EQUINE DISEASE QUARTERLY

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COMMENTARY

IN THIS ISSUE

I absolutely detest the dinner time phone calls from a robot voice soliciting input for a survey. During the last election season, my husband answered the phone and a (real!) person calling from a political party asked who he was going to vote for in the upcoming election. His answer: "whoever calls me the least, and so far, your candidate just lost."

Add an ever increasing number of email surveys from mystery organizations—all with a "Click Here to Participate" box that immediately raises a red flag of potential computer viruses—and it is clear why participation in any survey is so low.

After all, who has the time?

Not all surveys are created equal, however. Most people reading this publication have a financial interest in the horse industry. Backyard horse owners as well as million-dollar show barn owners want access to veterinary services, feed suppliers, equipment stores, and supplemental services. To attract quality businesses to an area, the concept of "follow the money" comes into play.

$23.4 billion dollars!

Does that number pique your interest? It should. That was the total value of Kentucky's equine and equine-related assets in 2011, according to the 2012 Kentucky Equine Survey.

The number is not wishful thinking. It is based on information provided by individuals who participated in the confidential survey and supplied data about their horse operations. The participants didn't hang up the phone. They didn't throw away the envelope. Instead, they recognized the value of an accurate assessment of the state's horse industry. And they were right!

Not everyone participated. Some people believe that supplying *any* personal data to a governmental agency or academic institution will have adverse effects—increased taxes, lack of real confidentiality, government interference with their horse operation. Other people may believe that their operation is so small that it doesn't matter (survey results say differently), and some people just truly were not interested.

So, how do you decide if you should participate in a survey?

Who is conducting the survey, and what other organizations are involved? Are they reputable or unknown to you? What is the purpose of the survey? Read the survey website. Call the contact person and ask questions. Be informed, because the information you provide could be important to increasing the accuracy of an economic survey. Or it may assist grant-funding agencies in deciding where to concentrate their research dollars. Or it may be critical in determining risk factors for a disease outbreak.

Dr. Stowe's and Dr. Rossano's article outlines the survey logistics for those contemplating such an endeavor. After seeing a presentation on the survey results, I was impressed not only by the economic impact of the Kentucky horse industry, but also in the hours of hard work by multiple individuals and organizations as well as of the people who completed the survey.

Phase 1 Results of the Kentucky Equine Survey can be read at http://www2.ca.uky.edu/equine/kyequinesurvey.

The next time the "survey" calls, consider the importance of your participation.

CONTACT:
Dr. Roberta Dwyer
(859) 218-1122
rmdwyer@uky.edu
Maxwell H. Gluck Equine Research Center
University of Kentucky, Lexington, Kentucky.

UK UNIVERSITY OF KENTUCKY
College of Agriculture, Food and Environment
Department of Veterinary Science

LLOYD'S

INTERNATIONAL

First Quarter Report 2013*

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

Reports of contagious equine metritis (CEM) were received from Germany, Ireland, and the USA. Three stallions and one mare, all non-Thoroughbreds, were confirmed positive for *Taylorella equigenitalis* in Germany. Ireland diagnosed CEM in a non-Thoroughbred stallion, which has since been successfully treated. Three recently imported Dutch Warmblood mares were cultured positive for *T. equigenitalis* in post-entry quarantine in Kentucky, USA. California reported detection of the organism in two mares and two stallions, all non-Thoroughbreds, none of them recently imported. One of the mares had been bred to one of the positive stallions in 2012. The original source of infection for this outbreak is still undetermined.

Strangles was reported in France (two outbreaks), Ireland, Sweden (endemic) and the USA (outbreaks in Kentucky, Maine, Ohio, and South Carolina). Equine influenza was only recorded in the USA, with outbreaks confirmed in Florida, Ohio, and Oregon. Two non-Thoroughbred stallions were diagnosed carriers of equine arteritis virus in Germany.

