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Equine Innovators: A Discussion With UK's Dr. Martin Nielsen

University of Kentucky researcher and leading equine parasitologist Martin Nielsen, DVM, PhD, Dipl. ACVM, talks about his research and the future of equine internal parasite control in our new podcast. Find us at **TheHorse.com/185170** or wherever you listen to your favorite podcasts.
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Alfalfa: Are Hay or Pellets Better Before Riding?

Research shows feeding horses alfalfa prior to riding can help buffer stomach acid and offers relief for ulcer-prone horses. But are hay or pellets better? **TheHorse.com/185191**

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VIEWPOINT

STEPHANIE L. CHURCH, Editor-in-Chief
@TH_StephLChurch



Tracking Output

Tell me about your horse's manure. Is it hard, soft, green, brown, mild-smelling, or super-stinky? How much of it is there—is your horse a prolific pooper or a more conservative one?

Those might seem like weird questions to ask, but be honest: You know the answers, don't you? We can be a little preoccupied with our horses' poop. Those piles are visual, olfactory, and even tactile indicators of how things are going inside that complicated equine gut.

This month freelancer Christa Lesté-Lasserre describes all the things poop can portend (page 28).

Here's what I've learned from the habits of my own horse, Happy:

- We have birds in our barn, so it's tricky to assess manure—they pick apart poop within minutes of it landing on the floor. So, I pay attention when Happy poops in my presence, before the birds descend. His piles have been a little soft/stinky since a hindgut microbial overgrowth episode a few seasons ago, so my vet and I have been working on correcting it with pre- and probiotics and other management techniques. If it were to become any softer than the "wet ball soup" Christa describes in her story, I would call my vet immediately.
- During winter and early spring the horses come in from the pasture at 3 p.m. daily (I have Happy on full board). I usually see him after 6, by which time he has pooped two to three times and has emptied at least half of one water bucket. If the pile quantity is less, the water bucket is full, or it appears he's been walking around the stall a lot, then I know to watch for signs of GI issues.
- Happy poops at the end of each ride. If it's an arena ride, he usually waits until he's in the barn. If we're on a hack or a cool-down outside the arena, he always poops in a specific spot. So, if I need to get a sample for a fecal egg count (for targeted parasite control) when he's on night turnout in spring/summer/fall with another horse, I just grab a Ziploc bag and sample that pile as I leave the farm.
- One summer evening last year, I did just that so I could mail a sample for a fecal microbiome test (to assess the ecosystem of microbes in his gut). Aside from having collected the poop during a sudden downpour, it was a reliable way to get a fresh sample when Happy was pastured.

Your manure minutiae mindfulness likely isn't lost on your family and friends, farm sitter, or anyone else who has watched you manage horses. Perhaps you've even instructed them on what to look for when they've filled in for barn chores.

Next time anyone declares it's a little odd you know your horses' poop so well, remind them it's just your way of catching conditions early, which could save not only money but even equine lives.

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BAD PONY CREATIVE EQUINE PHOTOGRAPHY

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SARAH PLEVIN, BVMS, MRCVS, CVA, DIPL. ABVP, ACVSMR

A Novel Tool for Tendon Injury Rehab

Overstrain injuries to the superficial digital flexor tendon (SDFT), which runs down the back of the cannon bone, are among the most common musculoskeletal injuries veterinarians diagnose in equine athletes. The many treatment options have three things in common: time out of training, expense, and no guarantee of success.

It makes sense, then, that injury prevention is always the goal; failing that, we need a method to optimally guide rehabilitation.

Unfortunately, current imaging approaches limit how accurately veterinarians can monitor the tendon. So, although we can use conventional ultrasound to confirm the presence of a core lesion, we are often unable to fully evaluate tendon structure, follow healing, or provide effective rehabilitation guidelines post-injury.

A new ultrasound technology, however, called ultrasound tissue characterization could get us one step closer to achieving the goals of preventing injury and optimizing rehabilitation.

Ultrasound tissue characterization is a relatively new technique aimed at alleviating some of the problems encountered with conventional ultrasound. It provides a 3D reconstruction of the tendon and classifies it by color-coded echo types based on the integrity of the tendon ultrastructure (that which is only visible with an electron microscope). According to van Schie et al., this method allows practitioners to discriminate between healthy normal, adaptive/remodeling, and injured/healing tissue, often when conventional ultrasound findings are unremarkable.

The key is successive evaluations, allowing vets to look at tendon structure differences over time. Consecutive exams allow them to determine if a tendon is static, adaptive, healing, or degenerating and recommend appropriate changes in training intensity.



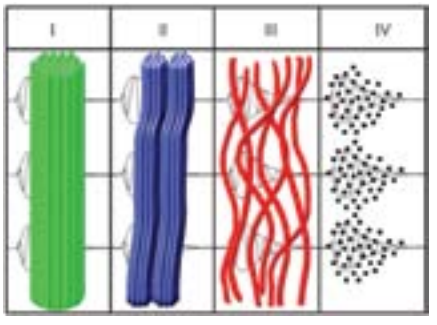
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With ultrasound tissue characterization, an ultrasound probe mounted onto a tracking device records up to 600 images.

