EQUINE DISEASE QUARTERLY

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COMMENTARY

IN THIS ISSUE

THIS ISSUE OF THE QUARTERLY CONTAINS several articles on diseases of horses that run the gamut of conditions. These diseases include an infectious neurologic disease in adult horses that only a few years ago appeared for the first time in this country, a viral infection of mares that causes abortions, and a type of cancer in mares. One constant is the need for rapid and accurate diagnosis. All of these conditions require a thorough and accurate pathologic examination and specific—sometimes elaborate—laboratory testing to achieve an accurate diagnosis.

A pathologic examination of a dead animal can be performed on the farm by a veterinarian, with tissue samples being sent to diagnostic laboratories for further examination and tests. Alternatively, the practitioner may have the horse transported to a veterinary diagnostic laboratory for a complete examination by a trained pathologist. This exam entails a detailed visual examination of the animal with complete dissection and sampling of tissues and possibly body fluids. The pathologist can recognize abnormal changes that may indicate a specific disease process or at least suggest what type of disease may be present. The pathologist is then able to conduct additional tests, including microscopic examination of tissues, to help arrive at a definitive diagnosis. Beyond the obvious importance of knowing why an animal died, the potential threat of exposure or transmission of a disease to other herd members and even to people makes accurate, timely diagnosis paramount.

Many of the conditions discussed in this issue occur as outbreaks, and diagnostic laboratories are on the forefront of emerging disease recognition, outbreak detection, and surveillance. With the constant threat of zoonotic diseases, potential for introduction of foreign animal diseases, and bioterrorism concerns, an advanced, high-quality diagnostic laboratory system is essential.

Unfortunately, in a time of budget cuts and revenue shortfalls, diagnostic laboratories are facing challenges in their efforts to provide rapid and complete service. Never has technology been advancing more rapidly than now, and it offers more rapid, sensitive, and accurate testing and disease diagnosis. However, this technology often requires elaborate and expensive equipment and more highly skilled technical operators.

Furthermore, the scope, role, and importance of diagnostic laboratories are all increasing. As new tests become available and more stringent regulations are placed on animal movement, more demands are being placed on diagnostic laboratories. Their importance must be realized and commitments made to adequately support and staff them. It is unrealistic for the major operational costs of a diagnostic laboratory to be borne solely by its users. Financial support must be viewed as an investment that will pay great dividends. We must recognize that diagnostic laboratories are essential to safeguarding animal health and more by protecting animal industries, food supply, human health, and potentially homeland security.

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LLOYD'S

INTERNATIONAL

First Quarter 2008

THE INTERNATIONAL COLLATING CENTRE, Newmarket, England, and other sources reported the following disease outbreaks.

Cases of African Horse Sickness (AHS) occurred in South Africa during the fourth quarter of 2007 and continued in 2008. The outbreak affected mainly young, unvaccinated, non-Thoroughbred breeding animals on a variety of premises, although vaccinated animals were also affected. Northern and eastern parts of South Africa are endemic for AHS, and cases are recorded annually. Equine encephalosis virus (EEV) serotypes 4 and 7 are also endemic in South Africa, occurring during the summer months. Approximately 1,000 Thoroughbred and non-Thoroughbred performance and breeding horses were reported as infected with EEV.

Contagious Equine Metritis (CEM) was confirmed in a single non-Thoroughbred horse in France.

Cases of abortion attributable to equine herpes virus-type 1 (EHV-1) infection were confirmed in Ireland (nine cases on five premises), Japan, (18 cases on 14 premises), the United Kingdom (three cases), and Central Kentucky, USA (10 cases among Thoroughbred mares on 10 farms). A single abortion attributable to EHV-4 was diagnosed both in Ireland and in the United Kingdom. An outbreak of paralytic disease caused by the non-neuropathogenic strain of EHV-1 was reported on a premise in France, affecting a non-Thoroughbred stallion and two mares that aborted. The paralytic form of EHV-1 was confirmed in one euthanized horse in the state of Delaware, USA.

A single clinical case of Equine Infectious Anemia (EIA) was identified in Bavaria, Germany, in a horse that was subsequently euthanized.

