



## Emerging Equine Diseases Four Important Diseases/Syndromes to Watch For

*Almost as fast as one disease is conquered new ones are discovered and sometimes created. We exchange new ones for old. The balance is clearly on the credit side and it is a fact that many of the old scourges, real or imaginary, are gone or are vanishing.*  
— Bernard Straus (physician), 1970

In 1968, the U.S. Surgeon General proclaimed that the war on infectious diseases had been won. Unfortunately, this statement was not true. Ongoing outbreaks of disease in humans and animals worldwide have established repeatedly that the war on infectious diseases is not over. Indeed, fully one third of all human deaths worldwide are still caused by infectious diseases.

Similarly, outbreaks of infectious diseases in horses will continue to occur as surely as new diseases will appear. The challenge to the horse industry is to prepare for this reality and invest in the research needed to understand these diseases and the factors that lead to



Photo by Katey Barrett

their emergence. By understanding the factors that influence the development, frequency and distribution of disease, we can develop reliable diagnostic techniques, effective therapies and appropriate control strategies.

This *Horse Report* presents some background information about infectious diseases and describes three diseases that have emerged recently and that may have a significant impact on horses. A fourth noninfectious condition is also described and is referred to

as a syndrome—a group of signs that characterize a previously unrecognized disease.

Discussions about infectious diseases, either in humans or animals, often make a distinction between an **emerging disease** and a **re-emerging disease** because it is an important piece of information for understanding the nature of infection. An **emerging disease** is defined as a previously unrecognized infection resulting

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## DIRECTOR'S MESSAGE

## New Challenges Replace Old Ones



Dr. Gregory L. Ferraro

It is perhaps human nature to take for granted our health and that of our animals. Many consider a healthy population to be the norm in the United States and other modern industrialized nations. What disease does exist is often considered to be static in nature in that it is comprised of largely recognized syndromes that affect a constant and predictable percentage of the population. Heart disease, diabetes, cancer, influenza, measles, chicken pox and so forth, while considered undesirable and unfortunate, are not surprising when diagnosed or discussed as public health issues.

Occasionally, the public is surprised by the sudden outbreak of a previously unknown or obscure health malady, such as the emergence of avian influenza in Asia or the West Nile virus in North America. What are these diseases? Where did they come from? How did they get here? Is my community in danger?

The truth is that worldwide disease is not static by nature. Rather, it is in a constant state of flux, with re-emerging diseases

shifting locations, vectors and hosts and newly emerging diseases creating health crises by exploiting small changes in their genetic or that of their carriers. Subtle changes in environmental conditions, concentrations of animal and human populations, or agricultural/industrial practices can over time induce pathogens to evolve in ways that exploit weaknesses in our health defenses.

How, then, is the public to be protected against these shifting enemies? Who can we turn to for the information needed for our defense and who can predict where the next battle might be fought? The answers lie within the infectious disease research programs of various private and public medical research institutions that currently exist throughout the world. The fact is that most of these surprise infectious disease threats have been on the radar screens of medical scientists for some time before they announce themselves to the public at large. To the credit of these diligent (and often obscure) researchers, many of these newly appearing diseases can be confronted effectively. The knowledge discovered by these experts form the basis upon which public health officials, regulatory agencies and your own physician or veterinarian take action. While these diseases sometimes result in widespread illness and death, especially among animals, their ramifications would be far worse if the basic understanding of their origins and disease process remained unknown.



*The Gross Clinic*, by Thomas Eakins, 1844–1916, copyright Thomas Jefferson University Medical College

Consequently, the investment made yesterday or today in what may appear to be “obscure” disease research oftentimes will provide significant returns in the future. Without such support, emerging pathogens, shifting vector habitats and changing environmental conditions could easily conspire, unnoticed, to create havoc that would be the envy of any terrorist. As citizens of this planet, we owe it to ourselves and our children to continually support medical researchers dedicated to disease control and eradication. In this issue of our *Horse Report* we provide you with some examples of diseases that may appear to be obscure at the moment but have the potential to do great harm. We hope that this presentation provides an example of why the investment in disease research of all kinds is so important.

