



EQUINE HEALTH UPDATE
 FOR HORSE OWNERS AND VETERINARIANS

Can My Horse Get Coronavirus?

By Danielle Keating, DVM Student (Class of 2020)
 Edited by Dr. Stacy H. Tinkler, Large Animal Internal Medicine

The short answer is, yes—your horse can get a strain of coronavirus, although it is not the same strain that is causing the COVID-19 coronavirus pandemic. The larger family of coronaviruses can be divided into four subtypes and cause different types of disease in different species. Coronaviruses have been found in a variety of species aside from humans including dogs, cats, pigs, cattle, horses, and chickens. Equine Coronavirus (ECoV) is a relatively uncommon disease but has become more frequent in the last 8-10 years. It has recently been estimated that sero-prevalence (horses that have antibody to ECoV) in US horses is about 10%. While COVID-19 is causing mainly respiratory disease in humans, ECoV is primarily a gastro-intestinal disease.

How can they get ECoV?

Horses contract coronavirus when an infected horse sheds the virus in its manure, which is then ingested by another horse. This could be directly via the manure, or via objects that have been contaminated by infected manure such as pitchforks, manure tubs, stalls, and even people and clothing. When foals get coronavirus, it is typically seen as a co-infection with Rotavirus or *Clostridium perfringens*, but in adults older than 2 years of age it is usually the only infectious organism found to be causing disease.

What is the clinical course of disease in horses?

It can take 2-4 days before horses display signs of being sick with coronavirus (the incubation period), and once they have recovered, they can continue to shed the virus for up to 21 days typically; however, there have been reports of persistent shedding up to 99 days and that horses may also shed the virus intermittently. This makes infected and asymptomatic shedders (horses that are sick, but do not have outward signs of disease) sources of infection for other in-contact horses.

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News & Notes



VETERINARY HOSPITAL PRESSES ON to Continue Treating Indiana's Animals

<https://www.purdue.edu/vet/news/pvr-veterinary-hospital-presses-on-to-continue-treating-indianas-animals.php>

Coronavirus *(continued from cover)*

Clinical signs of coronavirus in horses include fever, diarrhea or soft feces, a lack of appetite, and mild colic-like signs such as laying down and looking or kicking at their flanks. The good news is that coronavirus in horses is not generally a severe disease. Many horses may not even display outward signs of infection. Treatment for horses that show clinical signs is mainly supportive and depends on what signs the horse is displaying—it may include non-steroidal anti-inflammatory drug (NSAID) therapy or intravenous fluid therapy, with or without anti-diarrheal medications. Rarely, complications do occur and can be serious such as sepsis and neurologic disease due to increased blood ammonia levels. These more complicated cases may require hospitalization or more involved veterinary intervention.

Is it diagnosed the same way in horses as COVID-19 is in humans?

To diagnose equine coronavirus, a fecal sample must be submitted to a laboratory that will run a polymerase chain reaction (PCR) test to look for evidence of coronavirus RNA. We do not perform nasal swabs to diagnose equine coronavirus as it is primarily a GI disease.

Is there a vaccine to prevent the disease in horses?

While there is no vaccine for equine coronavirus, maintaining a high level of cleanliness in your equine facility is the best way to prevent coronavirus infections. Manure should be removed from stalls and harrowed from turnout spaces frequently, and then be disposed of appropriately to avoid cross-contamination of drinking water sources and turnout areas.

In the event of a coronavirus outbreak, maintaining good biosecurity protocol—including isolation of infected horses, dedicating specific equipment for infected horses, handling infected horses last, and minimizing individuals in contact with infected horses—is important to avoid further spread of infection to other horses. Equine coronavirus can be killed by

a variety of common cleaners including bleach and povidone iodine. When disinfecting equipment, it is important to remember to remove any organic material such as bedding, dirt, or feces prior to disinfecting.

Can I get ECoV from my horse or give COVID-19 to my horse?

Currently, there is no evidence that COVID-19 is transmissible to horses, nor is there evidence that equine coronavirus is transmissible to humans. While the COVID-19 pandemic in humans can be life-threatening, coronavirus in horses causes generally mild disease that can be treated supportively. Good barn management, cleanliness and biosecurity are the mainstays for disease prevention.