Researchers studying humans (Docking et al., 2015) and horses (Docking et al., 2012; Plevin et al., 2019) have reported ultrasound tissue characterization to be highly reproducible and user-independent. Their results suggest it's sensitive enough to detect the effect of changing loads (exercise) on tendon within days. This provides practitioners the opportunity to not only support rehab but also monitor tendons throughout training. Research is ongoing to determine whether the technology could help vets predict injuries.

Currently, it's used in elite human (Achilles tendon) and equine (SDFT) athletes to monitor tendon health and guide injury rehabilitation.

What do the colors mean? Green (Type 1 echoes) indicates normal, well-aligned, and organized tendon bundles. Blue (Type 2) indicates wavy or swollen tendon bundles. This can represent remodeling tendon or inferior repair. Red (Type 3) represents fibrillar tissue (the building block of tendon) from partial tendon rupture or initial healing. Black (Type 4) are cells or fluid and represent core lesions where no normal tendon tissue exists.



How does it work? A standard linear array ultrasound probe mounted on a motorized tracking device noninvasively and automatically moves down the SDFT over a 12-centimeter scanning distance. As it does, the device captures transverse images (horizontal planes) at regular distances and stores them in real time for processing. The system records images every 0.2 millimeters to generate a tendon volume of 600 images. Image acquisition takes approximately 45 seconds.

Vets can subsequently use this volume to visualize the tendon in 3D to determine its structural composition and quantify tendon matrix integrity.

How can it help rehabilitation? Scientists have shown that appropriate progressive loading helps stimulate optimal tendon remodeling and healing—this is where this technique has the potential to be most useful.

By offering real-time information on tendon matrix integrity, ultrasound tissue characterization allows vets to take advantage of the limited window for appropriate tendon remodeling after injury. By mapping the healing tendon's ultrastructure and remodeling response to exercise at each step in the rehab regimen, ultrasound tissue characterization allows us to optimize the most vital tool in our rehab arsenal: exercise. Although research is ongoing, ultrasound tissue characterization seemingly affords vets opportunity to tailor exercise regimens for the individual tendon, potentially allowing for a more successful return from injury.

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CUT THE LEG CRUD

10 Skin Issues and How to Clear Them

DIANE RICE

Here it is: The first warm(ish) day since late last fall. With an almost childlike enthusiasm, you bound to the barn for an early spring ride. You hear the birds chirping in trees surrounded by blue sky and feel the sunshine, warm on your face. You give the barn door a push and enter. Ahh, the smell of hay and horses. Then into the tack room, where you're greeted with the soothing fragrance of leather.

You pick up your horse's grooming tote, then head to his stall where he welcomes you with a nicker. But when you look inside, your heart sinks. Something isn't right with his legs. You stoop to inspect them, then close your eyes, taking a deep breath and wondering what your next step should be.

Skin is your horse's largest organ. As his body's covering, it not only envelops his form but serves as the first line of defense against the realm of invaders—bacteria, fungus, and much more—that can wreak havoc on both his comfort and beauty.

SHELLEY PAULSON

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What to do when your horse's legs are lumpy, bumpy, bald, crusty, hot, itchy, runny, scaly, or swollen

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"Some skin diseases in horses are asymptomatic and bother the owner more than the horse," says Jeanine Peters-Kennedy, DVM, Dipl. ACVD, ACVP, associate clinical professor of anatomic pathology and dermatology at Cornell University's College of Veterinary Medicine, in Ithaca, New York. "But certain diseases, like allergies and infections, can make horses' skin very itchy and uncomfortable."

Others can lead to swelling (which can cause the skin to slough and allow harmful organisms to enter the horse's body) or hyperplastic scar tissue, aka proud flesh, or leave permanent scarring, all of which could interfere with movement, says Valerie Fadok, DVM, PhD, Dipl. ACVD, senior dermatologist with Zoetis Pet Care, based in Bellaire, Texas. She recommends calling your veterinarian, then starting the hosing or soaking process (whichever your horse will tolerate), at any sign of swelling.

Read on for our sources' take on 10 conditions (in alphabetical order) that could be affecting your horse, how to treat them, and how to prevent them in the future.



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Draft breeds with heavy feathering can be prone to various skin issues, in which case shaving the fetlocks might help prevent or treat the disease.

Cannon Keratosis (aka stud crud)

Causes Cannon keratosis is a lesser-known chronic cosmetic condition involving overproduction of the keratin that forms the stratum corneum (horny outer layer of the skin). Fadok says veterinarians should consider infections such as dermatophilosis (rain rot, caused by bacteria) and dermatophytosis (ringworm, caused by fungus), which can also appear in this area, when diagnosing.

Signs Crusty lesions of unknown origin down one or more hind legs (formerly thought to be from urine dripping on the horse's legs—thus, the nickname).

Prevention None known.

Treatment There is no cure for this condition, but Peters-Kennedy says it can be improved with once- or twice-daily application of keratolytic (keratin-inhibiting) agents such as a 50% mixture of propylene glycol and water or once- to twice-weekly shampoos with sulfur or salicylic acid that will break down the crust.

Cellulitis (aka phlegmon)

Causes This inflammation of the subcutaneous (directly underlying the skin's surface layer) tissues frequently results from a *Staphylococcus* or *Streptococcus* bacterial infection secondary to an injury, such as a cut, scrape, or chemical irritation/contact dermatitis (skin inflammation), or from vasculitis (inflammation of blood vessels).

Signs Redness, warmth, swelling, tenderness, pain, fever.

