

## ZOONOSES: What Horse Owners Need to Know

*Human or livestock or wildlife health can't be discussed in isolation anymore. There is just one health. And the solutions require everyone working together on all the different levels. —Dr. William Karesh*

Zoonoses—diseases that can be transmitted to humans from animals—are a concern for all who live or work with animals. Our common ancestry with animals means that we share much of the same biochemistry and therefore much of the same susceptibilities. Humans and animals are at risk for cancer because our bodies are made up of large numbers of cells. If a mutation makes a single cell deaf to the needs of its body, it can develop a tumor.

Our common ancestry with animals is also the source of many dangerous infectious diseases. You may not think you have all that much in common with a chicken, but to an influenza virus



### INSIDE THIS ISSUE...

Zoonoses: What Horse Owners Need to Know.....	1
Director's Message .....	2
The Role of Veterinarians in Public Health .....	3
Illustration of a Zoonosis.....	3
Zoonoses and Horses .....	4
Rabies .....	4
Leptospirosis .....	5
Salmonellosis .....	8
MRSA .....	8
UC Davis Welcomes New Equine Ophthalmologist .....	11

humans and birds are promising hosts alike. Seventy percent of infectious diseases in humans got their start in animals. Conversely, animals can acquire diseases such as tuberculosis from humans.

The connections between the health of humans, animals and the environments in which they live have been known for ages. Hippocrates recognized that environmental factors can impact human health and that public health depends on a clean environment. In the nineteenth century, the physician Rudolf Virchow recognized the link between diseases of humans and animals and

coined the term *zoonosis*. He said, "... between animal and human medicine there are no dividing lines—nor should there be."

Emerging infectious diseases represent substantial threats to global health, and AIDS ranks as one of the most important infectious diseases facing humans in the twenty-first century. It is believed that the HIV virus in humans may have originated through contact with the infected blood of a primate during

—Continued on page 3

## DIRECTOR'S MESSAGE



Dr. Claudia Sonder and Cash

*The prevention of disease is one of the most important factors in the line of human endeavor. —Charles Mayo*

When I'm introduced as an equine veterinarian, people will often comment about their fear of horses or the courage involved in dealing with such a large patient. I usually smile and say that I'm more afraid of a mean cat than a mean horse any day. I can say this with all due respect to the cat. Most horses are willing to please and have a desire to do so. In truth, I believe it is the microscopic creatures that pose the greatest threat to human well-being. Today, one third of all deaths worldwide are due to infectious diseases.

Zoonotic diseases, simplified, are those that are transmitted from animals to humans or vice versa. Viruses and bacteria account for the majority of pathogens that infect humans and animals, although protozoal, fungal and protein agents such as prions are also in this category. Most of these agents live quietly within a known host or natural reservoir, causing minimal disease. This relationship allows them to propagate and evolve over time without killing their host. As contact between humans and animals has increased and worldwide travel has exploded, pathogens have been given access to new and defenseless hosts. This increased exposure

continues to result in disease outbreaks in humans and animals alike.

Veterinarians have been key players in advancing research and developing methods to treat and prevent infectious disease. They serve as the primary protectors of the safety and security of the food chain. Most pathogens enter our body through our digestive and respiratory systems, so the food we eat and the way it is handled have a large impact on our health. Veterinarians are trained to recognize infectious disease (foreign and domestic) and to monitor the import and export of animals and food. I can still recall studying for the state and national boards and memorizing the symptoms of countless infectious diseases that could shut American commerce down if allowed into this country.

Scientific discovery flourishes on the heels of necessity. Many of the vaccinations and treatments now available to protect humans and animals from disease were developed in response to outbreaks or impending threats. The West Nile vaccine developed in the early 2000s continues to save countless equine lives and should be a part of any preventative medicine program for horses. The HIV epidemic spurred antiviral research that has opened new doors for therapy in all species, including antiviral therapy for horses severely infected with equine herpesvirus-1 and now a cure for humans with hepatitis C.

Recently, the AAEP added rabies vaccination as a core equine vaccine in an effort to safeguard humans who interact with horses on a regular basis. Rabies had been considered 100% fatal in unvaccinated patients until 2004, when a Wisconsin teenager survived rabies infection due to a strong combination of antiviral therapy and induced coma. Since then, there have

been three successful human rabies outcomes in the United States using the Milwaukee protocol established in 2004. Rabies vaccination in equines and humans is highly protective against infection if kept current.