If you think your horse may have equine coronavirus, begin implementing biosecurity protocols for affected horses and contact your veterinarian to further guide proper isolation guidelines, submission of fecal samples and a treatment plan.

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Equine Summer Sores: A REAL PAIN, WHATEVER YOU CALL THEM

By Dr. Amanda Farr, Equine Community Practice

Equine summer sores are also known as habronemiasis, granular dermatitis, and jack sores. This is a parasitic disease found in horses, donkeys, mules and zebras, and the lesions form as a result of a complicated interaction between the horse, the stomach worm, and the pesky flies that act as intermediate hosts and carriers.

So, what are stomach worms?

The larvae of stomach worms (*Habronema microstoma*, *Habronema muscae*, *Drashia megastoma*) hatch from eggs laid on fecal material or moist bedding. These larvae are picked up by flies feeding on this material and then deposited near your horse's mouth. The larvae are swallowed and travel to the horse's stomach. Two months later, new stomach worms are fully grown and start laying eggs. These eggs travel out of the stomach, are passed in the manure, and the cycle starts all over again.

One bit of good news is that the stomach worms rarely cause problems inside the stomach—unless there is a very high load of them. The primary disease—summer sores—occurs when flies deposit the larvae on wounds, injured skin, or moist areas. The larvae are unable to complete their life cycle in the tissue, and they start migrating. Inflammation occurs as the body reacts to the migrating larvae, which is characterized by redness, heat, swelling and itching. Horses will rub or chew at the affected area, further traumatizing it.

Where and when do the lesions form most commonly?

Usually seen as non-healing sores, these most commonly form in existing wounds, around the eyes, in the corners of the lips or mouth, along the ventral abdomen (belly), and the prepuce (sheath). These sores often appear greasy or slimy, may ooze bloody fluid, and are typically extremely itchy. Yellow granules the size of rice grains may be visible in the sores (**Figure 1**).

As you can imagine by the name, these sores are most commonly seen during the summer months or during fly season, although they can occur year round in southern states. The sores can disappear in the winter and return in the spring. It is unclear if it is a recurrence of the same lesion or if it is a new lesion in the same place. More severe complications can occur with summer sores. Any non-healing wound, including summer sores, can develop into a sarcoid. Sarcoids are locally invasive fibroblastic skin tumors that can lead to ugly scars and inhibited range of motion if they occur over joints.



Figure 1. An ocular summer sore in the corner of the eye (medial canthus). The yellow sulfur-like granules are visible in the wound created by migrating larvae. (Courtesy of Miller and Scott, *Equine Dermatology*)

What's the best way to diagnose and treat summer sores?

Diagnosing summer sores can be challenging and expensive. In most cases the location of the lesion and its appearance, especially if it has the typical sulfur-like yellow granules, suggest the diagnosis. A biopsy, or tissue sample, can be examined microscopically or can be sent to a laboratory for molecular testing (PCR). Many clinicians believe the response to treatment (healing) is considered diagnostic as well.

The treatment of summer sores can be very difficult. For small lesions, an avermectin paste dewormer (ivermectin, moxidectin) will kill the migrating larvae. Once the larvae are dead and the body has cleaned up the inflammation and associated debris, the wound will begin to heal. Large lesions are more challenging, especially when exuberant granulation tissue (proud flesh) forms in the wound. Surgical debridement or removal of the excess tissue may be necessary. Systemic anti-inflammatories can aid in decreasing the inflammatory response coupled with topical medications. A physical barrier is sometimes necessary to stop self-trauma when lesions are large and painful or pruritic (itchy): bandages, body sheets, and neck cradles can be used. Additional treatments can include injection of specific medication into the lesions and cryotherapy (freezing the lesion with liquid nitrogen).

How can we prevent summer sores from forming at all?

Fly control is the best method to prevent summer sores, and can be accomplished through an approach that targets both the horse and the environment. Fly repellent sprays can be applied topically (read all label directions and do not over-apply oil-based fly sprays). Fly masks, fly sheets and fly boots or leggings can help reduce irritation and wounding from flies, as well as protect from larval deposition (**Figure 2**). Environmentally, large fans, fly repellents, feed through supplements, parasitic wasps and insect growth regulators can be used to decrease the fly population around the stable (**Figure 3**). Additionally, mowing pastures, removing fecal material from run-in sheds, and utilizing appropriate composting will help decrease the fly population.