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from the evolution of an existing pathogen or parasite and resulting in a change in host range, vector (carrier), ability to produce disease, or strain. Viral diseases feature prominently but not exclusively among these types of diseases because of their ability to change or mutate and spread quickly. Most of the recent emerging diseases have an animal origin, and almost all of them have *zoonotic* potential (capable of being passed to humans). Recent examples of previously unrecognized viral diseases that have emerged in human populations include severe acute respiratory syndrome (SARS) and avian influenza (H5N1).

A **re-emerging disease** is a previously known disease that makes a shift in its geographical distribution or expands its host range or significantly increases its prevalence. Once controlled and now reappearing, a re-emerging disease should be investigated to determine what factors have allowed it to reappear, such as changes in climate, nutrition, health status, law, and so forth. For example, rabies has recently been a cause for major concern in Eastern Europe, where several countries are witnessing an increased prevalence of the disease in animals, resulting in known fatal consequences for humans.

Many factors contribute to the emergence or re-emergence of diseases in horses. The major contributors are:

### **Human-induced changes**

- Global air travel of horses is second only to that of people. The increased sophistication and economic importance of the equine industry have resulted in an increased demand for movement of horses for sale, competition or breeding. The result is that a disease that arises in a single individual now has the possibility of being spread to horses at distant locations, whereas in the past long voyages on ships tended to exert their own quarantine/limiting effect.
- The increasing sophistication of therapeutic drugs has created opportunities for antimicrobial resistance, hospital-acquired infectious diseases and other ill-fated effects.

### **Evolution and the emergence of pathogens**

- Through the process of evolution, virulent strains of a particular microbe have evolved from a weaker ancestor. Microbial evolution is complex and scientists are just beginning to define it and the selective pressures that drive the process.
- The emergence of previously undescribed microbes. Some of these arise in one species and cause disease only when they are transmitted to a more susceptible host—for example, SARS and Hendra.

### **Ecological changes**

- Climate change has had an impact on the spread and distribution of insect-transmitted diseases. The spread of insect

carriers such as ticks and mosquitoes poses a significant risk of introducing foreign diseases. For example, the Asian tiger mosquito (*Stegomyia albopicta*) is a very aggressive feeder and now constitutes an important potential vector of diseases like West Nile encephalomyelitis and Dengue in the United States since it was introduced in 1985.

- Other environmental changes such as increased use of water resources, environmental pollution, disruption and alteration of native flora and fauna, and blurring of the urban/rural interface all create opportunities for the emergence of new infectious agents.

By considering all the above factors, researchers can begin to understand the epidemiology and development of many diseases of concern and develop the diagnostic technologies for detecting each one, as well as effective prevention and/or therapeutic strategies for their control.

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### Methicillin-Resistant *Staphylococcus aureus*

*Staphylococcus* is a family of bacteria that can cause a wide variety of diseases in humans and animals. One disease-causing species is *Staphylococcus aureus*, which can infect wounds. These bacteria can survive on dry surfaces, thereby increasing the chance of transmission. Any *S. aureus* infection can cause staphylococcal scalded skin syndrome, a reaction of the skin to exotoxins (proteins excreted by the bacteria that are harmful to the host) absorbed into the bloodstream. It can also cause septicemia (bacteria in the bloodstream), which can be life-threatening.

Methicillin is an antibiotic that was first introduced in human medicine in the 1950s for treating penicillin-resistant staphylococci. Within a few years, methicillin-resistant isolates of *Staphylococcus aureus* were identified. Since then, methicillin-resistant *Staphylococcus aureus*, or MRSA, has emerged as an important problem in human medicine, especially in the hospital setting. Since the 1990s, MRSA has become an increasing concern in people who have not been hospitalized or had invasive procedures.

More recently, MRSA has become a concern in veterinary medicine. *S. aureus* is not a common bacterial species in animals, and the importance of

MRSA in veterinary medicine is not well established. There are also concerns about MRSA as a possible zoonosis (a disease transmitted between animals and humans). Both human-to-animal and animal-to-human transmission are known to be possible, but it has not yet been determined whether animals are an important primary source of MRSA infections for humans, or if most animals are colonized after contact with human carriers.