Hendra virus (HeV) and Middle East Respiratory Syndrome (MERS-CoV) have made headlines recently. The Hendra virus has claimed the lives of Australian horses, veterinarians and horse owners. The reservoir is thought to be the flying fox bat, and the horses become exposed through environmental contamination with infected excretions. Veterinarians contract the virus handling the oral cavity of the horse during physical examination. MERS corona virus appears to reside in the dromedary host and is thought to infect humans through camel meat and milk.

Work is currently underway to better understand the pathogen/host/environment interactions and develop prevention strategies, diagnostic and therapeutic options. The UC Davis School of Veterinary Medicine houses the **Bernice Barbour Communicable Disease Laboratory**, which investigates pathogens and their interactions with hosts and their environment. Researchers in this lab come from varying disciplines to study the range of mechanisms used by microbes to cause disease in an effort to implement new and more effective methods of control.

So what can you do in your interactions with your horse and your environment to minimize the potential for zoonosis? In this *Horse Report*, we discuss the main infectious diseases that are shared by humans and horses, as well as some strategies for prevention. Teaching the next generation healthy interaction with horses and pets will serve them well in a day and age when emerging diseases pose new threats. ✨

## Zoonoses — From page 1

hunting and butchering of meat, and that this occurred in the early 1900s. It took many years for the social, economic and behavioral changes to develop and provide the perfect storm in which the virus could expand and reach epidemic proportions. Since it was first identified around 1981, HIV has infected at least 60 million people worldwide and caused more than 25 million deaths.

Tuberculosis is another significant disease in humans and animals. Susceptibility to *Mycobacterium tuberculosis* is relatively high in humans, primates and guinea pigs. Cattle, rabbits and cats are susceptible to another strain, *M. bovis*, and swine and dogs are susceptible to both *M. bovis* and *M. tuberculosis*.

Horse owners who are familiar with the zoonoses that affect horses are better equipped to manage their animals and property to minimize disease transmission. Awareness is the necessary element for prevention. Among the more serious diseases that can affect horses and are potentially infectious to humans are rabies, leptospirosis, Salmonellosis, and MRSA (methicillin-resistant *Staphylococcus aureus*). We discuss these in this *Horse Report*.

But first, did you know that veterinarians play an important role in safeguarding public health and in preventing the spread of disease from animals to people? Animal owners mostly see their veterinarians in a clinic or field setting where they provide medical care. But veterinarians also play a crucial role in ensuring public health by improving agriculture and food systems, advancing biomedical research, addressing zoonotic diseases, enhancing environmental health, and

helping manage new public health challenges.

### The Role of Veterinarians in Public Health

James Steel, an American veterinarian, is known as the “father of veterinary public health” because he pioneered efforts to prevent the spread of disease from animals to people. In 1942, a year after Dr. Steele received his DVM from Michigan State University, he became one of the first veterinarians to receive a master’s degree in public health from Harvard. In 1945, he started the veterinary public health program at the United States Public Health Service in Washington. In 1947, he and the unit moved to Atlanta to what is now called the Centers for Disease Control and Prevention.

Since 1892, more than a dozen diseases have been eliminated from equine, poultry and livestock populations in the United States. The elimination of these livestock diseases, along with research in animal health, is key to the remarkable gains in the efficiency of U.S. animal production and in overall public health.

Today, veterinarians and physicians are working together increasingly to solve problems that affect both animals and humans. Knowledge gained from one species often benefits another, since animals suffer from many of the same chronic diseases as humans: heart disease, cancer, diabetes, asthma and arthritis, to name a few.

Sometimes a disease is recognized in animals long before it is recognized in humans. Rous sarcoma virus, the first virus known to cause tumors, was discovered in chickens in 1911. The researcher who made the discovery, a physician named Peyton Rous, was awarded the Nobel Prize for

identifying this tumor-inducing virus and for the impact it would have on future research. The virus has been used to study the development of cancer and subsequently helped the discovery of other tumor-causing viruses.

Humans, animals, and animal products now move rapidly around the world and pathogens are adapting, finding new niches, and jumping across species into new hosts. Lessons learned from SARS (severe acute respiratory syndrome), West Nile virus and avian influenza are reminders of the need to view diseases globally; integrate animal and public health surveillance; and create new strategic partnerships among animal public health professions.

The future will most likely bring collaborations of veterinarians with scientists from multiple professions such as human medicine, bioengineering, animal science, environmental science, and wildlife. Together, they will be stronger to fight disease, and they will be wiser.