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Figure 2. A well-protected horse, wearing a fly mask, fly sheet and fly boots. (www.statelinetack.com/item/amigo-bug-buster-with-no-fly-zone/E031165/)



Figure 3. Feed through fly prevention uses a non-toxic insect growth regulator that is specific to house and stable flies. (www.valleyvet.com/swatches/34880_L_vvs_000.jpg)



Something in the Water: Blue-Green Algae and Your Horse

By Andrea Hall, DVM Student (Class of 2020)
Edited by Dr. Stacy H. Tinkler, Large Animal Internal Medicine
and Dr. Steve Hooser, Veterinary Toxicology

Spreading manure and fertilizer on fields is a major contributing factor to potentially harmful heavy algal blooms. Excess nitrogen and phosphorus contaminate water sources with excess nutrients and hot temperatures contribute to excessive, rapid growth of cyanobacteria (blue-green algae) known as “blooms” of algae. Algal blooms can occur in any body of fresh water, including rivers, but often occur in ponds and reservoirs. If the conditions are right, some cyanobacterial blooms can produce multiple toxins that are harmful to both humans and animals.

The most common species of blue-green algae in North America associated with poisoning are *Dolichospermum* (formerly *Anabaena*), *Aphanizomenon*, and *Microcystis*. Over thirty species of cyanobacteria have been associated with toxic water blooms. Not all strains produce toxins. Strains that can produce toxins generally only produce them under certain conditions. Environmental factors such as the temperature and pH of the water, sunlight, and nutrient concentration affect when toxins are produced. The most common time for blue-green algae poisoning is in summer and early fall due to warm temperatures and higher nutrient concentration due to dry periods. Toxins are released when the blue-green algal cells become damaged and die in the water. Toxins may also be released when ingested water reaches an animal’s digestive tract and the cells are disrupted.

When water containing excessive growths of toxin-producing blue-green algae is ingested, intoxication can occur depending on the amount ingested. Clinical signs that follow depend on the type and dose of toxin. Some algae produce neurotoxins causing muscle tremors or respiratory distress, seizures, paddling, salivation, and acute death within minutes to hours. Horses may also have watery to bloody diarrhea. Other algae produce hepato-toxins that damage the liver leading to acute or delayed death following liver failure. Horses that survive acute stages of liver damage may have secondary photosensitization of non-pigmented areas of the skin leading to hair loss and sloughing.

Diagnosis of a horse with blue-green algae poisoning is primarily based on history and clinical signs. If an animal has perished, a post-mortem examination may also be a useful

diagnostic aid. Water that the animal was drinking is the best sample to test for cyanobacterial toxins. Unfortunately, it is impossible to visually tell if water is contaminated. There may be a blue-green sheen in the water or dead wildlife near the body of water, but these are not always present nor are they reliable indicators. As previously mentioned, algae can be present but may or may not be producing toxins. In cases in which blue-green algae blooms are present, and there is potential harm to animals, testing can be performed on water samples at the Purdue University College of Veterinary Medicine’s Animal Disease Diagnostic Laboratory (ADDL) to look for blue-green algae and to detect the presence of blue-green algae toxins, anatoxin-a or microcystins. For additional information about blue-green algae testing, please visit the Purdue ADDL website at www.addl.purdue.edu. In addition, humans exposed to blue-green algae through direct or indirect contact should consult a medical doctor.

Treatment of horses with blue-green algae poisoning is supportive such as with intravenous fluids, nutritional support and symptomatic treatment of acute liver toxicosis in cases of hepatotoxicity. Some horses exposed to the hepato-toxins may recover with treatment, but in the case of neurotoxins, typically death occurs so quickly that the animal is simply found dead near a water source. Most importantly, the contaminated water source should be made unavailable. The horse should be kept out of direct sunlight in cases of liver toxicity to prevent photosensitization and provided with fresh, clean water and plenty of feed. Studies have shown that activated charcoal slurry may be beneficial to recovery as well. Bile acid transport blockers such as cyclosporin A, rifampin, and silymarin have effectively prevented hepatotoxicity and cholestyramine absorbed toxins in the gastrointestinal tract in the research setting when given prior to toxin exposure, thus making their clinical utility questionable. Do not use algacides, such as copper sulfate, to treat the blooms as this will cause the cells to rupture thereby releasing large amounts of toxins into the water.

