EQUINE DISEASE QUARTERLY

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## COMMENTARY

IN THIS ISSUE



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LLOYD'S

THE EYES OF THE INTERNATIONAL HORSE community will be on Kentucky in a few months, watching and awaiting the results of the 2010 World Equestrian Games (WEG). On one day, for example, NBC reportedly plans to broadcast live from the Ryder Cup golf tournament in Wales, then switch to live coverage of the Games. The potential worldwide audience could reach 500 million.

The results will crown champions, both four-legged and human. Championships will reflect the equine winners' genetic heritage, their evaluation and selection as athletes, and their aptitude and training for a specific discipline. Their human partners' talent and skills also will be tested to the maximum. Simply stated, the best are competing against the best for the ultimate goal—to win.

Some competitors will race the clock, while others will be adjudicated by a panel of renowned judges who will use their skills of both objective and subjective decision-making to assess the performances of the horses and their partners. Only the best of the best should win.

Yes, all of this comes to Kentucky in September, but what about those individuals who cannot make the trip? Will this North American event inspire them to be better at their sports and disciplines? We can only hope that is the case, that WEG becomes the "seed" from which hundreds and thousands of horse enthusiasts and owners, young and old, will be inspired to follow their dreams, to pursue their passion for horses.

Around the world today, the impact of equestrian competition on lives, cultures, and economies is obvious. It stems in part from the time when Genghis Khan and his followers invaded the Middle East and Eastern Europe on their Mongolian ponies. The demand for a skilled cavalry became necessary to defeat these invaders. The knowledge and skills of those early cavalrymen became the foundation for many of today's WEG events.

Equestrian events like WEG drive interest in American horse breeds, introducing, and in some cases re-affirming, the genetic and phenotypic qualities developed in the United States. The expansion of American breeds into Europe, Australasia, South America, and more recently into China is a clear sign of the demand for these qualities.

In 2010 China will host its 4th annual National Horse Expo, providing the international horse community an opportunity to introduce its breeds, disciplines, and products to a rapidly expanding market. Demand is growing in China for breeds developed in North America. The Chinese are developing new competition concepts around gymkhana-style team sports through clubs rather than the traditional horse show competition, which is a long way from the days of Genghis Khan but another way to enjoy horses.

While the eyes of the international horse community are on Lexington during WEG, we must remember that the market for our U.S. horse breeds is global. Events like WEG put the focus on our winning American breeds.

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INTERNATIONAL

# First Quarter 2010*

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

Contagious equine metritis (CEM) was reported from France, Germany, the UK, and the USA. France confirmed a single case in a Trotter. Two mares were cultured positive for *Taylorella equigenitalis* in Germany. The UK reported two cases on separate premises, one involving an Arabian stallion and the other a Highland mare. In the USA, one additional stallion (non-Thoroughbred) was cultured positive for *T. equigenitalis*. The stallion, which had been identified with the 2008/09 CEM event, had not been tested until early 2010.

Outbreaks of equine herpesvirus-1 (EHV-1) related respiratory diseases were reported on single premises in three states in the USA. The UK confirmed two cases of respiratory infection due to EHV-4. Outbreaks of EHV-1 abortion were reported from Argentina, France, Germany, Ireland, Japan, Switzerland, the UAE, UK, and USA. Single cases in Thoroughbreds were confirmed in Argentina, Germany, and the UAE. France reported 10 cases on seven premises, the majority involving Thoroughbred mares. Four outbreaks were recorded in Ireland, with nine abortions on one premises (all in vaccinated Thoroughbred mares) and single cases on each of three additional farms. Japan reported 26 abortions in Thoroughbreds involving 10 premises, the majority in vaccinated mares. Two cases of EHV-1 abortion on one premises were confirmed in Switzerland. In the UK, nine cases of abortion and one neonatal death in Thoroughbreds were diagnosed on individual premises. The USA reported 16 abortions, the majority in Thoroughbreds. Isolated cases of EHV-1 myeloencephalopathy were recorded in France and the UK. Japan reported five cases in vaccinated horses on one premises. An extensive outbreak was reported from Switzerland in which 10 of 20 horses and a donkey developed neurologic signs, with four horses having to be euthanized. The USA confirmed limited occurrences of the disease in Louisiana, Massachusetts, and New Jersey.

