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LLOYD'S

COMMENTARY

As of September 4, 2012, West Nile virus (WNV) infections in people, animals or mosquitoes have been reported from all states except Alaska and Hawaii, according to the Centers for Disease Control and Prevention (CDC). Of 1,993 human cases, 54% involved the nervous system. When are mosquitoes especially active? Dawn and dusk. When are most horse people also active? Dawn and dusk. If WNV is reported from 48 states, people and horses in 48 states are at-risk of being bitten by infected mosquitoes.

The only U.S.-approved WNV vaccines are for equine, and the American Association of Equine Practitioners lists WNV as a core vaccine, emphasizing its importance. Compare the cost for WNV vaccination versus costs for veterinary examination, diagnosis, and treatment of a neurological horse. And, let's not forget that any neurological horse needs to be handled as a rabies-suspect until proven otherwise.

While extensive WNV data is available at the CDC ArboNet website, equine specific data is not. According to the Kentucky State Veterinarian's website, as of September 11, 2012, 10 WNV-positive horses were reported from nine counties. Seven horses were unvaccinated; two were partially vaccinated and one was reportedly vaccinated. A summary of Kentucky WNV equine cases (2005-2011) shows that 91% of positive horses were not vaccinated; others were partially vaccinated or had unknown vaccination history. How complete is your equine vaccination program?

Understanding WNV vectors is important to human and equine health. Mosquitoes in the genus *Culex* are primary vectors of WNV with multiple species being able to transmit the virus throughout the continental United States. The house mosquito (*Cx. pipiens* complex) is common in areas across Kentucky. Inseminated females spend the winter in protected places near a moisture source and mortality is usually low following mild winters. Surviving females become active, laying rafts of eggs on the surface of water with moderately to very high organic content including grassy ditches, waste lagoons, and polluted ground pools. The life cycle from egg to adult takes about eight to 12 days during the summer.

Female *Cx. pipiens* usually remain within a half-mile of their breeding habitat. These night-flying mosquitoes feed primarily on birds but will enter buildings and feed on a variety of mammals and humans. They are particularly important in amplification of the virus in susceptible birds and along with other mosquito species can be "bridge vectors" that enable the virus to move from avian to mammalian species.

The two major preventive strategies in reducing risk of arthropod-borne viruses are: 1) using measures to reduce contact with mosquitoes, including insecticides and repellents; and 2) reducing, eliminating or treating known breeding sites. The success of both strategies is variable for many practical reasons.

Insect transmitted diseases rarely disappear. People need to take the WNV risk to themselves and their horses seriously. What are you willing to do?

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INTERNATIONAL

Second Quarter 2012*

The International Collating Center, Newmarket, United Kingdom (UK), and other sources reported the following disease outbreaks.

A report of contagious equine metritis was received from Germany involving two Icelandic mares.

Outbreaks of *Salmonella abortus equi* infection were recorded in Argentina (11 abortions on one premises) and Japan (one case).

Strangles was recorded in Germany (one case), Sweden (three premises), and the USA (Iowa, Kentucky, New York, Pennsylvania).

Multiple outbreaks of equine influenza were confirmed in France in May and June. Initially, five outbreaks were recorded in French Saddlebreds and sports horses that had participated in several competitions. One 10-day-old foal died. Two unrelated outbreaks subsequently occurred at equestrian centers. Another separate case of influenza was confirmed in a non-vaccinated horse recently imported from Portugal.

Equine herpesvirus-1 (EHV-1) related diseases were reported by Argentina, France, Germany, Japan, the UK, and the USA. Sporadic EHV-1 respiratory cases occurred in France and Germany, the UK, and the USA (California, Kentucky, Indiana, and Missouri). EHV-1 abortions were recorded in Argentina (one case), France (three cases on one premises), Germany (neonatal pneumonitis), Japan (11 cases in predominately vaccinated horses on 10 premises), and Sweden (three cases on two premises). Four cases of EHV-1 myeloencephalopathy were reported by Germany.

Several cases of equine coital exanthema (equine herpesvirus-3) were reported from Kentucky. Equine herpesvirus-4 was reported in Queensland, Australia (one case) and France (nine premises). Infections with equine herpesvirus-2 (six cases in Kentucky) and EHV-5 (two cases in Florida) were diagnosed.