Prevention Fadok recommends taking care of wounds as soon as they arise and using only nonirritating topical medications on your horse's skin.

Treatment Peters-Kennedy says treatment is cause-dependent, with diagnosis made via biopsy: If there's vasculitis (see page 15), immunotherapy might be required. Otherwise, says Fadok, base treatment on your veterinarian's recommendation for an antibiotic and, perhaps,



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topical therapy. She adds that veterinarians often recommend hydrotherapy (cold hosing), as well.

Contact Dermatitis

Causes Direct contact with a substance (such as hoof paints applied above the coronary band, topical medications such as neomycin or antimicrobials, or grass) or abrasion (from sandy pastures) resulting in irritation can cause these inflammatory skin lesions. They can become secondarily infected with opportunistic organisms such as *Dermatophilus congolensis* (the bacterium that causes rain rot) or *Staphylococcus*.

Signs Moderate itching, hair loss, skin redness.

Prevention Find and eliminate the cause, though Fadok says it can be tricky to diagnose. In the case of grass, you'd need to take your horse off the pasture and see if he improves, then put him back on it and see if he flares again.

Treatment Fadok advises washing the area with a gentle antiseptic shampoo (diluted, because it can be caustic when concentrated; learn about its properties under mange below) and applying emollients such as petroleum jelly, balms that contain essential oils, or diaper-rash-type creams, all of which provide a barrier against the irritating substance. If secondary bacterial infection occurs, ask your veterinarian about adding an oral antibiotic.

Mange

Causes Horses are susceptible to three types of this mite species; however, *Chorioptes* is most common on the legs. *Chorioptes bovis* mites (formerly *C. equi*) feed on skin cells and secretions. The condition is most common in draft breeds with heavy fetlock feathering.

Signs Variable pruritic (itchy) dermatitis with self-induced hair loss, crusting, and skin redness. Signs are more common in the winter.

Prevention Peters-Kennedy says she doesn't know of a valid preventive method, although some people administer ivermectin, a dewormer that could potentially kill *Chorioptes* mites. It isn't a great treatment, though, because *C. bovis* is a surface feeder rather than a blood feeder.

Fadok adds that because mange is contagious, inspecting any horses entering your premises can help, as can regular exams and fetlock hygiene for heavily feathered breeds. For severe disease, she says, shaving the fetlocks would be the best way to open the area up to air, but many people have these breeds because they love the feathers, and it can take a long time to grow them back out.



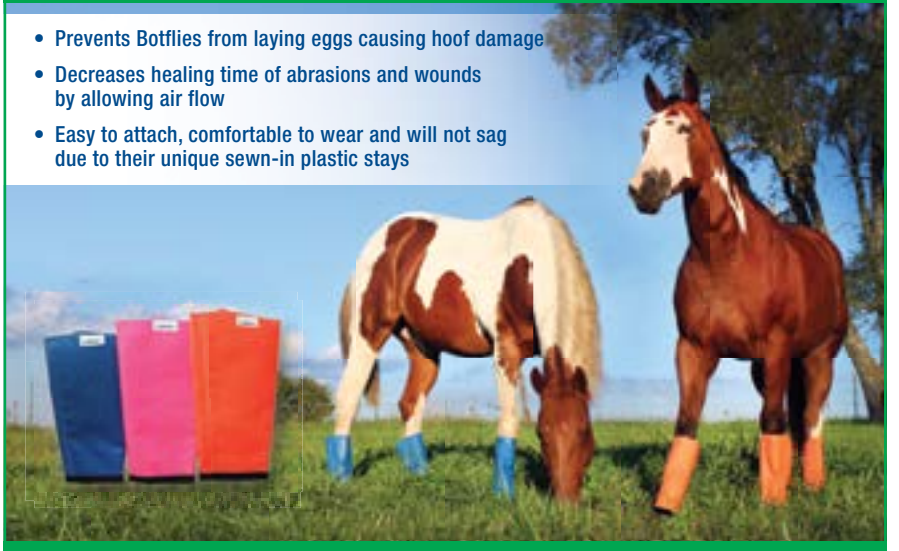
PAM MACKENZIE

Your veterinarian might take a biopsy to diagnose the cause of cellulitis and guide treatment.

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Treatment Peters-Kennedy recommends lime sulfur as a topical dip or wash. It's a concentrate that must be diluted, then applied to hair and skin (and left to dry) once a week for about four weeks. It smells like rotten eggs and will turn gray horses yellow, so it's not cosmetically pleasing, she says, but it's a very effective antiparasitic, antibacterial (fighting the bacterial infections that commonly accompany *Chorioptes*), and antipruritic treatment.

Rain Rot (aka Rain Scald, Dermatophilosis)

Causes Chronic warmth and dampness that macerates (softens) the skin, leaving it vulnerable to entry by *D. congolensis* bacteria, especially in horses with nutritional imbalances and/or following microtrauma to the skin such as scrapes and insect bites.

Signs Crusted-over ulcerated spots of skin covered by raised spots of hair that can form on the shoulders, barrel, hindquarters, lower legs, and/or faces of horses that regularly stand in wet grass or mud. Peeling off the crusts results in severe pain.

Prevention Fadok says rain rot is contagious, and many horses are permanently colonized with the bacteria, which live in a dormant form on the skin until activated by a combination of dampness and microtrauma to the skin. Keep your horse stalled until grass dries out later in the day, and control insects with a permethrin wipe or spray product to prevent bites.