Equine herpesvirus 1 and 4 related diseases were reported from France, Germany, Ireland, Japan, Sweden, UK, and the USA. EHV-1 respiratory disease was confirmed in France (three outbreaks), the UK (three outbreaks), and the USA (numerous outbreaks in various states). Abortion due to EHV-1 was recorded in France (six outbreaks), Germany (five cases), Ireland (three outbreaks, one involving two cases of neonatal pneumonitis, and the other two outbreaks involving five mares), Japan (17 cases on 11 premises), Sweden (one outbreak), the UK (two outbreaks, including one case in a mare and another involving a fatal case in a neonatal foal), and the USA (five isolated cases).

EHV-1 neurologic disease was confirmed in Germany (seven premises), Ireland (one case), the UK (two cases on two premises), and the USA. The USA recorded a significant number of outbreaks in some states during the first three months of 2013. Wild type and mutant (neuropathogenic) strains of EHV-1 were associated with the USA outbreaks. Outbreaks involving wild type virus were characterized by low morbidity and low to zero case-fatality rates.

Respiratory disease associated with EHV-4 was diagnosed in France (13 outbreaks), Germany (one case), Japan (6 cases on one premises), and the USA (numerous cases/outbreaks recorded).

The USA reported a number of cases of equine herpesvirus 2 or 5 infection in several states, the clinical significance of which remains to be determined.

Equine infectious anemia was recorded by France and the USA. The former diagnosed a fatal case in a donkey on Island La Réunion. The disease was confirmed on two premises in California, USA, one a "bush track" facility engaged in non-sanctioned racing (two positives of 16 tested). A further case was diagnosed on a second premises, epidemiologically related to the first.

Reports of equine piroplasmosis were received from France (endemic), Switzerland (single case), United Arab Emirates (endemic in non-Thoroughbreds, periodic clinical cases), and California, USA (five positive cases of *Theileria equi* on one premises and two on another).

Salmonellosis was recorded by Germany (one case), Ireland (one case), and the USA (disease diagnosed in several states; species Groups B and C2 involved). Three cases of equine monocytic ehrlichiosis were reported from the USA. Cases/outbreaks of *Lawsonia intracellularis* infection were confirmed in foals in a number of states, with Kentucky recording 16 cases.

The USA also reported 28 cases of leptospiral abortion in Kentucky and 20 cases of nocardioform placentitis and abortion (six due to *Crossiella equi* and 14 due to *Amycolatopsis* spp).

A non-fatal case of Ross River virus infection was reported from the Northern Territory, Australia. A number of outbreaks of *Rhodococcus equi* infection were diagnosed in various states in the USA.

**Fourth Quarter Report for Australia*

Equine Disease Quarterly

Editors
Roberta Dwyer
Peter Timoney
Neil Williams

Staff
Diane Furry
Tawana Brown
Dennis Duross

Correspondence should be addressed to the editors, Department of Veterinary Science, Maxwell H. Gluck Equine Research Center, University of Kentucky, Lexington, Kentucky USA, 40546-0099
Telephone (859) 257-4757
Fax (859) 257-8542

Internet address:
http://www.ca.uky.edu/gluck/index.htm

Streptococcus zooepidemicus: Only an Opportunist?

The association of a *Streptococcus* sp. with cases of equine fibrinous pneumonia was first reported in 1887 by the German bacteriologist J. W. Schultz. Now known as *S. zooepidemicus*, this organism is the most frequently isolated bacterial pathogen of the respiratory tract of weanling and yearling horses. Many of these infections are secondary to respiratory viral infections or to transportation of extended duration.

Although different genetic and serologic variants (serovars) of *S. zooepidemicus* co-colonize the tonsillar complex of most healthy horses, only a single Streptococcal clone is usually found in disease of the lower respiratory tract, a clone being isolates of a bacterial species that are indistinguishable in genotype. The invading clone varies from foal to foal in a group, although the same clone may affect more than one foal in that group. Genetic testing for specific genes in bacterial isolates can provide a valid, cost-effective approach to epidemiologic studies based on sequencing.