Equine viral arteritis was reported by France (five outbreaks; two carrier stallions) and Germany (four Warmblood carrier stallions).

Equine infectious anemia was reported by Argentina (seven horses in Buenos Aires Province), Germany (one imported mare from Eastern Europe), and Italy (38 cases since early 2012 on 30 different premises).

Equine piroplasmosis was confirmed in France (endemic), Switzerland, United Arab Emirates, (endemic, sporadic clinical cases) and the USA. Some 18,600 horses have been tested in the USA since early 2012. Seropositive horses were confirmed, four infected with *Theileria equi* and two with *Babesia caballi*, the majority Quarter Horse racehorses.

Thirty-five cases of Eastern equine encephalomyelitis were confirmed in the USA, with the largest numbers diagnosed in Florida (10), Mississippi (10), and Louisiana (eight). West Nile encephalitis was reported from Italy (one case in Sardinia) and the USA (three cases). A fatal case of Hendra virus infection was confirmed in Queensland, Australia.

Tasmania, Australia, confirmed endemic Ross River virus infection and reported two presumptive cases of the infection—one horse with neurologic signs and the other horse with a stiff gait and difficulty in locomotion.

In late April, vesicular stomatitis (serotype New Jersey) (17 premises in five counties) was rediscovered in New Mexico resulting in quarantine and restrictions.

Germany and the USA recorded cases of rotavirus infection in foals—two foals in Germany and six cases in Kentucky. The USA also confirmed outbreaks of *Clostridium perfringens* type A diarrhea in foals, mostly in Kentucky. Salmonellosis was reported from the USA; a total of 25 cases were caused by untyped *Salmonella* species: 19 Group B; five Group C1; and one Group C2.

The USA also confirmed cases of Potomac Horse Fever (*Neorickettsia risticii)*, 17 in Kentucky and one in Oklahoma. Turkey reported three cases of leptospirosis. Switzerland confirmed one case of anaplasmosis (*Anaplasma phagocytophilum)* and three fatal cases of equine grass sickness, which all presented with colic. The Northern Territory, Australia, reported a case of suppurative bronchopneumonia caused by *Burkholderia pseudomallei*. Tyzzer's disease (*Clostridium piliforme)* was diagnosed in a foal in Kentucky.

**First Quarter Report for Australia*

Equine Disease Quarterly

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Contagious Equine Metritis: An Insidious and Potentially Pervasive Disease

Ever since initial reports of its discovery in England and Ireland in 1977, contagious equine metritis (CEM) has given rise to considerable concern among horse breeders in many countries. The contagiousness of the disease in breeding populations, ability to cause widespread short-term infertility in the mare, and the occurrence of the carrier state in both stallion and mare are all concerns about CEM, one of the most internationally regulated equine diseases.

The rediscovery of CEM in the USA in December 2008 reawakened awareness and concern about the disease and led to the most extensive epidemiologic tracing and diagnostic testing of any prior CEM event in the country. Several important findings were to emerge from these investigations. Perhaps most disturbing was that the source of CEM was traced to a Warmblood stallion imported into the USA in late 2000, which had not been detected on pre- or post-entry quarantine and testing. On retrospective analysis, the causal agent of CEM, *Taylorella equigenitalis*, was found to have spread to 22 stallions, one gelding, and five mares, all of which were subsequently found to be carriers of the organism. It should be emphasized that at no time over an eight-year period have there been any reports suggestive of CEM in mares following artificial insemination with semen from these stallions. Of major concern was the circumstantial evidence implicating indirect transmission of *T. equigenitalis* to the 22 stallions and one gelding through the use of contaminated fomites at different semen collection centers. Collectively, these findings serve to underscore the insidious and pervasive nature of CEM and the need for greatly improved biosecurity measures in facilities that engage in semen collection of stallions.

Of singular importance in preventing future CEM events in the USA or other CEM-free countries is the need for a highly reliable means of screening stallions and mares for the presence of the carrier state and sufficient monitoring to ensure the prescribed testing protocols are properly administered. Ideally, this should be an integral part of the pre-entry testing requirements implemented in the exporting country.

Experience over the years, however, has shown the need to complement pre-entry testing with additional post-entry quarantine and testing in the importing country. Had such a system not been in place in the USA, CEM would have been reintroduced multiple times, primarily through imported carrier stallions, the majority culture positive for streptomycin-sensitive strains of *T. equigenitalis*. Clearly, this brings into question the reliability of the pre-entry testing performed on these and perhaps other imported stallions and mares.