Treatment Fadok says antiseptic shampoos containing chlorhexidine usually work. Peters-Kennedy prefers lime sulfur, whose antimicrobial properties usually knock the bacteria down. Our sources agree that if topical treatments fail, veterinarian-prescribed systemic oral antibiotics such as penicillin or trimethoprim-potentiated sulfonamides (TPSs, oral antibiotics) are the go-to medications for equine skin infections.

Ringworm

Causes Dermatophyte fungus (one of three mold genera: *Trichophyton* [*Trichophyton equinum*], *Microsporum*, and *Epidermophyton*) grows on skin, hair, and other body surfaces and usually invades the hair shafts, causing them to weaken and break off, leading to hair loss. It's



PHOTOS COURTESY DR. VALERIE FADOK

Dermatophilosis typically manifests as crusted and ulcerated lesions.

contagious and often associated with shared equipment such as boots and grooming tools. Fadok says some fungus species (*Microsporum gypseum*) might also exist in soil, particularly in the South where sandy pastures are common. Abrasions from the sand can make way for *M. gypseum* invasion. Young horses, such as foals and yearlings, are more commonly affected, as are horses under stress or with concurrent illness.

Signs Rounded, crusted patches of hair loss (hence the word "ring"). It can sometimes appear as pastern dermatitis but can show up anywhere on the horse's body. Veterinarians diagnose ringworm by examining a stained sample of the crust under a microscope.



The fungal species *M. gypseum* can invade lower leg abrasions, causing ringworm.

Prevention Avoid sharing grooming tools and other training aids unless you can disinfect them. Peters-Kennedy says the organism can live for 18 months under favorable (warm, moist) conditions.

Treatment Peters-Kennedy says mild infections often resolve on their own, but she recommends treating to prevent the disease from spreading. Fadok favors topical antifungals containing azoles: miconazole or ketoconazole shampoo. Peters-Kennedy opts for a leave-on rinse of lime sulfur, as opposed to a shampoo, because it has more residual activity and does not macerate or break hairs like shampooing can, causing the horse to spread contaminated material.

Sarcoids

Causes Peters-Kennedy says these nonmalignant tumors usually occur when the bovine papillomavirus is present along with skin trauma, and affected horses seem to be fairly young (under 6 years).

Signs Sarcoids can be occult (very subtle, often appearing as a circular patch of hair loss that resembles ringworm), verrucous (warty), nodular and fibroblastic (large and ulcerated, resembling proud flesh, but not necessarily associated with a wound), or malevolent (cancerlike). They most often develop on the head, belly, groin, and legs and can be invasive and recurring.

Prevention Veterinarians believe the virus might be transmitted by fly bites, so be attentive to fly control, says Fadok. Also, tumors usually form where skin trauma has occurred, so try to prevent wounds and abrasions. The tumor seems to be associated with horses that have a particular major histocompatibility complex (immune system) gene.

Treatment Sarcoids are difficult to remove because it's hard to get clean margins, but they don't metastasize (spread or migrate to internal organs) so aren't usually fatal. Fadok recommends leaving occult sarcoids alone. Although they don't improve, they might not get worse. But, they can progress to the fibroblastic form. There's no set-in-stone course of treatment, so consult your veterinarian to determine what's best for your horse. Peters-Kennedy says possibilities include surgically debulking the tumor in addition to chemotherapy, such as cisplatin injections.

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Wait, What About Scratches?

Rather than a specific condition, Fadok and Peters-Kennedy say scratches is more a syndrome that includes rain rot, ringworm, mange, staphylococcal infections, and vasculitis.



Staphylococcal Infections

Causes The bacterium typically causes pus formation, especially in skin and mucous membranes. It's always secondary to another condition or has an underlying cause, such as allergies or parasites.

Signs Annular (round) areas of alopecia (hair loss) and crusting. With those signs, staphylococcal infection is the veterinarian's first differential diagnosis (then ringworm, then dermatophilosis).

Prevention Prevent skin trauma, and treat underlying causes such as allergic dermatitis or external parasites, says Peters-Kennedy. And, adds Fadok, practice good hygiene (groom thoroughly using meticulously clean grooming tools), and remember that *Staphylococcus* species are opportunistic, tending to take advantage of damaged tissue.

Treatment Topical or oral antibiotics. If the signs are localized, says Peters-Kennedy, apply lime sulfur; if they're widespread, then use TPS or topical chlorhexidine according to your veterinarian's advice. Fadok adds that if routine measures don't work, contact your veterinarian to check for methicillin-resistant *Staphylococcus aureus* infections that require a culture and sensitivity test for diagnosis and treatment.

Vasculitis

Causes While the reason for this inflammation of blood vessel(s) usually isn't known, it's commonly due to photosensitization (a severe dermatitis that occurs when certain plant pigments damage nonpigmented skin cells in response to sun exposure). Veterinarians note it more frequently in white-haired skin (so on legs and stockinged areas such as fetlocks and cannons).

Signs Skin reddening, swelling, and crusting with eventual ulceration. Generally symmetric (in both of a pair of limbs).

Prevention Figure out the cause, and eliminate it. If that's photosensitization, then prevent exposure to direct sunlight by wrapping your horse's legs and/or turning him out in the early morning and/or late evening rather than during the day.