The last cases of equine influenza in Australia were reported on December 9, 2007, in New South Wales and on December 25 in Queensland. Other states and territories in Australia have remained free of influenza. There has been free movement of horses throughout Australia since March 14, 2008, and an extensive influenza surveillance program continues to be in place. In Japan, positive cases of influenza were detected at the Japan Racing Association (JRA) Ritto Training Center during January and in February at the Miho Training Center, with no new cases reported since March 11. Several riding horses stabled at Tokyo Racecourse and Chukyo Racecourse tested positive during February and March, respectively. Recent influenza isolates in Japan show no signs of antigenic change from Ibaraki/07 isolated in August 2007. At non-JRA facilities, several horses tested positive in January, and positive cases among riding horses throughout the country have been reported. Equine influenza was widely reported in the north of Sweden during January, primarily among trotting horses that had not been correctly vaccinated. Switzerland reported an outbreak on one premise among vaccinated non-Thoroughbred horses.

Four cases of Leptospira abortion were diagnosed among Thoroughbred mares in Central Kentucky during January, and cases of salmonellosis were diagnosed on two premises involving Thoroughbred horses during January in Japan.

Strangles was reported on premises in France, Ireland, Sweden, Switzerland, and the USA.

NATIONAL

USEF Equine Drugs and Medications Program

THE UNITED STATES EQUESTRIAN FEDERATION (USEF) is the national governing body for equestrian sport and is a member of the U.S. Olympic Committee. The USEF is responsible for enforcing the rules of 27 breeds and disciplines. Formerly this organization was known as the American Horse Shows Association (AHSA). The name may have changed, but the mission of its Equine Drugs and Medications Program has stayed the same since the program's inception in 1970.

Equine Disease Quarterly

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Over the past 38 years, the Equine Drugs and Medications Program has worked to protect the welfare of equine athletes and ensure the balance of competition. Currently, the program utilizes veterinarians and technicians around the country to collect blood and urine samples from horses competing at USEF events.

The USEF also contracts with the American Quarter Horse Association (AQHA) to enforce the AQHA's drug rules by collecting samples at Quarter Horse competitions for analysis. Additionally, the USEF is responsible for testing competitions throughout the United States that are operated under the rules of the Federation Equestre Internationale (FEI), the international governing body of equestrian sport headquartered in Lausanne, Switzerland.

In 2007, almost 17,000 blood and urine samples were collected and analyzed by the program, representing nearly 13,000 horses randomly selected for testing. Since 1995, the USEF has operated its own equine drug testing and research laboratory.

Drugs and medications are classified by the USEF's Drugs and Medications Rule as being permitted, restricted, or forbidden.

Permitted substances include dewormers, antibiotics (except procaine penicillin), antifungals, antiprotozoals, vitamins, electrolytes, and anti-ulcer medications. Caution is urged if one is using so-called herbal or natural products, since plants are commonly the source for pharmacologically potent, forbidden substances such as cocaine, reserpine, and marijuana.

Restricted medications include specific nonsteroidal anti-inflammatory drugs (NSAIDS), methocarbamol (muscle relaxant), and dexamethasone (corticosteroid). Restricted drugs are allowed to be present in the horse at the time of competition provided they do not exceed the levels specifically set for each drug.

Currently, no more than two approved NSAIDs are permitted in a horse's system at the same time, as long as neither is found in excess of respective restrictive levels. One exception to this regulation is flunixin and phenylbutazone, which are not permitted in a horse at the same time. A seven-day withdrawal from one of these two NSAIDs is recommended before initiating treatment with the other. In addition to flunixin and phenylbutazone, other NSAIDs that are allowed below restrictive levels include: naproxen (Naprosyn®), meclofenamic acid (Arquel®), firocoxib (Equioxx®), diclofenac (Surpass®), and ketoprofen (Ketofen®).

Very specific dose and time recommendations are published for all restricted medications to aid competitors, trainers, and veterinarians in maintaining compliance with the USEF's drug rules.

Forbidden medications and substances include those that may affect the cardiovascular, respiratory, or central nervous system or have a behavior-altering affect. This includes any stimulant, depressant, tranquilizer, local anesthetic, psychotropic substance, or drug that might affect the performance of a horse and/or pony, including corticosteroids and analgesics. Some forbidden medications may be used for legitimate emergency treatment if proper steps are taken.