Most equine respiratory infections associated with *S. zooepidemicus* appear to be endogenous involving expansion of a clone similar to those in that animal's tonsillar complex. Nevertheless, outbreaks of respiratory disease involving specific clonal genotypes transmitted in a geographic area over an extended time period have been observed in recent years. Each outbreak was associated with a different sequence type of *S. zooepidemicus*, a phenomenon similar to that observed with increasing frequency in dog shelters in North America, South Korea and the UK.

The enhanced virulence/transmissibility of epidemic Streptococcal clones is probably explained by genetic rearrangement or acquisitions that affect expression of virulence factors or increase their ability to proliferate and damage respiratory tissue or avoid innate immune defenses. For instance, acquisition of sequence that encodes a binding site for plasminogen in a virulence protein would create sites on the bacterial surface with plasmin-associated proteolytic activity for host cell or plasma components. Rapid proliferation accompanied by shedding of large numbers of streptococci from the respiratory tract would favor onward transmission of the clone.

The extreme diversity of *S. zooepidemicus* of equine origin and evidence that it has acquired DNA by lateral horse-to-horse transfer from other streptococci suggest emergence of novel clones may be a frequent event. The mechanism and site of these transfers are unknown. However, DNA elements that can mediate genetic transfer to recipient strains of *S. agalactiae* are present in the chromosomes of some strains of *S. zooepidemicus*. Another potential mechanism involves direct uptake and exchange of DNA, an extremely efficient process between co-colonizing strains of *S. pneumoniae* in the human nasopharynx, an environment, that physically at least, closely mimics that of the equine tonsillar crypt.

Despite the diversity of equine isolates of *S. zooepidemicus*, emerging experimental evidence indicates that immune responses cross-protective for different strains can be generated. This discovery will be a significant asset in the development of effective vaccines to combat Streptococcal respiratory infections.

CONTACT:
Dr. John Timoney
(859) 218-1106
jtimoney@uky.edu
Maxwell H. Gluck Equine Research Center
University of Kentucky, Lexington, Kentucky

Pastern Dermatitis—A Pathologist's Perspective

Inflammatory conditions of the pastern will be appearing with increasing frequency during the summer season. But as a diagnosis, "pastern dermatitis" leaves much to be desired. When this alone is noted on a biopsy report, it leaves the clinician and client with little useful knowledge.

Other names for this condition, with slightly varying clinical appearances, include scratches, mud fever, grease heel, dew poisoning, grapes, canker, and verrucous pododermatitis. But again, these colorful descriptors do not indicate the root of the problem. For that, pathologists rely on a series of modifiers describing the more subtle histologic (microscopic) variations on the theme of "dermatitis," and, just as importantly, a detailed history.

The skin overlying the pastern is not inherently different from anywhere else on the body, (with the exception of having longer hair, if not clipped). As such, the way it reacts to insult is rather ordinary: erythema (redness), erosions, ulcerations, and/or serous exudates in the acute phase of inflammation. Purulent (pus-like) exudate and granulation tissue form with a more prolonged insult, and fibrosis (scarring), epidermal thickening, and hyperkeratosis (scale, cornification) in chronic cases. The pastern, however, is uniquely qualified to develop severe, persistent, refractory skin disease because of its location and exposure to dirt, fecal material, persistent moisture, chemical irritants, ultraviolet rays, and direct trauma (plant stubble, rocks, overreaching/interfering). Draft breeds are more susceptible to pastern skin disease due to heavy feathering and possibly genetic factors.