Treatment If you don't know the cause, which Peters-Kennedy says is common, treatment usually consists of topical anti-inflammatory medications (glucocorticoids, aka steroids) or, if you're worried about overusing steroids, a non-steroidal called pentoxifylline. If those aren't effective, your veterinarian might try administering oral steroids.

Warts (Viral Papillomas)

Causes *Equus caballus* papillomaviruses (EcPV), nine of which are known in horses (compared to more than 200 human papillomaviruses), cause a hard skin growth that is usually benign but contagious.

Signs EcPV-1 most commonly appears on young horses' lips and muzzles but can also appear on their lower legs. You might see cauliflowerlike raised, scaly gray masses, sometimes near the hoof, that spontaneously resolve over months as the horse's immune system develops.

Prevention Prevent spread to other young horses by isolating affected animals, says Peters-Kennedy.

Treatment None needed, because lesions usually resolve on their own in one to three months. However, Fadok says if you have multiple warts and/or lots of foals or yearlings, you could remove the warts using cryotherapy (freezing) or surgical lasers, or your veterinarian might crush the warts, which is thought to release antigenic proteins and, thereby, generate an immune response.

Take-Home Message

Some leg crud is purely cosmetic; other types can be very painful and debilitating for your horse. As you would for any medical issue, consult your veterinarian to determine the type of skin problem plaguing your horse, the best course of treatment, and how to prevent its recurrence or spread to other horses.



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A look at current trends in mosquito-borne diseases affecting horses



Tiny Terrors

NANCY S. LOVING, DVM

Recent news reports describe accelerated wildlife species loss because of significant changes in habitat and food sources. But one creature that seems to be thriving is one of the world's most dangerous: the mosquito. Mosquito-borne disease affects all mammals, with some of the most virulent infecting horse and human similarly: Eastern equine encephalomyelitis (EEE), Western equine encephalomyelitis (WEE), and West Nile virus (WNV).

The good news is horses can't spread EEE, WEE, or WNV to other horses or humans, and vice versa. Female mosquitoes are the intermediate or "bridge" vectors that cause infection. Birds (and sometimes rodents) carry the viruses but don't always show clinical signs. Mosquitoes bite the birds and pick up the virus; then those carrier mosquitoes pass the virus on to horses, humans, or other birds when they take their next blood meal. People and horses are considered dead-end hosts because they don't have enough infective virus in their blood to be transferred through mosquitoes or body fluids to other humans or animals.

Let's examine recent trends with these three encephalitides—diseases causing brain inflammation—so you can understand how to best protect your horse.

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SHELLEY PAULSON

Eastern Equine Encephalomyelitis

Culiseta melanura mosquitoes transmit EEE, causing serious neurologic disease in horses, with a 90% fatality rate. These mosquitoes reside east of the Mississippi, localizing EEE to states in and around that region. Besides having a fever, infected horses develop an uncoordinated gait (ataxia) and often experience involuntary muscle twitching. Progressive encephalitic signs develop, such as head-pressing, aimless wandering, seizures, hyperexcitability, and coma. Once a horse goes down, he's unable to rise.

Through 2019, most equine cases of EEE were seen in Michigan (29), Florida (28), Louisiana (18), and near the Michigan border in Indiana (11). The earliest cases appeared in March and continued throughout the year.

Wendy Vaala, VMD, Dipl. ACVIM, director of life-cycle management equine and companion animal at Merck Animal Health and a member of the American Association of Equine Practitioners' vaccination guideline review group, says while officials reported far more human EEE cases in 2019 than in any previous year, they did not see a similar spike in equine cases. As of mid-December, an unprecedented number of 38 human cases with 15 fatalities had been reported in nine states, and 182 equine cases of EEE had been reported in 24 states. (For comparison, EEE reportedly infected 712 horses in the high-level year of 2003.)

"Increased spikes in EEE cases have been associated with a variety of factors," says Vaala, including:

- Warm, wet weather early in the year and/or extending longer into the fall favors a robust mosquito population capable of transmitting the virus among birds and from birds to humans and horses. The northern Midwest experienced a very wet 2019 beginning in early spring and extending into the fall.
- A new variant of the EEE virus might be present. In Florida the virus circulates year-round, providing opportunities for it to undergo genetic changes that could impact susceptible bird populations. More birds become infected and might carry the new variant north during normal migration. For example, in Massachusetts two of the last outbreak cycles of EEE involved new variants of the virus.
- Health officials often document EEE cyclical trends. After a year with particularly high levels of viral activity, surviving bird populations develop long-lived immunity to that strain, resulting in a transient decrease in EEE cases for a number of years. Once that bird population dies off, another period of increased susceptibility to EEE infection and carrier status in younger birds contributes to further EEE activity.

Usually, the number of WNV cases in horses is double the number of EEE cases. But in 2019 the number of EEE cases far outnumbered the 88 WNV cases reported by early December. Most were horses that were unvaccinated, undervaccinated, or had an unknown vaccination history, says Vaala.

Western Equine Encephalomyelitis

The *Culex tarsalis* mosquito, which lives primarily in the western part of the United States, transmits WEE, a neurologic disease similar to EEE. Fatality rate among infected horses is 40-50%. Recent years have seen a dramatic drop in equine cases, with none reported in the western U.S. since 2004. However, birds and mosquitoes in this area still harbor the virus, so vets recommend vaccinating horses annually as a safeguard.