Equine influenza was reported from Ireland, Sweden, and the USA. The disease was diagnosed in 10 partially vaccinated Thoroughbreds on two premises in Sweden. An isolated outbreak of respiratory disease in mini-donkeys in the USA was associated with evidence of concurrent influenza virus and EHV-1 infections.

Strangles was reported from Chile, France, Germany, Ireland, Korea, Sweden, the UAE, UK, and USA. Some countries regarded the disease as endemic, whereas others recorded limited outbreaks, especially in non-Thoroughbred horses, many of which were unvaccinated.

Many countries consider equine piroplasmosis endemic in their respective equine populations. As of early April, the USA reported 376 of 2,172 horses tested seropositive for *Babesia (Theileria) equi*, of which 292 were under quarantine on the index ranch in Texas. Additional seropositive horses are in quarantine in 10 states, including Texas. Only one of 861 in-contact horses in 17 states was confirmed seropositive. Testing for interstate shipment or movement to events resulted in 17 *B. equi* seropositive horses detected at racetracks in New Mexico. There is evidence that certain tick species on the index premises are capable of transmission of the infection.

France, Germany, Italy, and the UK confirmed cases of equine infectious anemia (EIA). Germany recorded seven cases on premises in one district; Italy reported three cases of subclinical infection on individual premises; the UK diagnosed EIA in two horses imported from Romania through Belgium.

Thirteen cases of leptospiral abortion due to *L. interrogans* serovar *pomona* were diagnosed in Kentucky, USA. The USA also reported four cases of *Lawsonia intracellularis* infection in foals confirmed by polymerase chain reaction (PCR) assay. Two cases of equine viral arteritis were diagnosed in Germany based on virus isolation and PCR. Sweden reported a single case of salmonellosis in a Trotter.

** Fourth Quarter Report for Australia*

**Equine Disease Quarterly**

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NATIONAL

# Adverse Events

AN ADVERSE EVENT CAN BE BROADLY DEfined as an undesirable occurrence after the use of a vaccine, drug, animal device, insecticide, medicated feed, etc. Multiple federal agencies are involved in taking reports of adverse events in animals, which can make it difficult for owners and veterinarians to easily notify the appropriate agencies.

Adverse reactions can range from a minor swelling at an injection site to salivation and diarrhea following an insecticide administration to acute collapse and death. The treatment of the animal should always come first. However, reporting adverse events for products used on horses is an important follow-up to the incident.

## Biological Products

The U.S. Department of Agriculture (USDA) Center for Veterinary Biologics (CVB) oversees biological products (vaccines, antisera, diagnostic kits, etc.) to ensure compliance with the U.S. Virus-Serum-Toxin Act. Consumers and veterinarians are advised to first contact the manufacturer of these products to report an adverse event and obtain advice from their veterinary services departments. Then, a report can be made to the USDA-CVB at http://www.aphis.usda.gov/animal_health/vet_biologics/.

A summary of adverse events reported to the USDA-CVB from 1999-2005 was published in the *Journal of the American Veterinary Medical Association*. Of the reports received by the CVB for horses, the three most numerous adverse events were classified as systemic (transient fever, malaise, and inappetence), 37.71%; local (localized swelling and pain), 16.50%; and anaphylaxis-hypersensitivity (hives, urticaria, acute collapse), 10.10%.

Veterinary drugs (including dewormers), medicated feeds, and animal devices are regulated by the Food and Drug Administration Center for Veterinary Medicine (FDA-CVM). "Adverse drug experiences" should be reported to the manufacturer first. Alternatively, a report can be made with Form FDA 1932a directly to the CVM. The form can be requested at 1-888-FDA-VETS (1-888-332-8387) or can be obtained at CVM's website: http://www.fda.gov/AnimalVeterinary/default.htm. Animal and veterinary drug, feed and product recalls are also posted at the above website. Perhaps the most visible FDA-CVM recall was pet food in 2007 for melamine contamination.

Topical insecticides for animals are regulated by the U.S. Environmental Protection Agency (EPA). Any pesticide federally approved by the EPA has an EPA registration number (sometimes written as EPA Reg. No.) on the label, which is needed in the event of reporting an adverse event. Horse owners should report adverse reactions to pesticides to the manufacturer, who is required to forward the information to the EPA. Horse owners can also report an adverse reaction directly to the EPA by following the instructions at http://pesticides.custhelp.com/cgi-bin/pesticides.cfg/php/enduser/std_alp.php.