### Illustration of a Zoonosis

What do horses have in common with sea otters? Here is an illustration of how these two very different species can share the same disease, facilitated by the ecosystem.

Equine protozoal myeloencephalitis (EPM) is a neurological disease that occurs when protozoal parasites infect and invade a horse’s central nervous system. Infection with this parasite results in characteristic lesions in the brain and spinal cord and causes incoordination and muscle atrophy. The two protozoal parasites have been identified as *Sarcocystis neurona* and, less commonly, *Neospora hughesi*.

— Continued on page 4

## Zoonoses

### — From page 3

Opossums are considered the definitive host for *Sarcocystis neurona*, shedding the infective sporocysts (egg-like stage of development) in their feces. (A “definitive host” is a host in which reproduction of pathogens takes place.) Horses become infected by ingesting food or water that has been contaminated with opossum feces containing the infective sporocysts. The definitive host for *Neospora hughesi* has not been identified but is assumed to be a domestic or wild carnivore, possibly a dog or coyote.

In approximately 2 to 4% of cases, the sporocysts ingested by a horse migrate from the intestinal tract into the bloodstream and cross the blood/brain barrier, causing disease. There, they attack the horse’s central nervous system. The onset of the disease may be slow or sudden, and the signs vary depending on the type of damage to the central nervous system. If left undiagnosed and untreated, EPM can cause devastating and lasting neurological deficits.



In 2004, sea otters near Morro Bay were found to be infected with the same parasite (*Sarcocystis neurona*) that causes EPM in horses.

In April 2004, an unusually high number of dead or stranded sea otters from the Morro Bay area were found to be infected with the same parasite that causes EPM in horses, *Sarcocystis neurona*. Such deaths have been reported previously, but the number of otter deaths during this particular time period greatly exceeded that in previous years, and localized clustering of *Sarcocystis neurona* infections had not been documented before. Many otters stranded alive had clinical signs suggesting brain damage. Affected otters tested negative for several pathogenic viruses, including West Nile virus. The harmful algal bloom toxin, domoic acid, may have contributed to the deaths of a few sea otters, as well as a second protozoal parasite, *Toxoplasma gondii*, which is excreted by cats in their feces.

Scientists believe that the *Toxoplasma* parasite ended up in the ocean through freshwater runoff. It is feasible that the parasite was then concentrated by ocean filter feeders such as shellfish, which were then eaten by the otters. Something similar may have occurred with *Sarcocystis neurona* through infected opossum feces.

*Toxoplasma gondii* causes toxoplasmosis in humans and is the reason pregnant women are told to avoid cats’ litter boxes. Since the 1920s, doctors have recognized that a woman who becomes infected during pregnancy can transmit the disease to the fetus, in some cases resulting in severe brain damage or death. *Toxoplasma* is also a major threat to people with weakened immunity. In the early days of the AIDS epidemic, *Toxoplasma* was to blame for some of the dementia that afflicted many patients at the disease’s end stage. Healthy children and adults can often fight off the protozoan, although some believe that it remains dormant



Opossums are considered the definitive host for *Sarcocystis neurona*, which can cause EPM in horses.

inside brain cells. About one-third of the world’s population is infected by *Toxoplasma*.

This example of protozoal parasites appearing in two quite different species underscores the importance of understanding the basic mechanisms by which all disease spreads and how humans, animals and ecosystems are profoundly interconnected.

## Zoonoses and Horses

Horse owners who are familiar with the zoonoses that affect horses are in a much better position to prevent them. Here are four of the more serious ones.

**Rabies** — Rabies is a zoonotic disease caused by viruses in the genus *Lyssavirus* and has the highest case fatality ratio of any infectious disease. The disease is invariably fatal in horses. Wildlife have accounted for >90% of rabid animals reported in the United States since 1980. The primary reservoir species responsible for

maintaining rabies are raccoons, bats, skunks, and foxes. It is a significant threat to horses in South and Central America but is not a major cause of death in North America due to successful vaccination efforts.

With the increasing urbanization of areas in which the disease is regularly found in wildlife populations, the risk of exposure continues to be a concern for veterinarians and horse owners. The Centers for Disease Control reported rabies infection confirmed in 47 horses and mules during 2012, an increase over the 44 cases reported in 2011.