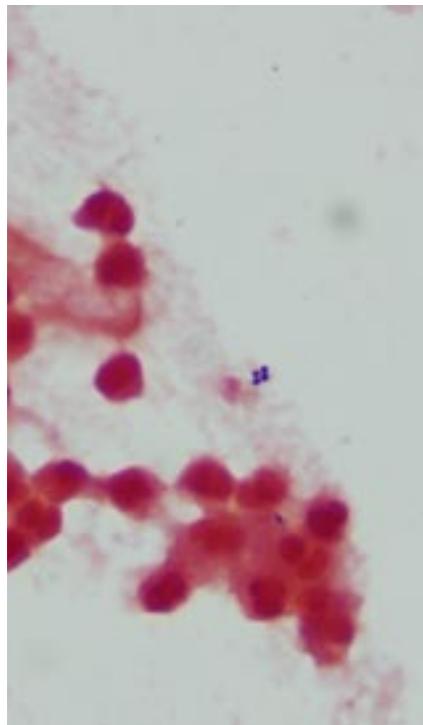
As in humans, animals can be colonized for variable periods of time without developing clinical signs (asymptomatic carriers). Most horses only carry the microbe for 2 to 4 weeks, although approximately 5% will carry it longer (9 months or more). The most common site of carriage in horses is the

nasal passages, although they can carry it on skin or in their gastrointestinal tract. Carrier horses are at greater risk than noncarriers for developing infections at catheter sites, in wounds, or in surgical incisions.

Recently, a horse was brought to the UC Davis Veterinary Medical Teaching Hospital (VMTH) for treatment of a surgical wound (surgery performed elsewhere) that had cultured positive for MRSA. This mare had had a skin mass removed from her mammary gland and had subsequently developed a purulent discharge from the surgical wound. She was referred to the VMTH due to concerns at her home stables over quarantine and spread of MRSA.

At the VMTH, another wound culture was performed as well as a nasal swab. Both were positive for MRSA. The horse was otherwise in good systemic health, and all vital parameters were within normal limits. Because previous treatment with antibiotics was ineffective, it was discontinued and an aggressive wound-cleaning regime with dilute chlorhexidine was undertaken. The infection dissipated and the wound healed. Subsequent wound cultures and nasal swabs taken 6 weeks later were both negative for MRSA.

The Veterinary Medical Teaching Hospital has an aggressive infection control program in place for prevention of infections. It also allows rapid recognition and isolation of cases if clinical infection does occur. Every horse is treated as a potential carrier of MRSA. The



***Staphylococcus aureus*** are spherical bacteria that occur as microscopic clusters resembling grapes. This photo shows *S. aureus* as identified from a sample taken directly from a horse wound.

program emphasizes the use of gloves to handle all patients as well as hand washing after handling every patient.

### Prevention

According to the Centers for Disease Control and Prevention, it is well-documented that the most important measure for preventing the spread of pathogens is hand-washing. This is certainly true for preventing the transmission of MRSA. In addition, the use of disposable gloves reduces skin-to-skin contact and therefore further reduces the risk of transmission.

If your horse has been identified with MRSA, either as a carrier or with an active infection:

- It should be isolated to prevent transmission to other animals or humans.
- It should be kept in a stall where it has no nose-to-nose contact with other horses.
- Only a small number of people should handle the horse (no children, elderly, immunocompromised, or people with wounds or incisions).
- Horse handlers should wash hands thoroughly and/or use an alcohol-based hand sanitizer to disinfect hands afterward.

If your horse has an incisional infection or wound that requires cleaning, used bandages and disposables used for cleaning should be discarded in a plastic bag containing a small amount of disinfectant such as dilute bleach, betadine or nolvasan.

If there is a risk of body fluid spillage from the cleaning process, contact your veterinarian for assistance with the process and recommendations on how to do this safely.

To ascertain that your horse has cleared a carrier state of infection, it should have two negative cultures of the nasal passages and the wound or incision taken by your veterinarian. For more information on MRSA, **Dr. Gary Magdesian**, Infection Control Officer, may be reached by calling the VMTH at (530)752-0290.