Veterinarians (only) should use the National Pesticide Information Center's Veterinary Pesticide Adverse Effects Reporting portal at http://pi.ace.orst.edu/vetrep/.

In order for agencies to identify trends or spikes in adverse event reports, veterinarians and owners need to take the initiative and file reports with the appropriate manufacturers and federal agencies. Only through this process can a greater "adverse event" be averted.

Frana, T.S., L.A. Elsken, S.A. Karli, (2006). Summary of adverse event reports for veterinary biologic products received by the USDA from 1999-2005. JAVMA 229(7)1100-1102.

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# Understanding Piroplasmosis

EQUINE PIROPLASMOSIS IS CAUSED BY A protozoan parasite, either *Babesia. equi* (formerly known as *Theileria equi*) or *Babesia caballi*. Due to its prevalence in recent U.S. outbreaks, *B. equi* is the focus of this article.

The recent insidious emergence of piroplasmosis, a tick-borne disease, is a striking reminder of the vigilance required to remain free of the class of infectious diseases that include persistence in their pathogenesis. Pathogen persistence is the ability of an infectious organism to remain in the host long-term, even for life, in the absence of easily detectable clinical disease. A critical outcome of persistence is infected populations that are clinically silent reservoirs for transmission.

Infection of equine erythrocytes by *B. equi* leads to variable levels of anemia, fever, anorexia, malaise, and icterus. Although death is possible following infection of a naïve horse, it has not been reported in the current U.S. infections. The reasons for clinically silent transmission of *B. equi* are not well understood. Possibilities include missed diagnosis due to the non-specificity of clinical signs; the contributions of parasite virulence and the horse's ability to control parasite replication; the roles of infection prevalence within horses and transmission of competent tick populations; and the overall health status of newly infected horses. These parameters likely contribute collectively to transmission dose and clinical outcome of initial infection.

Although the host-parasite-vector parameters responsible for the level of clinical disease are not well understood, factors likely responsible for re-emergence of *B. equi* infections in the United States are better defined. The historical widespread use of the complement fixation test (CFT) for serological screening of horses moving internationally likely allowed for entrance of infected horses into countries considered free of infection and/or disease. Equine immunoglobulin IgG(T) does not fix complement via the classical pathway and therefore contributes to false-negative CFT results. Movement of infected horses into areas with transmission-competent ticks may lead to additional infections. Transition to the use of cELISA and polymerase chain reaction (PCR) testing has enhanced detection of clinically silent, persistently infected horses. An important component of infection and disease control in a low-prevalence country such as the United States is treatment of persistently infected horses with the intent of eliminating *B. equi* and removing transmission risk. While a number of drugs have been tested, the majority of data have been derived using imidocarb dipropionate (ID). Published data clearly show that ID is an effective anti-babesial chemotherapeutic that reduces *B. equi* parasitemias associated with acute and persistent infections.

However, controversy exists concerning the ability of ID to completely eliminate *B. equi* from persistently infected horses. Several reasons exist for this controversy. Past use of the CFT to measure the expected decrease in anti-*B. equi* antibody following parasite removal may have given false-negative results, and since several different recommended ID doses and treatment protocols have been used, some may have led to ID-resistant strains. Alternatively, there may be naturally occurring strains or sub-populations of *B. equi* that are resistant to elimination by ID.

Further complicating assessment of chemotherapeutic efficacy in the complete elimination of *B. equi* persistence is the potential of persistence-specific antibody titers, even in the absence of stimulating antigen. Antigen-independent models have been proposed to explain the persistence of long-term antibody titers. These models include memory B lymphocytes with special "memory" qualities that need fewer signals to mature to plasma cells and/or the presence of long-lived, antibody-producing plasma cells. A possible outcome of persistent antibody titers is finding treated horses that are PCR-negative but antibody-positive for *B. equi*, suggesting parasite elimination but antibody persistence. Should such data be forthcoming, consideration must be given to changing the premise that specific antibody titers always indicate *B. equi* infection and transmission risk.

Management options available to owners of *B. equi* and/or *B. caballi* infected horses are evolving and variable depending on location.