Current pre-entry and post-entry quarantine and testing requirements for CEM, especially of stallions, are logistically burdensome and costly for owners and breeders. Accordingly, every effort should be made to develop more reliable means of detecting the carrier animal that are more sensitive, specific, and rapid than present testing procedures. The value of molecular-based tests, such as polymerase-based assays, need to be fully explored side by side with classical technologies.

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Mobile Blue Light Therapy

Horses are long-day seasonal breeders. The natural reproductive period coincides with the light-filled days between May and September, when the environment is optimal for the survival of offspring. However, the universal birthday for many horse breeds is January 1. This creates a demand for early foals in order to produce mature yearlings and two-year-old racehorses.

Utilization of artificial light to advance the breeding season is common practice within the

Thoroughbred industry. Mares are maintained indoors under barn lighting until 11 p.m. for eight to 10 weeks beginning around December 1. The artificially extended day length acts to inhibit the hormone melatonin and fools the mare's reproductive system into activating earlier in the year. Historically, light from a 100-watt light bulb in a 12-foot by 12-foot stall has been used. This amount of illumination is loosely defined in the literature as "enough light to read a newspaper."

Recently, light in the blue light spectrum (465-485nm) has been found to facilitate more accurate and efficient levels of melatonin inhibition in other species. In 2011, we investigated the threshold level of blue light required to inhibit circulating concentrations of melatonin in the horse and found it to be within the range of 10-50 lux. (Lux is the standard international unit of illuminance). The average light intensity at eye level in a stall illuminated by a 100-watt light bulb is 250 lux. Of greater significance was that the level of melatonin inhibition achieved did not differ when light was administered to one or both eyes.

A second multi-institutional study was conducted to determine whether low-level light to a single eye from a head-worn light mask could advance the breeding season in mares maintained outdoors. Fifty-nine non-pregnant, healthy Thoroughbred mares were allocated to one of three groups. On December 1, Group 1 (n=16) was housed indoors in individual stalls under barn lighting (250 lux) until 11:00 p.m. daily. Group 2 (n=25) wore light masks programmed to be on from 4:30 p.m. to 11:00 p.m. daily and was maintained outdoors as a herd. Group 3 (n=19) was maintained outdoors under the natural photoperiod as a control. All mares were maintained on farms in Lexington, KY.

At two-week intervals until mid-February, all mares received rectal ultrasound examinations and blood was collected for progesterone hormone analysis. Oestrous cyclicity was defined as the presence of follicles >20mm detected in conjunction with serum progesterone >1ng/mL, indicative of ovulation. On February 10, the number of mares determined to have ovulated was 14/16 (87.5%) in Group 1; 20/25 (80%) in Group 2; and 4/19 (21%), in Group 3. There was no statistical difference between Groups 1 and 2, indicating that mobile blue-light therapy from head-worn light masks is as effective at advancing seasonality as indoor barn lighting.

Studies are underway to investigate additional applications of mobile blue-light therapy in horses for the purposes of increasing foal birth weights in early foals and mitigating the effects of jet lag in performance horses. The light mask technology will be available in 2013.

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Fluoridated Water and Horses

The potential risk of fluoride-supplemented public water to horses is a topic that periodically arises. A casual internet search of this topic can uncover alarming reports purporting fluoride poisoning in horses from fluoridated municipal water. These reports typically are published in non-peer reviewed sources and are missing important information necessary to confirm the diagnosis, to rule out exposure to other fluoride sources, and to eliminate other potential causes. A careful review of the peer-reviewed literature in reputable scientific journals showed no published reports documenting fluoride poisoning in horses due to ingestion of fluoridated public water.

Fluoride is one of the most common elements in the environment and is found naturally in soil, rock, water, air, plants, and animal tissues. Volcanic rock and ash and water from deep wells or hot springs in some regions are naturally high in fluoride. Low concentrations of dietary fluoride can be beneficial to animals; excessive amounts can cause fluoride poisoning (fluorosis).