Rabies infection usually occurs by the bite of a rabid animal but may also be transmitted when fresh saliva from an infected animal comes into contact with a wound or mucous membranes. Encounters between a horse and a rabid animal rarely are witnessed, and bite wounds, which can be puncture-like, can be difficult to find. The delayed development of clinical

signs has been attributed to the undeveloped state of the virus, which must first replicate in the muscle at the wound site before it migrates into the nervous system.

The clinical signs of rabies in horses include inability to stand, ataxia and muscle weakness, excessive sensitivity to touch, muscle tremor, lameness, anorexia, loss of tail and anal sphincter tone, loss of sensory perception in the hind limbs, fever (>101 degrees F), colic, depression, convulsions, and aggressiveness. However, because rabies can "look like anything," it is difficult to make generalizations. Most horses do exhibit some degree of sensitivity to touch, fever, ataxia, and muscle weakness. Survival time after the onset of signs may range from 2 to 5 days and can be as long as 2 weeks, although that is unusual.

While the incidence of rabies in horses may be low, the disease is invariably fatal and has considerable public health significance. The AAEP

recommends that rabies vaccine be a core vaccine for all equids. UC Davis veterinarians recommend that horses be vaccinated against rabies according to the schedule shown below.

**Leptospirosis** — Leptospirosis is a potentially fatal disease that humans and animals can contract through contaminated urine or water. Although leptospirosis is considered the most common zoonotic disease of people worldwide, our understanding of its epidemiology is minimal and further research is needed.

The causative agents are a small group of spirochete bacterial species in the genus *Leptospira*. These spiral shaped bacteria are contracted across mucous membranes and then may invade kidney and liver tissue, initially causing nonspecific, flu-like symptoms. If left untreated, it can cause organ failure and death.

— *Continued on page 6*

### Recommended Rabies Vaccination Schedule for Horses

Adult Horses		
Annual	One dose; annual revaccination	Booster vaccination induces persistently elevated levels of anti-rabies antibody.
Broodmares		
Annual	One dose; prior to breeding	Booster vaccination induces persistently elevated levels of anti-rabies antibody. Therefore, this vaccine may be given post-foaling, but prior to breeding.
Foals and Weanlings (<12 Months Old)		
Age 6 months	First dose	
4 to 6 weeks after first dose	Second dose	
Age 10 to 12 months	Next dose	

## Zoonoses

### — From page 5

Older literature attributed each *Leptospira* serovar to a specific animal host (e.g., *canicola* to dogs, *hardjo* to cattle) and claimed that cases occurred in tropical areas with abundant rainfall. However, we now recognize a much more complicated, very poorly understood epidemiological web of serovars infecting multiple hosts, including rats, skunks, opossums, raccoons and foxes. (Serovar refers to distinct variations within a species of bacteria or viruses.)

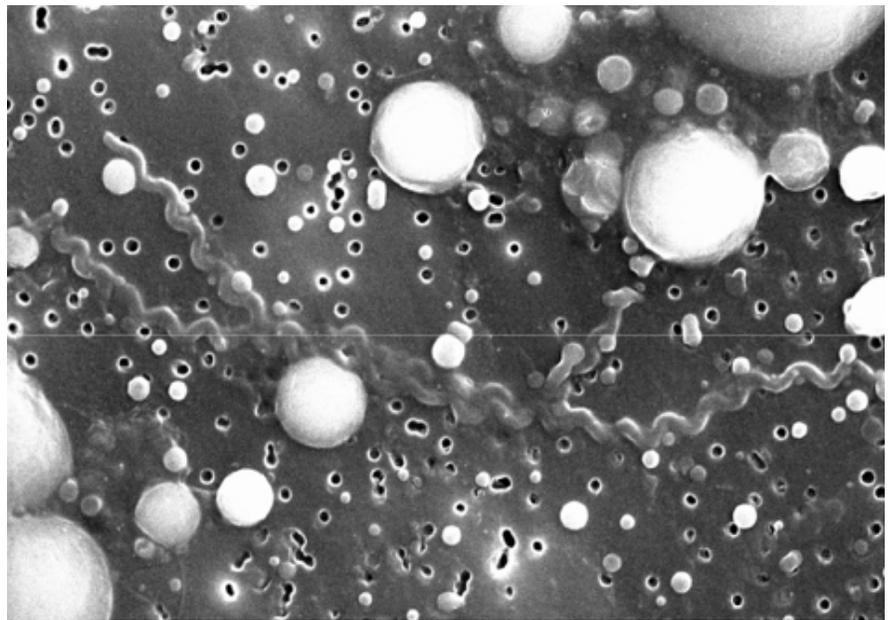


*The culprits. Rats and squirrels are among the multiple hosts that carry and spread leptospirosis.*



Horses can become infected by eating hay or grain that has been contaminated by infected urine, or they can contract it by drinking from standing water that has been similarly affected. In some cases, horses may be affected by the direct splashing of infected animals' urine into the eyes or mouth.