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Sinusitis: *WHAT DOES THAT MEAN FOR MY HORSE?*

Co-authored by Andrea Hall, DVM Student (Class of 2020)
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What are sinuses?

Sinuses are air-filled cavities within the head that help to make the skull less heavy as well as house a number of important structures including tooth roots and nerves. The paranasal sinuses in horses have many paired left and right compartments and include the frontal, maxillary, sphenopalatine, and dorsal and ventral conchal sinuses. Horses with healthy sinuses produce mucus which flows freely through the sinuses and into the nasal passages for drainage.

What is sinusitis and what can cause it?

When a horse develops abnormal nasal discharge that originates from the paranasal sinuses, it can have many causes. The term sinusitis refers to inflammation or infection of one or more sinuses. Sinusitis is the most common disease of the paranasal sinuses and can occur acutely or chronically. Bacterial or fungal infection of the sinus without an inciting cause is referred to as primary sinusitis. Primary sinusitis can affect any horse despite breed, age, or sex. The most commonly isolated bacteria are *Streptococcus* species.

Secondary sinusitis refers to inflammation due to another primary cause. The sinuses accommodate some of the maxillary premolar and molar tooth roots of the upper cheek teeth. Secondary sinusitis is commonly the result of a tooth root infection of one of these teeth. The last four cheek teeth are contained within the maxillary sinus and are the most likely to cause sinusitis. Other secondary causes include facial bone fractures, sinus cysts, ethmoid hematomas, polyps, and other neoplastic masses.

What signs would I see if my horse had sinusitis?

The single most common sign of sinusitis is nasal discharge. The character of this discharge is variable depending on the cause but is most commonly purulent (thick yellow discharge) or bloody. Often the discharge will also have a foul odor. Discharge usually occurs on the side of the affected sinus. The bone covering the sinuses is extremely thin, therefore sinusitis from a cyst or expanding cancerous growth can readily distort the facial bones. Primary sinusitis or even secondary sinusitis due to a tooth will not typically have changes in the facial bone. Horses with sinusitis will rarely have a fever but often have increased respiratory rate or effort if there is obstruction of the airways. Holding a hand over each nostril can assist in detecting differences in airflow. Tapping on the skin over the sinuses may detect a dull sound that would indicate the presence of fluid within the sinus instead of the normal hollow sound.

What tests might be performed?

There are many diagnostic tests to determine if a horse has sinusitis and the inciting cause. Endoscopy is placing a small camera in the nose of the horse. It is used to confirm the origin of a horse's nasal discharge by following the discharge in the nasal passage to the opening of the sinus into the nose. The endoscope, however, cannot enter the sinuses from the nasal passage in a normal horse. Radiographs (x-rays) can reveal fluid within a paranasal sinus, cysts within the sinus, solid masses, bone changes associated with dental disease or neoplastic masses. An oral exam is used to evaluate the teeth. An abnormal odor, fractured molars or premolars, or periodontal pockets may be identified during an oral examination. Endoscopy, radiographs, and oral exams may not reveal the inciting cause of the sinusitis. If that is the case, further diagnostics may be pursued.

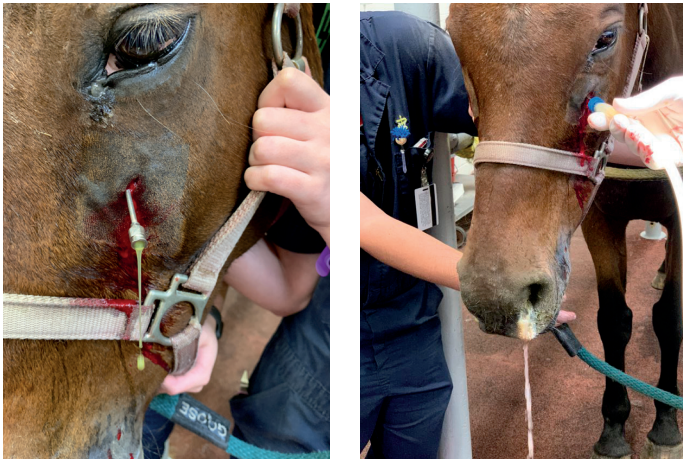
Additional diagnostics commonly include sinocentesis, sinoscopy, or CT scan. Sinocentesis is obtaining a sample of fluid from the sinus through a small hole for examination and culture. Sinoscopy involves making a hole in the bone over the affected sinus for a flexible endoscope to be passed through. After rinsing the sinus the inside of the sinus can be viewed which cannot be accomplished with standard upper airway endoscopy. This diagnostic additionally allows for treatment via direct lavaging (rinsing) of the affected sinus. A CT scan can be utilized for a more detailed and 3D view of the sinuses as associated structures, often revealing the inciting cause. Depending on the referral center a CT scan may be able to be performed standing or under general anesthesia.