## African Horse Sickness

Scientists have been predicting that insect-borne diseases would move north as global warming takes hold. They have predicted since at least 2002 that bluetongue virus could invade northern Europe and Britain. Those predictions have now come true. According to the Food and Agriculture Organization of the United Nations, transboundary animal diseases that were originally confined to tropical countries are on the rise around the globe. They do not spare temperate zones including Europe, the United States and Australia. The arrival of bluetongue virus in the United Kingdom and the movement of West Nile virus throughout the United States are prime examples. Bluetongue virus was first discovered in South Africa. Since the summer of 2006, the virus has been found in Belgium, Germany, Luxembourg, the Netherlands, the north of France, and most

recently the United Kingdom, Denmark, the Czech Republic and Switzerland. West Nile virus first appeared in the United States in 1999 and rapidly made its way from the east coast to the west coast, as shown in the maps below.



It is conceivable that *African horse sickness* (AHS) might soon follow. AHS is a devastating insect-transmitted viral disease of horses that is endemic to sub-

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Saharan Africa and occurs extensively throughout much of South Africa. One form of AHS (lung form) is characterized by very high fever, difficulty breathing, frothy discharge from the nose, and sudden onset of death. The mortality rate with this form is about 90 percent. Another form (cardiac form) is characterized by fever followed by swelling of the head and eyes, inability to swallow, bleeding in the membranes of the mouth and eyes, and a slower onset of death occurring 4 to 8 days after the onset of fever. The mortality rate with this form has been estimated at 50%.



The cardiac form of African horse sickness is characterized by fever followed by swelling of the head and eyes, inability to swallow, and bleeding in the membranes of the mouth and eyes.

Because of its devastating effects, AHS is on the list of economically important equine diseases worldwide and is required to be reported to local and international officials (including the OIE, the animal equivalent of the World Health Organization).

Outbreaks of AHS have occurred regularly in southern Africa since horses were introduced to the region several centuries ago. Some of these outbreaks have resulted in devastating losses. Periodically, AHS has occurred in North Africa, the Mediterranean Basin, and the Middle East. The most notable recent incursion was into Spain in the late 1980s, an outbreak that severely complicated planning for the equestrian events at the 1992 Summer Olympic Games in Barcelona.

African horse sickness is transmitted by the blood-sucking insect *Culicoides* (a small fly), so the disease occurs only where competent vector insects are present. It is otherwise not contagious. *Culicoides* insects are abundant on all continents except Antarctica, but to date just two of the 1300+ species of these insects have proven to be competent vectors of AHS virus. However, other closely related *Culicoides*-transmitted viruses such as bluetongue virus have recently expanded their ranges in both Europe and North America, perhaps as a result of climate change. Furthermore, the emergence and spread of bluetongue virus in Europe is associated with *Culicoides* species that had not previously been incriminated as vectors

of the virus. Thus, there is considerable concern that AHS virus might soon follow the path that has been blazed by bluetongue virus into Europe and beyond. An incursion of AHS similar to that caused by bluetongue virus would be catastrophic to the global horse industry.



Adult biting midge, *Culicoides sonorensis*, showing blood-filled abdomen and the characteristic wing patterns used for species identification.

The onset of AHS can occur very suddenly in a form that is intense and severe to the point of widespread lethality in susceptible horses. AHS can also manifest as a mild or even inapparent infection. In populations of horses who have never been exposed to AHS, such as those in North America and Europe, explosive outbreaks of highly fatal disease characterized by spectacular vascular and respiratory failure would be expected, with mortality of up to 95% of infected horses. Severely affected horses can die suddenly with few lesions, whereas those that survive even a short time typically have severe subcutaneous and lung edema.

Given the severity of AHS and the explosive nature of outbreaks coupled with the lack of any effective therapy, even

today, considerable effort has been expended to develop AHS vaccines. These have included inactivated and live-attenuated vaccines. The live-attenuated vaccine is used in regions of Africa where AHS is endemic, but well-vaccinated horses still die from the disease and the vaccine itself can sometimes cause the disease. Thus, it is not 100% effective and has certain inherent disadvantages that would likely preclude its use outside of Africa.