West Nile Virus

As the primary reservoirs for WNV, many avian species (corvids, such as crows, ravens, and jays; house finches; and owls and hawks) often succumb to the infection. Some birds retain viremia (virus in the blood) for three months, possibly resulting in overwintering of the virus; in other words, even if mosquitoes have died off for the winter, new generations can pick up virus from those birds in which it's been lying in wait. Mosquito-infecting WNV titers have been found in the blood of infected cottontail rabbits, some squirrels, and chipmunks; however, scientists don't yet know their importance as reservoirs for the virus.

A horse exposed to WNV through the bite of an infected mosquito does not always develop clinical signs, but when he does they can be serious. Along with fever, many horses experience problems with their cranial nerves, which are responsible for functions of the head, such as chewing, swallowing, blinking, and facial muscle tone. Infection with WNV causes other neurologic problems, including hind-limb weakness, ataxia, an inability to stand, and paralysis. Encephalitic signs such as seen with EEE are also possible. About 33% of horses with WNV die. Of those that recover, about 40%



2019 EEE Cases in the U.S.



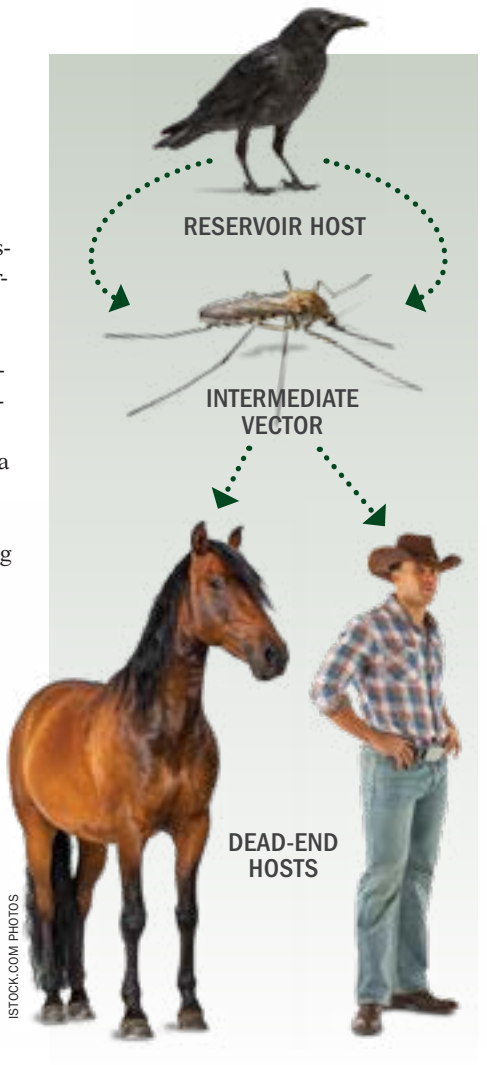
2019 WNV cases in the U.S.

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experience persistent neurologic deficits.

Horses older than 15 are more at risk of developing severe neurologic signs from WNV and dying as a result. Horses that develop signs from WNV later in mosquito season (which varies by region but occurs when temperatures are consistently above 50 degrees) have a less favorable prognosis for survival than horses that fall ill earlier in the season.

In contrast to EEE, WNV isn't as localized to specific regions of the country because various mosquito species that live throughout the United States and Canada carry and can transmit the virus. In temperate climates WNV tends to appear in mid- to late summer, lasting until a killing frost eliminates mosquito vectors. Cases in 2019 occurred primarily in California (15), Colorado (10), and Florida (10).



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Preventing Disease

Owners can protect their horses from EEE, WEE, and WNV with annual vaccination. All horses are at risk of contracting mosquito-borne viruses if not immunized correctly. Owners are fortunate to have access to effective EEE and WEE vaccines and several effective WNV vaccines developed and labeled specifically for horses. To date, no vaccines have been developed for humans against these diseases. The equine vaccines are very safe, inexpensive, and highly efficacious. Properly vaccinated horses appear to be adequately protected, says Vaala.

Horses that have not received a full series (two to three injections spaced three to six weeks apart) of the initial immunizations or a yearly booster are at risk of contracting disease. The Indiana state veterinarian's office released a statement about its 11 EEE cases in 2019, noting "all affected horses were unvaccinated, and clinical signs progressed quickly. The one horse that survived had a history of vaccination but was not up to date."

A similar trend occurred in Michigan: "Eighty-six percent of the equine cases were either unvaccinated or had not received an annual vaccination for at least a year," says state veterinarian Nora Wineland, DVM, MS, Dipl. ACVPM.

Indeed, horses that have received the initial two- to three-part series of EEE/WEE or WNV vaccines are not protected forever. Your veterinarian must administer the vaccine booster annually, preferably at least two to four weeks prior to your region's anticipated mosquito hatch.

These vaccines provide effective viral immunity for four to six months. Veterinarians recommend twice-annual boosters in areas of the country where mosquito populations persist due to mild weather year-round.

"In an unusually warm and wet year, more frequent EEE vaccination is warranted," says Vaala. "Also, owners shipping horses south for winter shows should make certain their horses are properly immunized against mosquito-borne diseases."

"Vaccination frequency is best discussed with a horse owner's veterinarian," says Wineland. "Vaccines are licensed based on studies completed by the manufacturing company as part of the approval process. Studies that review duration of immunity inform your veterinarian about recommendations for vaccination frequency relative to your geographic environment."