Leptospirosis is now classified as a re-emerging infectious disease by the



*This photograph of *Leptospira spirochetes* was taken with a scanning electron microscope and shows the spirochetes (squiggles) on the surface of a water filter.*

Centers for Disease Control and the World Health Organization. Increased attention has revealed numerous human and animal cases worldwide, including in the continental United States. Surveillance in children in inner cities found exposure and cases in Baltimore and Detroit, while clinical cases occurred in adult participants of water-related endurance sports and recreation, including in California. A whopping 65% of dairy workers in one study had exposure to *Leptospira*. Canine, cattle and wildlife cases are common in some areas of the United States, including California. Vaccines with limited efficacy are available for dogs and cattle, but not for horses or humans.

The incubation period for leptospirosis in horses is one to three weeks. Horses might experience a variety of clinical signs, including fever, loss of appetite, swelling of the eyes, light sensitivity, tearing, ocular discharge, eye cloudiness, and redness around the eye, as well as lethargy and mid- to late-term abortion. Adult horses have been known to develop jaundice and even die from kidney and/or liver failure. Diagnosis of

leptospirosis can often be overlooked because the clinical signs of the disease are common to other diseases. Only laboratory tests of blood or urine can confirm if leptospirosis is present.

A complication of leptospirosis in horses is equine recurrent uveitis (ERU) or *moon blindness*. Recurrent uveitis or moon blindness is the leading cause of blindness in horses. The blindness is caused not by the leptospirosis infection itself, but by the immune response to the initial infection, including severe inflammation inside the eye. Thus, horses with chronic ERU are not necessarily contagious for leptospirosis.

As the name of the disease implies, ERU typically occurs multiple times, which increases the chances for damage to the eye and eventual vision impairment. The clinical signs mimic trauma or injury to the eye and include watering of one or both eyes, squinting, redness, and the cornea may become opaque and cloudy. The condition is very painful and often the horse is very sensitive to light.



**Left:** An active episode of equine recurrent uveitis. Note the redness to the conjunctiva, excess tearing, and hazy appearance. **Right:** End stage equine recurrent uveitis. Note extensive corneal scarring.

Currently, treatment of recurrent uveitis is to aggressively treat acute attacks and also minimize the frequency and severity of recurrences. Any horse with a suddenly painful, teary eye should receive immediate attention from a veterinarian who can then make a definitive diagnosis and initiate appropriate treatment. New methods used by veterinary ophthalmologists to treat ERU involve implantation of medicated “wafers” or injections of medication into the back of the eye. These anti-inflammatory drugs are then absorbed slowly over the course of years.

Good farm management techniques can help reduce the risk of infection. Keep wildlife away from feed sources and do not allow standing water to accumulate. Do not allow horses (or any of your animals) to drink from stagnant water sources as standing water might be contaminated with leptospirosis-tainted urine from wildlife or cattle. Good disinfection programs will help reduce the risk of exposure to leptospirosis and many other diseases.

— **Continued on page 8**

#### HOW TO LOWER THE RISK OF LEPTOSPIROSIS INFECTION

- Keep wildlife away from feed sources.
- Do not allow standing water to accumulate.
- Do not allow animals to drink from stagnant water sources.
- Have a good disinfection program in place.



*Leptospira* tend to survive well in wet, freshwater environments, such as lake basins, marshes, or areas where puddles frequently form or persist. Many horse owners have dogs who frequent the barn or live in rural areas, and these dogs should be current on their vaccinations against leptospirosis. According to the American Veterinary Medical Association, currently available vaccines effectively prevent leptospirosis and protect dogs for at least 12 months. Annual vaccination is recommended for at-risk dogs.

**Zoonoses**  
— **From page 7**

**Salmonellosis** — Salmonellosis is one of the most commonly diagnosed infectious causes of diarrhea in adult horses. Clinical manifestations range from no abnormal clinical signs (subclinical shedder) to acute, severe diarrhea and even death. The disease is seen sporadically but may become an epidemic, depending on the virulence of the organism, level of exposure, and host factors.