Efforts to develop an effective **recombinant** AHS vaccine have been accelerated by recent expansions in the distribution of competent *Culicoides* insect vectors in Europe. It is critical that studies be undertaken to determine the ability of *Culicoides* insects throughout the world to serve as vectors of AHS virus, and what impact recent changes in global climate might have on the vectorial capacity of individual insect species.

**Recombinant** vaccines are vaccines in which genes for desired antigens are inserted into a vector, usually a virus, that has a very low virulence. The vector expressing the antigen may be used as the vaccine, or the antigen may be purified and injected as a subunit vaccine. Advantages of recombinant vaccines are that the vector can be chosen to be not only safe but also easy to grow and store, reducing production cost. Disadvantages of recombinant vaccines are their cost to develop, since the genes for the desired antigens must be located, cloned, and expressed efficiently in the new vector.

There is also an urgent need for research to better understand how the AHS virus causes injury to the blood vessels so that improved therapeutic strategies can be developed to treat affected horses.

The increased mobility of viruses and their carriers is a new threat that countries and the international community should take seriously. Early detection of viruses together with surveillance and control measures such as new vaccines are needed as effective defense measures.

The **Equine Viral Disease Laboratory** at UC Davis, under the direction of **Dr. Jim MacLachlan**, participates in the international effort to develop better diagnostic technology to identify, monitor and control diseases like African horse sickness as well as improved vaccines to prevent them. Research studies focus on the development of new diagnostic and vaccine technologies, definition of the epidemiology and pathogenesis of important viral diseases of the horse, and the recognition of new and emerging viral diseases of the horse. The Equine Viral Disease Laboratory recently developed a recombinant vaccine against bluetongue virus and is using the same approach to develop a more effective vaccine against African horse sickness.

For more information on African horse sickness or to help support the research on developing a vaccine for African horse sickness, contact Dr. MacLachlan at [njmaclachlan@ucdavis.edu](mailto:njmaclachlan@ucdavis.edu).

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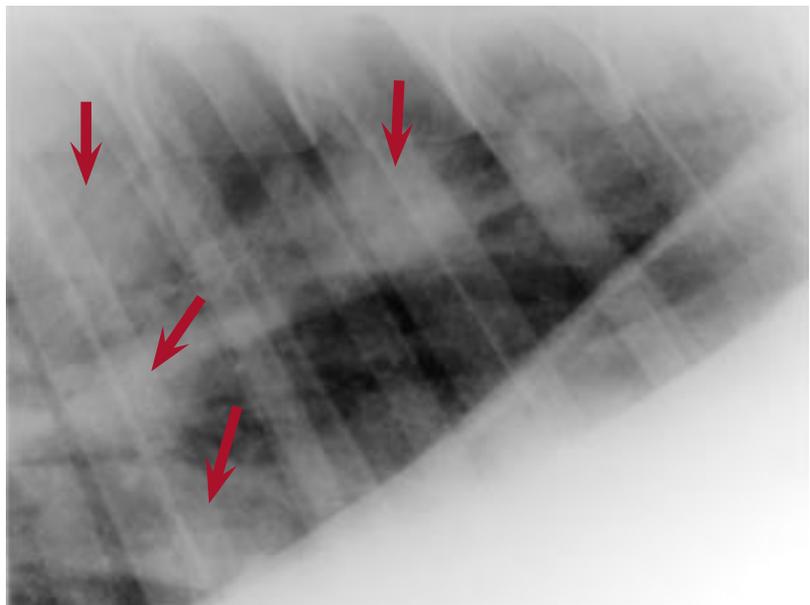
### Equine Multinodular Pulmonary Fibrosis

Generalized lung diseases in horses that cause fibrosis (the formation of excess fibrous connective tissue in an organ or tissue as a reparative or reactive process) and severely impaired respiratory function are devastating for the affected horse. They are also frustrating and heartbreaking for the practitioner and owner because the cause is usually difficult to determine and treatment options are few and of limited success. Horses with progressive fibrotic lung disease are typically in respiratory distress of varying degree, with increased respiratory rates, abnormal lung sounds and signs of effort such as flared nostrils. Horses are often presented to the veterinarian because of weight loss, fever, coughing, increased respiratory and heart rate, and nasal discharge. Diagnostic workup of affected horses routinely involves blood work, chest radiographs and ultrasound, pulmonary fluid analysis, and lung biopsy.