In 2007, the USEF Drugs and Medications Program tested 802 days of competitions held under USEF rules, with slightly more than 150 positive findings. Violations included 26 for sedation and long-acting tranquilizers, 34 for excessive amounts of restricted medications, six for antihistamines, and violations for a lengthy list of miscellaneous substances. Penalties can include suspensions and/or fines and the return of all winnings. Fines for the above cases ranged from $750 to $5,000, and suspensions were for up to five months. The statistics for these positive findings do not include those of the AQHA. Including the testing done for the AQHA, more than 1,000 days of competition were tested.

Not all positive findings may be violations. If conditions for the therapeutic administration of a forbidden substance have been met, a positive finding can be considered compliance with the rule.

The USEF strongly encourages its members to review the current USEF 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 at http://www.usef.org/documents/competitions/2007/2007DrugsMedsGuidelines.pdf.

Resources:

- USEF Drugs and Medications, (800) 633-2472 or www.usef.org/contentpage2.aspx?id=dm
- United States Equestrian Federation, www.usef.org
- American Quarter Horse Association, www.aqha.com
- Federation Equestre Internationale, www.fei.org

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West Nile Incidence and Vaccination, 1999-2007

WEST NILE VIRUS (WNV), AN ARBOVIRUS endemic in North America, is the causative agent of West Nile Equine Encephalomyelitis (WNEE) and an important consideration in the differential diagnosis of horses with signs of neurologic disease. WNV vaccination is important in the prevention of WNEE and is considered one of the core equine vaccinations by the American Association of Equine Practitioners. Core equine vaccinations are those indicated for use in all horses irrespective of use or geographic location in the USA. (www.aaep.org/vaccination_guidelines.htm).

Since the initial detection of WNEE in 1999 in New York, the virus has spread throughout the 48 contiguous states and the District of Columbia. Data available from the United States Department of Agriculture (USDA) indicate that from 1999 through 2006 a total of 24,841 WNEE equine cases have been laboratory confirmed. The peak of the equine cases occurred in 2002 (Figure 1). Current as well as historical data regarding the number and location of WNEE is available at www.aphis.usda.gov/vs/nahss/equine/wnv and in the "Equine 2005 Part II: Changes in the U.S. Equine Industry," 1998-2005 at http://nahms.aphis.usda.gov. While still an endemic disease in the USA, a decline in WNEE is probably due to a combination of naturally acquired immunity, management, and frequent use of WNV vaccination. Management and control measures in the USA include pesticide use against larvae and adult mosquitoes, repellents (topical pyrethroids), and vector-resistant housing such as screened stalls or stalls with fans to reduce mosquito

It is important to acknowledge that the number of cases reported could be impacted by factors in addition to actual cases, including disease recognition on the part of equine owners, pursuit of an etiologic diagnosis by the examining veterinarian through laboratory testing, and reporting criteria and surveillance at the state level.

The frequency of use of the WNV vaccines has been estimated in the National Animal Health Monitoring Systems (NAHMS) "Equine 2005 Part I: Baseline Reference of Equine Health and Management." For operations that gave any type of vaccine to equids in the previous year, eighty-five percent vaccinated some or all of their resident horses against WNV, making this the most commonly used vaccine in horses in the USA. These facts illustrate the rapid and widespread response of both pharmaceutical companies and the equine industry to the disease risk posed by WNV in the USA. Three different types of WNV vaccines are now licensed and commercially available for use in horses in the USA: WNV killed with adjuvant; WNV canarypox recombinant with adjuvant; and WNV chimera with yellow fever virus vaccine. With an estimated equine population in the USA of approximately six million, the vaccine manufacturers marketed approximately 4.1 million doses in 2006.