Knowing that ticks are required for natural transmission allows for tick-free quarantine as one option. The implementation of this option is related to the practicality of maintaining a tick-free environment and knowledge of the transmission capacity of local ticks. Next, historical and recent data indicate that ID treatment will remove transmission risk from some infected horses; however, a clear understanding of the meaning of the presence of specific antibody in a treated, PCR-negative horse must be defined.

There are at least two explanations for an ID-treated, PCR-negative, antibody-positive horse. First is that a specific antibody may be the result of the length of the infection and long-lived memory B lymphocytes and plasma cells. Second is that it has been hypothesized that in PCR-negative, antibody-positive horses, parasites are sequestered in, for instance, capillary beds or bone marrow. With time the parasites will emerge in the peripheral blood, and such a horse will re-convert to PCR-positive and remain a transmission risk. It is the opinion of this author that the collective data indicating ID treatment for complete removal of *B. equi* and or *B. caballi* from infected horses are worthy of consideration in non-endemic countries. The final word on ID treatment must await the defining of the transmission risk of treated horses that are PCR-negative but possess persisting specific antibody.

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KENTUCKY

# Foal Pneumonia

FOALS, LIKE OTHER YOUNG ANIMALS, ARE especially susceptible to diseases. A review of necropsy cases over a one-year period at the University of Kentucky Livestock Disease Diagnostic Center was conducted to determine common pathologic diagnoses in the foals submitted for necropsy. For this study, all foals 1 day to 6 months of age were included. A total of 272 foals within this age range were submitted and examined in the one-year period. A variety of different pathologic diagnoses were made; however, by far the most common diagnosis was pneumonia.

There were 84 foals diagnosed with pneumonia, which represented 31% of all submitted foals. The cases were arbitrarily separated into age groups of 1 to 6 days, 1 to 4 weeks, and more than 1 to 6 months of age. Forty-two cases (51%) were less than 6 days of age, seven cases (9%) were 1 week to 4 weeks of age, and 33 cases (40%) were 1 to 6 months of age. In two cases the age was not indicated. These data show the first week of life to be a critical time for the development of pneumonia; however, pneumonia is also problematic in older foals. Fillies comprised 58% of the cases; colts, 42%. There were 71 Thoroughbreds (87%), four Standardbreds, two Quarter Horses, two Miniature Horses, one American Saddlebred, one Hanoverian, and one mixed-breed foal. The high percentage of Thoroughbreds is consistent with the horse population of the area. Thirty-eight of the 84 cases (45%) had other pathologic diagnoses in addition to pneumonia. Common additional conditions included enteritis, septicemia, and fractured ribs.

Pneumonia in this group of foals was commonly associated with bacterial infection. Other causes of foal pneumonia, such as viruses and parasites, were not diagnosed. Of the 84 pneumonia cases, bacteria were isolated from 40 cases, and 44 cases had either no growth (38 cases) or non-pathogenic bacteria (six cases). The foals often had been treated, and prior antibiotic therapy likely contributed to the inability to isolate bacteria even though there

likely was an underlying bacterial etiology in many of these cases. The most commonly isolated bacterium from the cases of pneumonia was *E. coli*, which was cultured from 14 cases. *E. coli* was followed by *Rhodococcus equi* (13 cases), *Klebsiella pneumoniae* (8), *Streptococcus zooepidemicus* (7), *Actinobacillus equuli* (5), and *Enterococcus spp.* (5). A variety of other bacteria were isolated on rare occasion. Thirteen cases had multiple bacteria isolated from the lung. *E. coli* was the most common bacterium isolated when a mixed culture was obtained.

*E. coli* was isolated primarily from younger foals, with 71% of the isolates from foals less than 1 week old. *Rhodococcus equi* is typically associated with pneumonia in older foals, and in this group of cases all 13 were in foals over 1 month of age. *Klebsiella pneumoniae* was also recovered primarily from young foals, with seven out of eight cases in foals less than 1 week old. The *Streptococcus zooepidemicus, Actinobacillus equuli*, and *Enterococcus spp.* cases were more equally divided between both young and older foals.

These findings show that pneumonia is one of the most important disease conditions in foals and that foals in the first week of life are especially at risk. A relatively small group of bacterial organisms are typically associated with the cases of foal pneumonia.

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