*Salmonella* is spread feco-orally between animals by manure that contaminates feed or water or by contact with animals actively shedding the bacteria. A foal might pick it up when nursing a mare or nuzzling her flank if she has lain on dirty bedding or her tail has flicked feces onto her body. A foal will also eat manure and can pick it up that way. Mice droppings in hay or grain can also be a source of *Salmonella*. Barnyard chickens, pigeons and wildlife can be a source of *Salmonella*, especially if they defecate on hay or other feed.

Stress appears to play an important role in the progression of the disease—a history of surgery, transportation, or change in feed; concurrent disease, particularly GI disorders (colic); or treatment with broad-spectrum antimicrobial drugs often precedes the diarrhea.

Three forms of salmonellosis have been recognized in adult horses. One is the subclinical shedder, which has the potential to transmit the bacteria to susceptible animals either by direct contact or by contamination of the environment, water or feed sources. Multiple fecal cultures may be necessary to identify low-level shedders because the microorganism is shed in the feces intermittently

and in small numbers. If stressed, the carriers may develop clinical disease. The national prevalence of fecal shedding of *Salmonella enterica* by normal horses in the United States is estimated to be <2%. However, the proportion of hospitalized horses shedding is much higher (approximately 8%), likely due to stress and concurrent illness.

The second form of the disease is characterized by a mild clinical course, with signs of depression, fever, low-grade colic, anorexia, and soft but not watery feces. Affected horses may have increased susceptibility to infection. Clinical disease may last 4 to 5 days. Because recovered horses may continue to excrete the organism in their feces for days to months, isolation of the shedding horse and thorough cleaning and subsequent disinfection of the contaminated area are recommended until fecal cultures are negative.

The third form of salmonellosis is characterized by the sudden onset of severe depression, anorexia, profound neutropenia (decreased neutrophils that result in increased susceptibility to infection), and frequently abdominal pain. Diarrhea develops within 24 hours after the onset of fever. Affected horses dehydrate rapidly, and metabolic acidosis and electrolyte losses occur as the horse deteriorates. Clinical signs of sepsis (a potentially fatal whole-body inflammation caused by severe infection) and hypovolemic shock (heart failure) can progress rapidly.

Treatment in animals and humans is primarily supportive, consisting of fluid and electrolyte administration, as well as the use of intestinal protectants. Systemic antimicrobials are used only when the risk of septicemia is high, such as when treating young, elderly and immunocompromised patients, or when

treating particularly invasive strains such as *Salmonella typhimurium*. The use of antibiotics has little benefit in treating primary gastrointestinal infections, does not eliminate subclinical states, and may contribute to the development of antibiotic resistance.

Dr. Gary Magdesian, equine critical care specialist at the William R. Pritchard Veterinary Medical Teaching Hospital, has provided the following information on caring for *Salmonella*-positive animals (see page 9).

**MRSA (Methicillin-Resistant *Staphylococcus aureus*)**—MRSA is a type of bacteria that is resistant to certain antibiotics. These antibiotics include methicillin, cloxacillin, dicloxacillin, oxacillin, and nafcillin, as well as a closely related class of drugs known as cephalosporins (e.g., cephalexin). Overuse of antibiotics and the use of more powerful drugs than necessary for less serious infections may be some of the causes of the development of MRSA.

Approximately 1 to 2% of people carry MRSA on their skin or in their nose. Infections caused by MRSA, for the most part, are not different from any other Staph infection, although some strains of MRSA may be more aggressive than regular Staph isolates. The diagnosis of an MRSA infection requires laboratory testing. Testing can also be important since MRSA's antibiotic resistance may make it more difficult to manage and information is needed to guide treatment.

First, there is a distinction between MRSA colonization and MRSA infection. Colonization is the presence of the bacteria with no signs of illness or infection. MRSA infection involves clinical signs of illness or inflammation due to tissue damage

— **Continued on page 11**

## HOW TO CARE FOR ANIMALS TESTING POSITIVE FOR *SALMONELLA*

Animals are diagnosed for *Salmonella* by fecal culture. Animals that are sick or have been sick have altered intestinal flora and fauna, which makes them more likely to be colonized by *Salmonella*. In these animals, exposure to as few as 1/100<sup>th</sup> of a drop of *Salmonella* culture may result in temporary colonization and fecal shedding.