Veterinarians routinely utilize in-house cytology, skin scrapings, direct microscopic examination of hairs, fungal cultures, and complete blood counts in their diagnostic work-ups for complex skin cases such as pastern dermatitis. In acutely severe cases or cases that are unresponsive to treatment, biopsies offer a direct view of the disease process and can lead to a definitive diagnosis. However, histopathology of inflammatory lesions is only useful when interpreted in light of the clinical history and gross appearance of the lesions. In order to maximize the utility of a biopsy, it is extremely important to take adequately large (6 mm punch) and multiple specimens of active lesions. Providing a detailed description, clinical history, overview of the animal's environment, diet, vaccination history, and overall herd health are also critical as well as good quality digital photographs.

While the treatment will obviously largely depend on the diagnosis, some basic principles are:

- Keep the area clean and dry.
- Monitor for and manage any sign of exuberant granulation tissue (proud flesh).
- Check the other feet and legs regularly to monitor any disease spread.
- If the skin appears to be dry and cracking, oil-based emollients or antimicrobial ointments can help reduce fissuring and secondary infections.

Pastern dermatitis can be a debilitating condition for horses. Correct diagnosis early in the course of disease can greatly expedite its resolution, and most horses will return to function.

CONTACT:
Dr. Lynne Cassone
(859) 257-8283
lynne.cassone@uky.edu.
Veterinary Diagnostic Laboratory
University of Kentucky, Lexington, Kentucky

Causes of Inflammatory Conditions of the Pastern

The most well-described (though not necessarily the most common) infectious etiologies include:

Bacteria
Dermatophilus congolensis
Staphylococcus aureus
Spirochetosis
Any cause of pyoderma

Fungi/yeast/oomycetes
Pythium spp.
Malassezia spp.
Phaeohyphomycosis
Zygomycosis

Parasites
Chorioptes mites
Pelodera strongyloides
Strongyloides westeri

Non-infectious causes
Contact irritant
Hypersensitivity
Drug reaction
Trauma
Photosensitization
Pastern leukocytoclastic vasculitis
Photoaggravated vasculitis
Pemphigus foliaceus
Chronic progressive lymphedema

Snakebite in Horses

With warm weather comes the increased risk of snakebite. The major venomous snakes in the United States are the pit vipers, including rattlesnakes, water moccasins, and copperheads. Pit vipers are named after the heat-detecting holes, or pits, on each side of the head that help the snake locate prey. Pit vipers can be differentiated from other snakes by their triangle-shaped heads, narrowed necks, and tail rattles (rattlesnakes only). Coral snakes, another type of poisonous snake in the U.S., do not pose much risk to horses because of their small mouth size.

Venom components vary tremendously by snake species, but most venoms contain substances that cause breakdown of tissues and blood vessels, impair blood clotting, and damage the heart. Venoms from some species of snake also contain neurotoxins. Snakebite severity depends on multiple factors such as snake species, size, recent feeding, and number of bites. Some bites are "dry bites," where little venom is injected. Other bites, such as when a snake is stepped on and releases all of its venom agonally, can be very severe. Victim factors such as horse size, age, disease conditions, medications, and bite location also influence bite severity.

Clinical signs of snakebite in horses vary widely but generally include pain and swelling at the bite site, and often sloughing of tissues near the bite. Bite wounds may not be readily apparent. Dry bites with little venom injected or bites from copperhead snakes often cause only mild signs. Bites from dangerous species of snakes and large doses of venom can cause marked pain and swelling, coagulopathy, hemorrhage, cardiac arrhythmias, shock, collapse, and even death. With neurotoxic venoms, paralysis can occur. Horses bitten on the nose can develop nasal swelling and respiratory distress. Signs of envenomation can occur within minutes or be delayed for many hours.

The best first aid is to keep the horse calm and arrange for immediate veterinary care. No first-aid treatments performed by owners in the field have proven particularly helpful, and many folk remedies can even be harmful. Suction devices have not been shown to be beneficial in animal models of snakebite.