Fluorosis can occur in any species, including horses. In the past, fluorosis occurred more commonly due to ingestion of forages or waters contaminated with fluoride-containing industrial waste, high-fluorine rock-phosphate supplements in animal feeds, and fluoride-containing

rodenticides, insecticides, and other chemicals. Regulations restricting the amount of fluoride in industrial pollution, requiring de-fluoridation of rock-phosphate feed ingredients, and banning many fluoride-containing pesticides have greatly decreased the occurrence of fluorosis. Fluoride poisoning still occasionally occurs in areas with high volcanic activity or secondary to ingestion of fluoride-containing medications or contaminated water.

Acute, high-dose intoxications result in severe signs and rapid death. Chronic, lower dose intoxication causes predominantly tooth and bones abnormalities. While small amounts of fluoride improve tooth and bone strength, excessive amounts can cause lameness, stiffness, bone thickening, pain and difficulty eating, weight loss, poor growth rates, and poor health. Teeth are affected during the period of tooth development, which in horses is complete before 4-5 years of age. Fluorotic dental lesions will not develop if animals are exposed to excessive fluoride after permanent teeth have erupted.

Public water sources in Kentucky and nationwide often are supplemented with fluoride to help prevent dental disease in humans. Fluoride supplementation in public water is targeted to achieve fluoride concentrations of 0.8 to 1.3 mg/L. The maximum fluoride concentration permitted in public water sources by the national Safe Drinking Water Act is 4 mg/L. The maximum safe level of fluoride in water for horses has not been established. Published guidelines for horses are based on extrapolations from other species. In the USA, the EPA recommends a maximum fluoride concentration of 2 mg/L in water intended for livestock.

In Kentucky, the majority of horses drink fluoridated public water as their major water source, and fluorosis is not seen in this horse population. Studies are needed to determine safe limits of fluoride in feed and water for horses, however evidence to date indicates that fluoride concentrations allowable in U.S. public water systems are well tolerated by horses and do not cause fluorosis.

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Recent Changes to the USEF Equine Drugs and Medications Rule

The United States Equestrian Federation (USEF) is the National Governing Body for Equestrian Sport. The mission of its Equine Drugs and Medications Program always has been to protect the welfare of equine athletes and ensure the balance of competition.

Recently, there have been significant changes to the Federation's Equine Drugs and Medications Rules. The USEF Board of Directors voted to amend its Therapeutic Drug Rule and restrict use to a single nonsteroidal anti-inflammatory drug (NSAID), allow for the emergency use of flunixin, and reclassify anabolic steroids as forbidden. Additionally, the USEF Board adopted changes to the penalty structure regarding Fédération Equestre Internationale (FEI) banned substances.

As of December 1, 2011, only one of the seven approved NSAIDs listed in the USEF Rule GR 410.4 is permitted to be present in the same plasma or urine sample. Due to this rule change, revisions have been made regarding detection times of some of the therapeutic drugs used on competition horses. Most notably, the detection time for the seven NSAIDs approved for use with quantitative restrictions currently has been reduced from seven days to three days when administered according to the dose and time recommendations currently provided by USEF.

The USEF Board of Directors also approved a rule provision allowing for the emergency administration of flunixin by a veterinarian to treat colic or an ophthalmic emergency. Filing a USEF Medication Report Form is required if an NSAID listed in GR410 (a) through (g), other than flunixin, has been administered to the horse within the three days prior to competition. A Medication Report Form is required to be signed by the veterinarian who administered the flunixin, and the same

medication report should document a 24-hour withdrawal from competition following administration. It is important to note that compliance with this rule is dependent upon the flunixin being administered by a licensed veterinarian following a physical exam.

Anabolic steroids will be considered a forbidden substance under the USEF Therapeutic Rule. No anabolic steroid is to be administered to a horse or pony in the time before competition such that it—or any metabolite of it—might be present in the animal or might be detectable in its blood or urine sample at the time of competition. The Federation utilizes the Racing Medication and Testing Consortium guidelines for recommended detection times.

Also effective December 1, 2011, the FEI Clean Sport initiative inspired changes to USEF GR 409, which affect the rules governing FEI discipline competition at USEF Licensed Competitions. (www.feicleansport.org/prohibited.html)

The USEF strongly encourages its members and veterinarians to review the current Drugs and Medications Rule and to be aware of the published recommendations for treating a horse in competition. These recommendations can be found in the Federation's Drugs and Medications Guidelines pamphlet online.

Resources

U.S. Equestrian Federation, www.usef.org.

Fédération Equestre Internationale, www.horsesport.org.

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