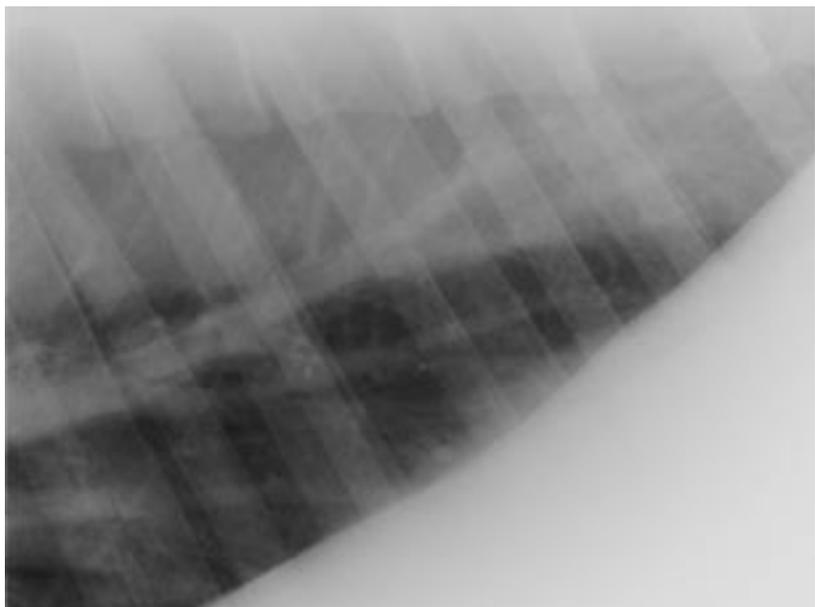
A variety of toxins, cellular infiltrations, infectious agents, and inhaled foreign particles such as silica have been implicated as causes of lung disease of this type, but determination of the cause is often elusive—despite detailed examinations such as lung biopsy or analysis of lower airway fluid samples.

Recently, a research group at Michigan State University reported that a subset of fibrotic

lung disease in horses was associated with equid herpesvirus-5 (EHV-5) infection. They termed the disease *equine multinodular pulmonary fibrosis* (EMPF) and it commonly affects horses in their mid-teens with no breed or gender predisposition. The researchers segregated horses with fibrotic lung disease into distinct groups based on post-mortem gross and microscopic examination of their lungs. EHV-5 was detected by molecular methods, and herpesvirus-like particles visualized by electron microscopy, in the lung tissue of one of these groups significantly more frequently than the rest. This finding suggests that EHV-5 could play a role in the development of the disease in these horses.



Above photo shows a radiograph of the lungs of a horse with equine multinodular pulmonary fibrosis. Note the areas of opacity that correspond to the abnormal parts of the lung that are fibrotic (arrows). Below photo shows a radiograph of a healthy lung.



EHV-5, as well as its close cousin EHV-2, is in the gammaherpesvirus family, which distinguishes it from better-known equid alphaherpesviruses such as EHV-1, an important cause of abortion and neurologic disease. Like all herpesviruses, EHV-5 is characterized by its ability to establish latent, life-long infections. Based on research done on foals born at the Center for Equine Health by **Dr. Stephanie Bell**, it appears that EHV-5 infection of horses is very common, and that the majority of infections occur during the first 6 months of life. Up to approximately 80% of California horses are infected with EHV-5. The virus has also been identified in horses in New Zealand, Australia, and Europe.

Prior to the description of its association with fibrotic lung disease, EHV-5 had not been associated with a disease entity in horses. While the causal relationship between EHV-5 and EMPF has certainly not been proven, its frequent detection in the lung tissue of horses with EMPF as compared with that of control horses suggests that EHV-5 plays a role in this disease. What is not clear is why a common virus such as EHV-5 would cause disease in only a relatively small proportion of the horses that it infects. Factors that influence the development of lung pathology in only certain horses could include differences in individual horse's immune systems, variations in virus strains, and the infecting dose.