Animals that have recovered after a clinical course of salmonellosis are evaluated for diarrhea or other illness that could be attributed to *Salmonella* and are discharged when these signs are not present. However, they may be shedding small numbers of *Salmonella*. Since the number of bacteria required to cause illness in healthy normal animals is very high, it is unlikely that the discharged animal would pose a risk to others on returning home, **provided that good farm management techniques are in place and that precautions are taken to protect vulnerable animals and humans.**

- ☛ Any humans with immunosuppressive diseases, taking immunosuppressive drugs or antimicrobial drugs, or having cancer or sickle cell anemia, and elderly people, pregnant women and children should avoid contact with the animal until it is culture negative.
- ☛ Keep the recovering animal separate from others, especially from the most susceptible animals (those that are stressed, sick or on antibiotics), especially young animals, for a period of 6 to 8 weeks.
- ☛ Wear latex gloves and wash your hands with soap thoroughly after handling this animal. Alcohol-based hand sanitizers are effective as well.
- ☛ Clean the infected animal's stall last and disinfect rakes, forks, and any other implements used with 1 part bleach in 10 parts water or other disinfectant as recommended by your vet (Accel, Trifectant, Stall Safe are others).
- ☛ Wear eye and hand protection when handling bleach, and use only in a well-ventilated area. Please review disinfectant use and protocols with your veterinarian.
- ☛ Foot baths with a similar concentration of bleach or other disinfectant can be placed outside the stall or pen. Note that different disinfectants must not be used simultaneously or allowed to contact one another because toxic byproducts can form.
- ☛ Do not use manure on fields or in the garden. Do not use the same carts for feed and manure.
- ☛ Signs of salmonellosis in humans include diarrhea and fever.

Most animals stop shedding *Salmonella* by 8 weeks after regaining normal health and bowel function. Your veterinarian should obtain fecal cultures (or PCR) once weekly, and when one of the samples is negative, then four additional daily samples should be obtained. When the horse has five negative cultures, it would be considered negative.

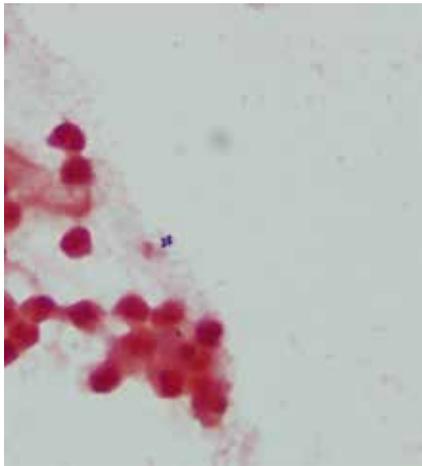
## Zoonoses

### — From page 8

caused by invasion by the bacteria. Infection requires treatment, while colonization does not. Most people do not know they are colonized because the bacteria are present but are not causing any symptoms. Good hand hygiene and proper wound care help ensure that bacteria do not enter the body through breaks in the skin and potentially cause infections. MRSA is present in a wide range of animal species, including horses. Food animals and pets likely play a role in human MRSA infections. Some groups of individuals who work closely with animals, such as veterinarians, have high MRSA colonization rates. It is certain that animals are a source of human MRSA infection in some circumstances, but humans may also serve as sources of infection in animals.

**There is clear evidence of interspecies transmission of MRSA between horses and humans, resulting in both colonization and infection.** Higher rates of MRSA colonization than would be expected have been identified in horse owners and equine veterinarians. One study reported colonization of 13% of horse owners and the presence of a colonized person on every farm that had one or more colonized horses, with indistinguishable human and equine strains.

Most colonized horses do not develop clinical infections, but colonization at the time of hospital admission is a risk factor for the development of such infections at catheter sites, wounds or incisions. MRSA-colonized horses are also of concern because of the potential for transmission to other horses, humans, and potentially other animal species.



*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.

The William R. Pritchard Veterinary Medical Teaching Hospital at UC Davis 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 program emphasizes the use of gloves to handle all patients as well as hand washing after handling every patient.

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.

Horses who have tested positive for MRSA, either as a carrier or with an active infection, should follow the recommendations provided by Dr. Magdesian on the next page. ✱



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

## UC Davis Welcomes New Equine Ophthalmologist

Dr. Mary Lassaline will be joining the clinical faculty at the William R. Pritchard Veterinary Medical Teaching Hospital in mid-August. She will be developing a full-time service in equine and livestock ophthalmology within the hospital and instructing senior veterinary students and residents rotating through the Veterinary Ophthalmology Service. She will also provide consultations with referring veterinarians and clients.