Treatment varies with the severity of the bite, but may include fluids, pain medications, wound care, antibiotics, tetanus prophylaxis, and antivenin. Antivenin can decrease the amount of tissue damage and hasten recovery times, and can be especially helpful in cases of severe envenomation. Antivenin is dosed according to the estimated amount of venom injected, not the patient size, so even one vial of antivenin can have beneficial effects. Cardiac arrhythmias occur in many horses and may require treatment. Horses with severe nasal passage swelling may need treatment to maintain a patent airway; nutritional support may be required if swelling impairs the horse's ability to eat and drink.

Even after horses have recovered from the immediate effects of snakebite, subsequent complications such as heart failure or kidney damage are possible. Cardiac failure can occur weeks to months after the bite incident, necessitating continued evaluation and monitoring.

A vaccine is now available for use in horses to help prevent complications of snakebite, but efficacy in horses is not yet well documented. Contact your veterinarian for more information about snakebite in your region.

CONTACT:
Dr. Cynthia Gaskill
(859) 257-7912
cynthia.gaskill@uky.edu
Veterinary Diagnostic Laboratory
University of Kentucky, Lexington, Kentucky

KENTUCKY

Conducting a Scientific Survey of a State's Equine Population

Having reliable data on a state's equine industry is important for policy makers, community planners, entrepreneurs, business owners, and veterinarians. The process by which the data are collected is integral in determining the reliability and accuracy of the results.

Utilizing the services of an unbiased, professional survey group may be the most efficient way of completing such a project. Many of the states that have conducted these surveys joined forces with their field office of the U.S. Department of Agriculture's National Agricultural Statistics Service (NASS). NASS conducts hundreds of surveys every year covering all types of commodities and livestock and are survey experts. NASS has a priority of providing unbiased statistics with the highest level of confidentiality and data security. This is especially important when dealing with sensitive information collected as a part of these surveys.

The most important step in ensuring accurate results is developing a comprehensive population list from which to sample. Most NASS field offices have a list of equine operations that are classified as "farms," which are defined as having annual sales of at least $1,000.

However, a significant number of equine operations do not fit this definition (such as pleasure horse farms), so attempts must be made to identify and

Department of Veterinary Science
Maxwell H. Gluck Equine Research Center
University of Kentucky
Lexington, Kentucky 40546-0099

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include those operations. Achieving this requires a multifaceted approach. First, researchers can request membership lists from the state's equine associations and organizations (realize that this often requires a vote by the organization's board or membership). Second, since not all equine enthusiasts are members of organizations, additional efforts are required to reach these individuals. For the 2012 Kentucky Equine Survey, 34 public meetings were held across the state, often planned with the assistance of county Extension agents and held in conjunction with their equine-oriented programs. The meetings helped to contact these individuals, explain the importance and benefits of the study, and encourage them to submit their contact information to NASS.

During this phase of the study, the partner groups (which usually include university and industry representatives) will also work with NASS to develop the questionnaire. NASS has a comprehensive questionnaire with standard questions, but some questions can be tailored to a state's specific needs or interests. Providing the opportunity for survey suggestions from potential survey participants may also engender support or 'buy-in" from the equine industry.

For the Kentucky Equine Survey, NASS mailed the questionnaires to a weighted, stratified random sample of equine operations in July 2012. Data collection efforts, which included mail-in responses, telephone follow-up of non-responders and field visits commenced in August 2012 and was completed in October 2012. Results were summarized and a final narrative completed in March 2013.

Conducting a thorough and accurate statewide equine study requires collaborative efforts of researchers and industry groups, ample time for planning, raising funds (the Kentucky Equine Survey budget was $600,000), data collection, and data analysis. From start to finish, expect the project to take about two years. However, these efforts are rewarded with accurate descriptive statistics that will benefit many groups, businesses, and individuals.

CONTACT:
Dr. C. Jill Stowe
(859) 257-7256
jill.stowe@uky.edu
Department of Agricultural Economics

Dr. Mary Rossano
(859) 257-7552
mary.rossano@uky.edu
Department of Animal and Food Sciences
University of Kentucky, Lexington, Kentucky