Horses with fibrotic lung disease of any type are typically treated supportively with anti-inflammatory drugs and

antibiotics if secondary bacterial infection is suspected. The response to treatment is variable and depends on the severity of the disease. Horses that develop pulmonary hypertension (high blood pressure) and right ventricular dilation (heart failure) have a less favorable outcome.

Based on the association with EHV-5, treatment of horses with EMPF with antiviral drugs could be considered, and research into this possibility is currently being undertaken in the **Equine Viral Disease Laboratory** by Dr. Bell and her colleagues at UC Davis. Currently, the prognosis for horses with EMPF is guarded. Our goal is that future discoveries regarding the pathogenesis of the disease will shed light on prevention and treatment options.

## Bone Fragility Syndrome

Unlike the previous three emerging diseases that were just described, *bone fragility syndrome* (BFS) is not an infectious disease but a progressive, debilitating and ultimately fatal bone disease recognized recently in horses in California. The disease affects bones of the upper portion of the limbs (e.g., scapula or shoulders, pelvis), ribs and vertebral spine. Horses that are mildly affected with BFS appear to have an intermittent lameness without an identifiable cause. The lameness may affect one leg, several legs, or different legs at different times. When multiple legs and/or the spine are affected, horses can appear to have a generalized stiffness and reluctance to move.

As the disease progresses, bones of the spine and upper portions of the front and hind legs become weak. Over the course of months to years, the bones deform and sustain incomplete bone fractures that attempt to heal. Ultimately, a fracture may be severe enough to cause death or necessitate humane euthanasia.

Horses that are severely affected with BFS can be recognized by skeletal deformities. The scapula (shoulder region) begins to bow outwardly. This usually starts with one shoulder bowing initially, but often both shoulders are eventually affected. The back becomes markedly swaybacked in a relatively short period of time. The neck becomes stiff so that it is difficult to turn the head or eat off the ground.



Note the prominent lateral (outward) bowing of the left shoulder as viewed from behind the horse.

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Diagnosis of bone fragility syndrome is confirmed by bone scans. The results of routine blood tests are usually normal. Radiographs of the legs are generally not helpful in disease diagnosis because the bones in the lower part of the limbs are minimally affected. Good quality radiographs of the lower cervical vertebrae in the base of the neck may be useful for detection of bone changes in moderately to severely affected horses. Ultrasound examination of the scapula may demonstrate thickening of the scapular spine or evidence of fracture. Bone scans are highly useful for determining the extent of the disease. Unfortunately, they are available only at university and specialty equine practices because they require expensive, specialized equipment.

Affected horses may have concurrent pulmonary disease. Many horses with bone fragility syndrome have lung inflammation associated with inhalation of cristobalite, a type of silicate crystal found in the soils of some geographic regions. Horses with moderate to severe lung disease require extra effort to breathe. These horses may have an elevated breathing rate during rest, accentuated muscles in the chest and abdomen due to increased muscular effort to breathe, and flaring of the nostrils in an effort to obtain more air.

There is no known effective treatment for bone fragility syndrome. We have used a variety of medications to reduce pain and inflammation with



*Horses with advanced stages of bone fragility syndrome usually have a marked swayback that is characteristic of the disease.*

limited success. Most horses respond for a period of time to treatment but eventually worsen. Although bisphosphonate medications can potentially retard the bone loss that occurs with disease progression, no studies have been conducted to determine actual efficacy.

The cause of bone fragility syndrome is unknown. Because known affected horses often have both pulmonary disease and bone disease, there is circumstantial evidence that both diseases share a common cause. However, there is as yet no direct evidence for a relationship between pulmonary disease and bone fragility syndrome.

Researchers in the **JD Wheat Veterinary Orthopedic Research Laboratory** at UC Davis are currently conducting studies to improve our understanding of bone fragility syndrome. One of their immediate goals is to identify the geographic locations

of affected horses to determine whether there is any evidence for potential risk factors and causes of the disease. If there is evidence to indicate that there are risk factors, they would then develop recommendations for decreasing the risk or preventing the disease. Another immediate goal is to develop a practical, affordable test for diagnosing the disease. To this end, they are exploring blood tests that may be useful for detecting the high bone turnover evident in the affected horses seen to date. The overall goal is to determine the causes, risk factors, and development of equine bone fragility syndrome so that management strategies can be developed for treatment and prevention.