It is also important to involve your veterinarian in the immunization process. "To optimize an immune response, the vaccine must have been handled appropriately (distribution to administration), not be expired, and be properly administered to a healthy horse," says Vaala, something the veterinarian is best-equipped to do. Moreover, "major vaccine producers offer a 'vaccine guarantee' that provides financial support for diagnostic work-ups and treatment of horses that have contracted one of the core diseases despite having been properly immunized with a veterinarian-administered vaccine."

Another point to consider for prevention revolves around turnout time—horses turned out at dusk or dawn are exposed to more mosquitoes than if they were confined in stalls with fans and/or insect sprays during those hours. Vaala says mosquitoes have difficulty landing and feeding in a constant breeze. She also recommends applying mosquito repellent labeled for equine use.

"Comprehensive mosquito control remains an important part of any prevention strategy," she says.

Remove all standing or stagnant water that can serve as mosquito breeding habitats to reduce populations on your farm. Even the least suspected "container" is a risk, including persistent puddles around water tanks or in tire tracks. Water troughs, wheelbarrows, clogged gutters, ditches, nonchlorinated pools, decorative ponds, bird baths, flowerpots, buckets, abandoned tires, tarps, holes in trees, manure piles that collect water, culverts, and even discarded jars, soda cans, or water bottles are potential breeding sites for mosquitoes. Discard or drain such water-holding receptacles regularly.

Potential Effects of Climate Change

While scientists have not yet come to a consensus about climate change and how it does or will affect various ecosystems, recent trends could shed light on how mosquito-borne disease might fare in the future. Over a 20-year period Canadian researchers reported seeing a 10% increase in human cases of mosquito-borne disease. The United Nations' Intergovernmental Panel on Climate Change

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anticipates that mosquitoes will not only expand their range but also become more abundant. It attributes this to warming temperatures, higher amounts of precipitation, and extreme weather events.

"Michigan experiences equine cases of EEE each year, typically fewer than 10 per year," says Wineland. "High amounts of rainfall contribute to an increased number of cases, and (in spring 2019) Michigan experienced abnormally heavy rainfall."

Larvae of many mosquito species in the mountains and northern states grow in melting snow pools in the spring, can tolerate a bit of freezing, and emerge as adults early to mid-summer. In Plains states, *C. tarsalis* mosquitoes flourish in spring rain puddles, emerging in large numbers in late June.

More rainfall amplifies the amount of standing water available to mosquitoes for laying eggs. Hot summers without drought breed the most mosquitoes, but rainfall can confound populations with its variability and intensity. Deluge-type storms, for instance, can flush out mosquito larvae that were developing in ponds and ditches, leading to reduced numbers.

Higher temperatures increase the rate of larval development, which means more mosquitoes to breed and exponential population increases. High seasonal temperatures also shorten incubation times, with more rapid mosquito hatches increasing numbers of potentially infective mosquitoes. Plus, infected females seek hosts for blood meals over a longer life span.

Climate and weather patterns also influence yearly bird clutches, especially susceptible hatchlings that have poor defensive behaviors against biting mosquitoes, in part because they can't yet fly. These young birds often develop high viremia because they have no immunity.

To add to the issue, some mosquito species are likely to extend their range into new areas. And, reservoir bird populations are likely to move in conjunction with climate-related changes to food supplies and habitat. The Canadian report cites that over the next 60 years, duration of mosquito-borne disease transmission in Canada is likely to extend beyond the typical three-month period to five months.

Concern over the ongoing loss of insect and bird biodiversity (think bees) could also potentially lead to reduced pesticide use. This could affect mosquito curtailment, with greater numbers and higher risk of disease exposure. At this time, however, "there is no reason to think that mosquito control measures have decreased in the U.S. or that the 'bridging' mosquito populations are becoming resistant to the pesticides used," says Vaala.

Take-Home Message

Annual or twice-annual vaccination strategies and comprehensive mosquito control efforts on horse properties can go a long way toward protecting both human and horse from mosquito-borne disease.



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DEWORMING Guide



SHELLEY PAULSON

Horse owners should perform targeted deworming to prevent parasitic disease in their horses, minimize parasite egg shedding on their properties, and help prevent anthelmintic resistance.

TERMS TO KNOW

Anthelmintic A deworming drug. The main classes of anthelmintics used in horses are benzimidazoles (e.g., fenbendazole), pyrimidines (e.g., pyrantels), and macrocyclic lactones (e.g., ivermectin, moxidectin).

Anthelmintic resistance An inherited trait in which parasites survive dewormer treatment and pass the drug resistance on to subsequent generations of worms.

Fecal egg count (FEC) The number of parasite eggs per gram (epg) in a horse's manure sample before deworming.

Fecal egg count reduction test (FECRT) The percent reduction in parasite eggs based on an FEC performed 10-14 days post-deworming.

Refugia The unreached population of worms during treatment (e.g., those parasite stages on pasture or in untreated horses). The more parasites in refugia, the less chance of them developing resistance. Ideally, we want to deworm when refugia levels are at their highest, in spring and fall.