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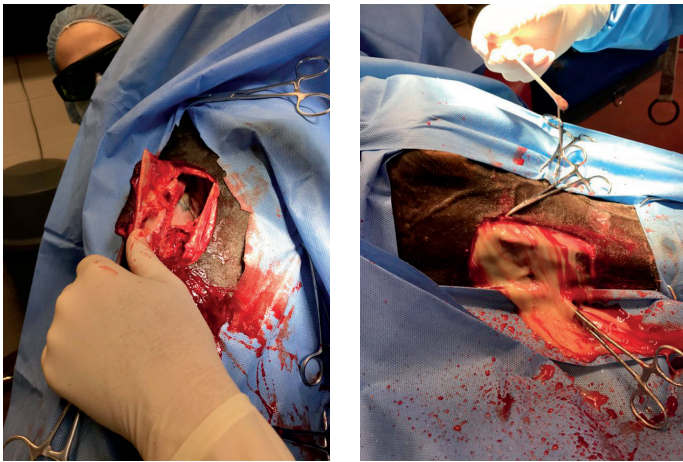


Figure 1. Purulent (thick yellow) nasal discharge indicating an upper respiratory abnormality. This abnormality could be sinusitis among other possibilities. (Photo courtesy of Dr. Jan Hawkins)

Sinusitis (continued from page 5)



Figures 2 and 3. A cannula has been placed through the small sinus trephination to collect a sample of fluid. The sinus is then being lavaged (rinsed) through the small trephine hole.



Figures 4 and 5. Bone flaps created into the sinus standing (image 4) and under anesthesia (image 5) to allow for sample collection, exploring the sinus, and removal of abnormal tissue. (Photos courtesy of Dr. Jan Hawkins)

What treatments might be suggested if my horse is diagnosed with sinusitis?

Primary sinusitis typically resolves with systemic antibiotic therapy with or without lavaging the effected sinus. In cases of secondary sinusitis, the primary disease process must be treated in order to resolve the sinusitis, which often requires surgery. Antibiotic therapy will only temporarily resolve the signs of sinusitis. Surgical treatments like opening a bone flap into the affected sinus may be used to remove exudate or masses and to provide additional drainage into the nasal passage. Less invasive surgery, sinus trephination, may be possible depending on the inciting cause. If dental disease is the inciting cause, the affected tooth will likely be removed, the socket flushed, and packing placed to prevent recontamination of the sinuses with food.

The majority of cases of sinusitis will receive a regimen of anti-inflammatories to assist in reduction of swelling and discomfort associated with the disease or any surgical procedures. A bacterial culture is often performed, and if indicated, the appropriate antibiotic is selected to use systemically and possibly to lavage through the sinus. A hospital stay can range from a day to several days depending on the underlying cause for sinusitis and the treatment plan elected by the owner and veterinarian. Regardless, horses that are treated for sinusitis have a good prognosis for returning to function after treatment if not neoplastic (cancerous) in origin.

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Blue-Green Algae (continued from page 4)

Blue-green algae poisoning is often preventable. The best strategy for preventing algae blooms is by minimizing nutrient inputs into your pond or other bodies of water. The primary sources of nutrient runoff include: over application of fertilizer, manure, or poultry litter, leaking septic systems, drain fields, or grey water discharge, animal waste from livestock or migratory birds, and shoreline erosion. The use of grass-lined ditches or swales between fields and water sources or a thick vegetative border, especially wetland plants, can help redirect nutrient runoff. Other methods include adding a means of aeration and circulation to the pond, draining down the pond in winter, skimming any stagnant or scummy water, limiting light availability by planting trees or shrubs or covering the pond for a time, or lastly, building a floating wetland in the pond to help soak up nutrients.