If you think you have a horse that might be affected with bone fragility syndrome, please contact Dr. Mandy Murray via e-mail at [almurray@ucdavis.edu](mailto:almurray@ucdavis.edu) or Dr. Susan Stover at [smstover@ucdavis.edu](mailto:smstover@ucdavis.edu).

## CEH Congratulates Winners of California Thoroughbred Foundation Scholarships

California Thoroughbred Foundation Scholarships have been awarded to fourth-year veterinary students Justin McCormick and Alina Vale.

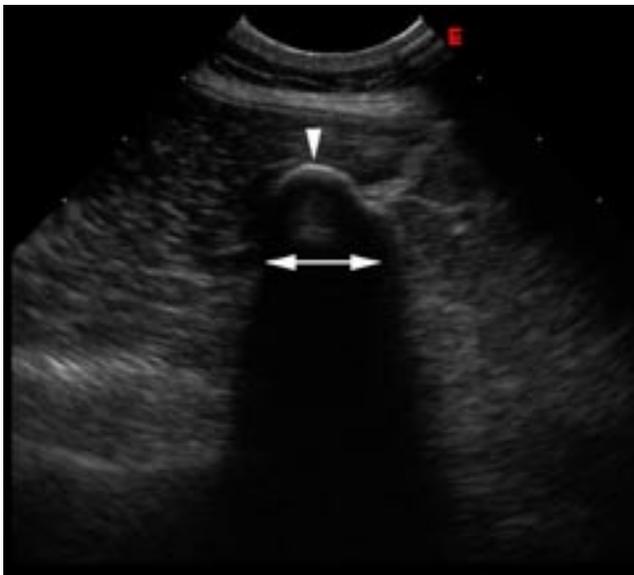
Justin received his undergraduate degree in veterinary science/microbiology and a Master's degree in pathobiology both at the University of Arizona. He is interested in performance horses in relation to lameness, orthopedics and advanced imaging and would like to specialize in equine surgery.

Alina received her undergraduate degree in veterinary science from UC Davis. She also is interested in performance horses in relation to preventing and treating lameness and other medical conditions in equine athletes. She has a special interest in working with an organization that rehabilitates, retrains and finds homes for injured and retired performance horses.

Congratulations to these two outstanding students!



Justin McCormick (third from right) and Alina Vale (second from right) at the awards presentation. Also pictured (from left to right) are Dr. Gregory Ferraro, Mr. Jim Murphy, Mrs. Jeanne Canty and Dean Bennie Osburn.



Ultrasound images of a normal scapular spine (left) and an abnormal scapular spine (right) from a horse with bone fragility syndrome. Ultrasound can be used to detect thickening of the spine (double arrows) in some horses, as shown in the right image. The abnormal spine also shows an irregular bony surface (arrowheads) compared with the smooth, curved surface of the normal horse.

## UPCOMING EVENTS

## Horse Day

October 11-12, 2008

Freeborn Hall  
University of California, Davis

Various speakers will discuss topics in nutrition, first aid, equine diseases, coat color, foot care, foal care, dental care, behavior and more. There will also be demonstrations at the Animal Science Horse Barn on training the young horse, trailer loading, horse packing, training for jumping, driving, dressage, cutting, and reining. Tours of the School of Veterinary Medicine will be offered. On Sunday, there will be a farrier workshop featuring the anatomy and physiology of the foot and shoeing for laminitis, navicular disease, and crooked legs.

For more information, visit the Department of Animal Science website at <http://animalscience.ucdavis.edu/events/horseday/default.htm>.

# CEH HORSEREPORT

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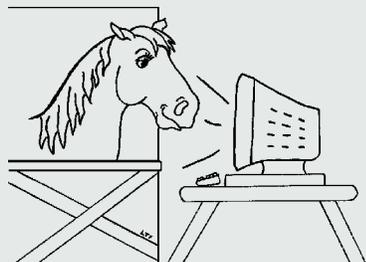
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