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KENTUCKY

Equine Herpes Virus Abortions

THE MONITORING OF ABORTIONS ATTRIBUTABLE to equine herpes virus type-1 (EHV-1) initiated in 1957 among the Thoroughbred mare population of Central Kentucky has continued annually for the past 51 years. The number of abortions per 1,000 pregnant mares (as illustrated in Figure 2), based on accessions to the University of Kentucky Livestock Disease Diagnostic Center (LDDC) and confirmed by laboratory diagnosis, is considered an accurate reflection of the field incidence. This accurate number is due to the diligence of farm managers and attending veterinarians ensuring that all fetuses and neonatal foal losses are submitted for examination.

The figure for the number of pregnant mares is derived annually from the number of foals registered by the Jockey Club, taken as 70% of mares considered in foal. The most recent Jockey Club 2007 Fact Book reported 9,903 foals registered in Kentucky for 2005—29% of

Figure 1. Number of laboratory-confirmed human and equine West Nile Virus cases per year in the United States.

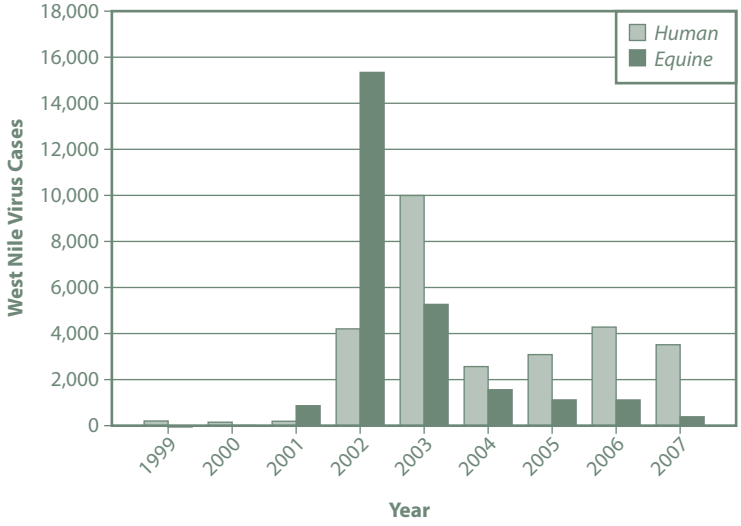
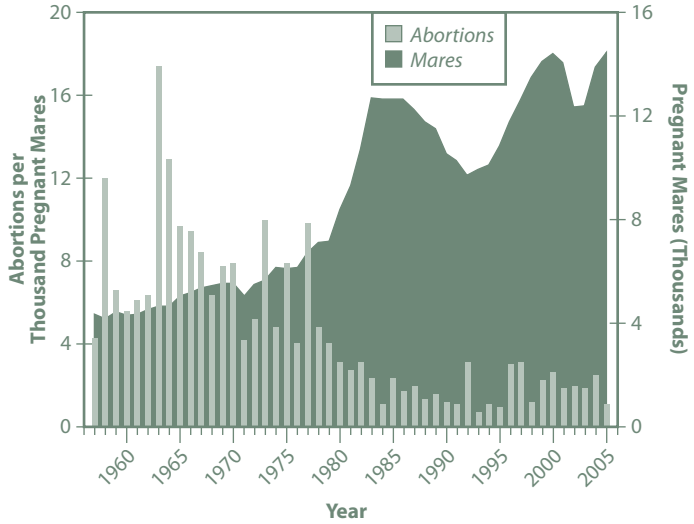


Figure 2. Prevalence of EHV-1 abortion and the population of Thoroughbred mares in Kentucky, 1957-2005.



This is the correct version of Figure 2. Due to a printing error, the vertical axes were displayed incorrectly in the printed version. We apologize for this error.

the U.S. foal crop—which translates to 14,147 pregnant mares. This number represents a recovery from the decline in numbers recorded during 2001 and 2002 due to the effects of Mare Reproductive Loss Syndrome (MRLS). The number of EHV-1 abortions per 1,000 pregnant mares has remained below five since 1977 despite a doubling in size of the mare population. Since 1977 the overall number of EHV-1 abortions has ranged from a low of 11 in 1993 to a high of 47 in 1997, with 18 recorded in 2006 and 22 in 2007. The majority of cases in recent years are single events on individual farms among a population of mares that is routinely vaccinated against the disease. However, multiple abortions may still occur, as evidenced by one farm in 2007 that experienced six abortions. When multiple abortions occur, the initial or index case is usually the source of infection to subsequent losses. The aborted fetus and placenta are a potent source of virus that overwhelms the immunity of even a vaccinated mare that is a contact in the same barn or paddock. To prevent such an occurrence, the precautions outlined in Figure 3 should be strictly followed. The accumulated data confirms that sound management practices (as illustrated in Figure 4) combined with an annual vaccination program at five, seven, and nine months of pregnancy, have contributed to a low level of EHV-1 abortions over the past 30 years.