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Thrush—Ooooh that smell!

By Dr. Sarah Waxman, Equine Community Practice

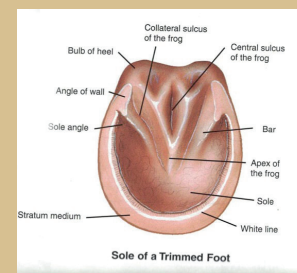
Many horse people are familiar with the term “thrush” and know that it’s a stinky foot problem that their horse can get, however there are many details that can get overlooked. Is it a bacterial problem? A fungal problem? Will it make my horse lame? What can I do about it?

Thrush in horses is an infection of the frog and hoof tissues with environmental bacteria and/or fungus. Manure and urine, along with microorganisms (often *Fusobacterium necrophorum*), begin to eat away the horn tissue of the frog, causing the sulci of the frog (**Figure 1**) to deepen and soften. When thrush is mild there is a foul smelling, black gooey substance that is found in the sulci of the frog and at this time it is very unlikely that the horse will be lame. If this process is not halted, further tissue necrosis (tissue “rotting”) can occur and either make it easier for a horse to be injured after stepping on a foreign body or the sensitive laminae of the hoof can become infected and lead to extensive and even permanent damage to the hoof. At this point lameness will likely be present. Although this happens in less than 10% of cases, if it’s your horse, neither he, nor you, will be very happy about it.

While unsanitary conditions are often the cause of hoof thrush, wet bedding, use of straw bedding, and constant wet outdoor conditions (i.e. deep mud) can also lead to thrush. Horses that have poor quality hoof horn, contracted feet and small frogs, ones that rarely get their hooves trimmed or picked, or that rarely get exercised may also develop thrush.

If you think your horse has thrush, the first thing to do is thoroughly clean out all of the hooves. You do need to be careful, however, because if the thrush is deep and you get too aggressive with a hoof pick, you can cause bleeding. Normal hooves and frogs do NOT bleed when you pick them out. Bleeding will not be detrimental, but your horse may jump when you hit sensitive tissue (the tissue that will bleed), and it can be alarming to some people. You then need to assess your horse’s feet to see if they are overdue for the farrier. If this is the case, get them scheduled right away. In the meantime, if the thrush is mild, you can treat the affected areas with a commercial thrush product or caustic solution (such as tincture of iodine, Kopertox, or dilute bleach water [30ml in

Figure 1. Equine hoof anatomy, image courtesy of the Illustrated Atlas of Clinical Equine Anatomy and Common Disorders of the Horse.



5L of water]). If the foot is bleeding from it, you can pack the foot with a sugar-iodine mixture, but you really ought to be consulting your veterinarian at this point and you should not put anything caustic on it. Your veterinarian can evaluate and determine if more aggressive treatment is needed or prescribe a topical antibiotic.

The next thing to do is to assess your horse’s environment and if possible, change it. If the stall is heavily contaminated with manure and urine it must be cleaned and the bedding changed. Wood shavings are preferred over straw when it comes to managing thrush. If your horse lives outside and cannot be brought into a clean stall or transferred to a cleaner and drier area, you must do the best you can to modify the area. This may include removing manure buildup, putting down limestone, or may be as simple as feeding your horse in a different area of the lot that is drier, such as on a hill.

Seeing as though some degree of thrush may be found in up to 45% of horses, it is important to maintain as good hoof hygiene as possible. As a horse owner, I understand how hard that can be during certain times of the year (this past winter in Indiana??), but with frequent hoof picking, routine hoof trimming, and early intervention, you can keep your horse protected from advanced cases of thrush.

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Summer Sores (continued from page 3)

FINAL THOUGHTS

With fly season upon us, it is time to be prepared to prevent summer sores. If your horse has a wound or suspicious area, please consult with your veterinarian to get a diagnosis and start treatment right away. Good fly control is an important part of keeping your horse safe and healthy over the summer, and plays a big role in preventing the formation of summer sores.



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EQUINE HEALTH UPDATE

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