*Dr. Mary Lassaline*

Dr. Lassaline received her veterinary degree from Michigan State University as well as a doctorate in cognitive psychology from the University of Michigan. She completed an internship in medicine and surgery at Rood & Riddle Equine Hospital, followed by a residency in veterinary ophthalmology at the University of Florida. Her primary area of research has been in equine corneal disease. She is board-certified by the American College of Veterinary Ophthalmologists.

Dr. Lassaline is currently an Associate Professor of Ophthalmology at New Bolton Center at the University of Pennsylvania, where she developed a new rotation dedicated to equine ophthalmology for veterinary students and residents. She looks forward to helping horses with eye problems and accepting referrals from our loyal referring veterinarians. For nonurgent conditions, appointments may be made now for late August or later. More urgent cases can be seen sooner by our current veterinary ophthalmology team. Welcome Dr. Lassaline!

### HOW TO CARE FOR HORSES TESTING POSITIVE FOR MRSA

- ☛ Any horse testing positive for MRSA should be quarantined on the farm or stable to prevent colonization and/or infection of other animals or people.
- ☛ The quarantined horse should be kept in a stall where it has no nose-to-nose contact with other horses. It should not be turned out into areas where there are other animals.
- ☛ Only a small number of people should handle the horse. No children, elderly, immunocompromised (e.g., HIV) or people with wounds or incisions should come in contact with the horse.
- ☛ Horse handlers should wear gloves at all times when handling the horse and should wash hands thoroughly and/or use an alcohol-based hand sanitizer to disinfect hands afterward.
- ☛ If the horse has an incisional infection or wound that requires cleaning, we recommend that you follow this procedure: Once the infected site is cleaned, the bandages and disposables used for cleaning should be discarded in a plastic bag with a small amount of disinfectant such as dilute bleach (one tablespoon bleach:one quart water), betadine, or nolvasan added.
- ☛ If there is a risk of body fluid spillage from the cleaning process, contact your veterinarian for assistance with the process and for recommendations on how to do this safely.
- ☛ To know if your horse has cleared a carrier state or infection, it should have two negative cultures of the nasal passages and the wound or incision taken by your veterinarian.

# CEH HORSEREPORT

Mail ID#1415  
Center for Equine Health  
School of Veterinary Medicine  
University of California  
One Shields Avenue  
Davis, CA 95616-8589

Presorted  
First Class Mail  
US Postage  
PAID  
Davis, CA  
Permit #3

RETURN SERVICE REQUESTED



## View the videos in our award-winning online Horse Report!

*The Horse Report* is now brought to you in an online format that allows us to include videos. If you can access *The Horse Report* from our website, you can read it sooner and save us the postage. Send your e-mail address to [ljchristison@ucdavis.edu](mailto:ljchristison@ucdavis.edu) and receive an e-mail notice whenever a new publication is posted!

[www.vetmed.ucdavis.edu/ceh](http://www.vetmed.ucdavis.edu/ceh)

# CEH HORSEREPORT

©The Regents of the  
University of California  
Summer 2014

Center for Equine Health  
(530) 752-6433  
[www.vetmed.ucdavis.edu/ceh](http://www.vetmed.ucdavis.edu/ceh)  
[www.facebook.com/ucdavis.ceh](https://www.facebook.com/ucdavis.ceh)

Director: Dr. Claudia Sonder  
[csonder@ucdavis.edu](mailto:csonder@ucdavis.edu)

Director Emeritus: Dr. Gregory Ferraro  
[glferraro@ucdavis.edu](mailto:glferraro@ucdavis.edu)

Senior Editor: Barbara Meierhenry  
[cehwriter@ucdavis.edu](mailto:cehwriter@ucdavis.edu)

Management Services Officer: Kimberly Ney  
[klney@ucdavis.edu](mailto:klney@ucdavis.edu)

Dean, School of Veterinary Medicine:  
Dr. Michael D. Lairmore

*The Center for Equine Health is supported with funds provided by the State of California Pari-Mutuel Fund and contributions by private donors.*

*The University of California does not discriminate in any of its policies, procedures or practices.*

*The University is an affirmative action/equal opportunity employer. The information you provide will be used for University business and will not be released unless required by law. To review your record, contact Advancement Services, 1460 Drew Avenue, Ste. 100, Davis, CA 95616. A portion of all gifts is used to defray the costs of administering the funds. All gifts are tax-deductible as prescribed by law.*