Figure 3. Prevention of EHV-1 abortion:

- Divide pregnant mares into groups by stage of gestation and maintain in isolation.
- Isolate all new arrivals for 21 days.
- Keep first-foaling mares away from older mares.
- If mares are removed, do not reintroduce.
- Maintain vaccination program.
- Segregate pregnant mares from weanlings and other horses.
- Keep foster mares away from pregnant mares.

Figure 4. Action to be taken if an abortion occurs:

- Place aborted fetus and membranes in leak-proof container and dispatch to diagnostic laboratory.
- Disinfect and clean contaminated area.
- Place mare in isolation.
- Do not move in-contact mares.
- If positive for EHV-1, split in-contact mares into small groups.

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Mammary Gland Tumors in Mares

Mammary neoplasia (tumors) in the mare is exceedingly rare. To date, published cases consist of reports of six single cases and one report each for two, three, and four mares. Of published cases, all tumors were malignant except one report of a benign (non-cancerous) adenoma. Previous abattoir studies report an incidence of 0.11% to 1.99% for equine mammary tumors.

Published reports of mammary neoplasia in mares have several characteristics in common. Mares presented with unilaterally or bilaterally enlarged mammary glands that were firm, usually painful, and typically ulcerated and/or draining serosanguinous or purulent material. Clinical signs progressed over weeks to months. Pregnancy and lactational status varied; age ranged from 12 to 21 years. Initial diagnosis of mastitis and treatment with antibiotics and anti-inflammatory agents initially resulted in some improvement of discharge and swelling, but clinical signs always recurred.

At the University of Kentucky Livestock Disease Diagnostic Center from 1994 to March 2008, 11 cases of mammary neoplasia were diagnosed. Most cases were submitted for necropsy; a small number were biopsy samples. All eleven cases were malignant, and complications resulting from primary neoplasia or metastasis were the cause of death or euthanasia in most cases. Often there was a history of weight loss, depression, and laboratory results indicating other organs were affected by neoplasia, such as the liver and kidneys. More than half of the cases had gross and/or microscopic evidence of metastasis such as lymph node enlargement or neoplastic nodules in other organs. Based on these results, it appears that equine mammary neoplasms are much more likely to be malignant than benign, and hence carry a poor prognosis for long-term survival.

Definitive diagnosis of mammary neoplasia is made with microscopic examination of excised mammary tissue. Cytologic examination of fine needle aspirates and/or mammary

discharge is usually unrewarding in terms of confirming or ruling out neoplasia. Most neoplastic lesions have an inflammatory component, especially with chronic and/or ulcerated masses. For that reason, observation of large numbers of inflammatory cells and bacteria does not help to differentiate between neoplasia with an inflammatory response and true inflammation of the mammary gland. A core or excisional biopsy taken from affected tissue some distance away from sites of ulceration and drainage is recommended. Samples taken from ulcerated tissue may show only inflammation and necrosis and not contain enough neoplastic tissue for definitive diagnosis.

The treatment of choice for mammary neoplasia in the mare is total removal of mammary tissue and any accessible lymph nodes. Disease may initially appear unilaterally but subsequently become bilateral or show evidence of bilateral disease grossly or microscopically. Unfortunately, by the time a definitive diagnosis is made and surgery is performed, metastasis to regional and distant lymph nodes and tissues has most likely occurred. Most mares do well immediately after surgery then have recurrence of neoplasia at the excision site or evidence of metastasis such as lymph node enlargement, weight loss, and malaise. Mares are often euthanized due to poor prognosis or deterioration due to metastases. In a mare with enlarged mammary glands and poor response to antibiotic therapy, neoplasia should be considered a differential diagnosis.

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