program models tick species distribution from tick collection records. Historical tick presence data[1] collected from 1960 to 1999 were combined with environmental data including mean temperature, precipitation, land cover, and topography. These data were used to define the tick species' ecological requirements and then used to predict the relative suitability of the habitat for this tick species across the contiguous United States.

The results show that the presence of the American dog tick is not uniform across the country (Figure 1). The environmental conditions surrounding the presence of the American dog tick varied between the western and eastern regions of the United States; thus, these regions likely represent different ecological niches for this tick species. The largest per-state percentage area of suitable habitat for the American dog tick was in the eastern region of the United States in Delaware, New Jersey, Virginia, and Florida. Other states with a high percentage of suitable habitats were North Dakota, South Dakota, Minnesota, Ohio, Missouri, California, Oregon, and Washington. Suitable environmental conditions were either absent or present only in localized areas in the Rocky Mountain regions of New Mexico, Arizona, and Colorado.

Environmental variables having the greatest contribution to the model were elevation, temperature, and the amount of vegetation moisture present in the months of May and August. Data results show the American dog tick is more likely to be found at lower elevations and in areas with warmer temperature and higher humidity.

In assessing the likelihood of a horse encountering the American dog tick, it is necessary to combine information on the presence of suitable habitat, tick abundance, and the number of horses exposed in specific tick habitats. For example, an area with ideal tick habitat and frequent horse visits—either while a horse is feeding or through human or horse activities—provides a greater chance of disease transmission via ticks to a horse than an area with limited tick habitat and infrequent horse exposure. Understanding the factors necessary for ticks to thrive in a given region will aid in targeted EP surveillance activities, customization of horse management practices, and effective tick control on a regional basis. Currently APHIS's recommendations are adequate for managing and controlling ticks on horses to minimize EP transmission via ticks.

[1] *Data obtained from the Smithsonian's United States National Tick Collection and the tick surveillance program of the Veterinary Service's National Veterinary Services Laboratories.*

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Biosecurity during Horse Events

WITH THE OUTBREAK OF EQUINE HERpesvirus-1 (EHV-1) myeloencephalopathy in May, biosecurity and showing horses have been front page news. Summer months are prime time for large, organized trail rides, horse shows, sales, parades, and other events where horses congregate. One show in Utah from which horses returned to multiple states illustrates very well how rapidly horses travel and can spread disease.

Following are biosecurity measures to implement when horses are congregated at events:

• Minimize nose-to-nose contact between horses. Do not allow another horse to sniff your horse's nose "to get acquainted."

• Do not share equipment for use with other people's horses. Alternatively, if any equipment is loaned, keep it away from your horses until it is cleaned with a detergent, rinsed, and properly disinfected.

• Do not use common water troughs. Bring your own water and feed buckets.

• Avoid common-use areas such as tack stalls used to groom and tack multiple horses. If these common areas must be used, use cross ties instead of tying horses to a post, wall, or other nose-to-nose contact area.

• Halters, lead shanks, and face grooming towels should be used on one animal only and not shared between animals.

• Wash your hands or use a 62% ethyl alcohol hand gel before and after handling or riding other people's horses.

• Early detection of disease is paramount, especially contagious infectious diseases. Take horses' temperatures twice daily (morning and night) during the event and for two weeks after return to the stable.

• Quarantine horses when they return to the barn or training facility after an event.

• Clean and disinfect horse trailers before they're used by other horses.

These precautions do involve more work, more time, and more awareness. However, it will help reduce the risk of horses being exposed to multiple viral and bacterial diseases while on the road.

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KENTUCKY

Antimicrobial Susceptibility Testing

ONE OF THE PRINCIPAL FUNCTIONS of a microbiology laboratory in order to best treat infections is determination of antimicrobial susceptibilities of bacterial isolates. This testing is performed on bacterial (and some fungal) isolates from clinical specimens if the isolate is a probable cause of the animal's infection and the susceptibility of the isolate is uncertain. From the veterinarian's point of view, the results of susceptibility tests are often considered as important or more important than the identification of the pathogen involved. Therefore, the antimicrobial susceptibility test is routinely performed in microbiology laboratories.

Antimicrobial susceptibility testing basically predicts the effectiveness of treatment with the antimicrobial agents that were tested against the isolated microorganisms. Interpretative criteria that determine whether the bacterial isolate is susceptible, intermediate, or resistant to the antimicrobials are established by the Clinical and Laboratory Standards Institute (CLSI), an international, interdisciplinary, standards-developing, and educational organization.

There are two main methods of determining antimicrobial susceptibility. The Kirby-Bauer (or disc diffusion) method is inexpensive, flexible, and one of the more established methods in use. This method involves swabbing a standardized suspension of a bacterial isolate over the surface of an agar plate and placing paper discs containing a concentration of a single antimicrobial drug on the inoculated surface. After overnight incubation,

(Kentucky: Antimicrobial Susceptibility Testing, continued)

the diameters of the zones produced by drugs are measured, and per CLSI guidelines, the isolate is interpreted as either susceptible, resistant, or intermediate. Unfortunately, the qualitative interpretive criteria for veterinary pathogens and drugs for the Kirby-Bauer method are limited. Additionally, the system is not automated, and antibiotic susceptibility tests cannot be performed on some slow-growing bacteria (such as nocardioform bacteria, *Listeria*, and some mycobacteria), anaerobic bacteria, and fungi.

The second most common method, the broth microdilution method, provides antimicrobial susceptibility results with minimum inhibitory Concentration (MIC) levels. MIC represents the lowest concentration of drug required to inhibit the growth of a bacterial isolate. Broth microdilution methods are used with both commercial automated and semi-automated instruments. Most current instruments work on the principle of turbidimetric detection of bacterial growth in a broth medium by use of a photometer to examine the test wells (the sample being clear or less turbid when the drug inhibits bacterial growth). The broth microdilution (or MIC) method is a more expensive method but includes a broader and updated number of antimicrobials for veterinary pathogens. The MIC method is also able to determine antimicrobial susceptibility patterns for nocardioform and other slow-growing bacteria, some fungi (yeasts), and some anaerobic bacteria that cannot be assessed by Kirby-Bauer disk diffusion.

For these reasons, the University of Kentucky Veterinary Diagnostic Laboratory and other diagnostic laboratories have started using the MIC method for the bacteria (and yeast) isolated in animal specimens. We believe that this new method will better serve our clients. The Kirby-Bauer method will also be available upon request from practitioners.

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FIGURE 1.
USA Tick Habitat Suitability