HOW TO DEWORM ADULT HORSES FOR STRONGYLES

1 In the spring and fall, collect manure samples from each horse, and have your veterinarian perform fecal egg counts.



2 Based on FEC results, determine whether your horse is a low, moderate, or high shedder.

Low	0-200 epg	no other treatments besides spring and fall
Moderate	200-500 epg	1 more treatment mid-summer
High	>500 epg	1 more treatment mid-summer and late fall (if grazing season's longer than 6 months)

3 Give all horses their spring and fall treatments seven days later (regardless of shedding status). Macrocyclic lactones are most effective against strongyles.



4 Have your vet perform a fecal egg count reduction test in 10-14 days to determine whether the drug used is effective against the parasites on your farm.



5 Test each anthelmintic class at least once every three years, and base future deworming decisions and timing on drug efficacy and horses' shedding status.



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KNOW YOUR EQUINE PARASITES

	Small strongyles (cyathostomins)	**Tapeworms** (*Anoplocephala perfoliata*)	**Roundworms, aka Ascarids** (*Parascaris equorum*)	**Pinworms** (*Oxyuris equi*)	**Large strongyles** (*Strongylus vulgaris*)
Horse Demographic Affected	All horses over 6 months of age	All horses over 6 months of age	Foals younger than 6 months and some yearlings	All horses	All horses
Prevalence	Widespread throughout the U.S., particularly in moist environments	Widespread throughout the U.S., particularly in moist environments	Widespread on U.S. breeding farms	Widespread throughout the U.S.	Rare in managed U.S. horse populations
Related Problems	Weight loss, lack of appetite, diarrhea, fever, lethargy, dull hair coat, poor performance	Ileocecal impactions and spasmodic colic	Airway inflammation, small intestine impaction, ill thrift, poor growth	Itching, intense tail rubbing, skin irritation around anus	Peritonitis and colic due to intestinal damage
Drug Resistance	Widely resistant to benzimidazoles and pyrimidines, early evidence of macrocyclic lactone resistance	No signs of resistance	Widespread macrocyclic lactone resistance, some resistance to other drug classes	Widespread macrocyclic lactone resistance	No reported resistance
Deworming Suggestions	Follow steps on opposite page	Yearly praziquantel or pyrimidine treatment, followed by fecal egg counts	Benzimidazole treatment at 2-3 months and 5-6 months old	A pyrimidine or benzimidazole upon diagnosis	Follow steps on opposite page

▶ **Tip: Pull out and laminate this spread for easy reference in your barn!**

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Smart strategies for targeting a variety of internal parasites in horses

Practical PARASITE Control

CHRIS WHITE, DVM

"What should I use to worm my horse, Doc?" It's a question I get on a regular basis (and often in a thick New England accent, because I practice in Southern Maine). After a quick explanation that these medications are called dewormers and don't "worm" anything, a discussion follows: What is the horse's turnout? Does he travel? How many horses share his pasture? These details are pertinent to solving the riddle of when to deworm and with what.

In this article we'll provide an overview of the common parasites your horse might face, the drugs best used to treat them, and the current state of anthelmintic (dewormer) resistance and deworming protocols.

Fecal Egg Counts

Gone are the days of rotating dewormer brands. A fecal egg count (FEC) is a simple, useful tool for evaluating a horse's parasite load. It involves analyzing a horse's fecal sample to gauge the number of parasite eggs per gram (epg) of manure. Veterinarians then use that number

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to move forward with treatment.

"It is a rough estimate of the parasite burden that your horse has inside of the gastrointestinal tract," says Allison Williard, DVM, of Auburn Equine, in California.

Don't expect your horse's FEC to be 0, however. Veterinarians classify horses in one of three categories based on their FEC results: low (under 200 epg), medium (200-500 epg), and high shedders (above 500 epg). Guidelines suggest, regardless of the count, treating horses twice annually to rid the system of tapeworms and any other parasite not picked up on the FEC.

The FEC result is a snapshot in time. "Shedding will change based on season, age, and the stress level of the horse," says Damita Hansen, DVM, of Cornwallis Veterinarians Ltd., in Nova Scotia, Canada. "As a horse ages, many factors and conditions may raise or lower its normal shedding level. This is why it is important to continue to monitor FECs at least yearly, even on horses who are previously low shedders."

One step beyond an FEC is a fecal egg count reduction test (FECRT). "To me, an FECRT is as, or more, important as an FEC," says Hansen.

An FECRT is the only way to definitively assess parasite resistance against a drug in a stable. This test involves obtaining a fecal sample and submitting it for analysis, administering a dewormer, and taking another fecal two weeks later.

"An FEC is performed on both, and the difference between the two samples is calculated as a percent reduction," says Hansen. "A low percent reduced indicates that not many worms were killed by the dewormer—therefore, the dewormer was ineffective, or the worms showed resistance. This is especially important for moderate or high shedders—you want to ensure your dewormer is effective and (the worms in) your individual horse (are) not developing a resistance problem."

Anthelminthic Resistance

Anthelminthic resistance is quickly becoming one of the biggest issues facing equine medicine. What were once such effective dewormers are now no longer treating a horse's parasitic burden. The old school of thought for treating large strongyles (more about these worms on page 26) was to use a different dewormer type every two to three months—in other words, to rotate dewormers. While it was effective in eradicating large strongyles, it impacted other parasite species.

"The unexpected and unintended consequence of the frequent rotational deworming programs was the development of multidrug resistance in an emerging small-strongyle population," says Ashleigh Olds-Sanchez, DVM, Dipl. AVBP-Equine, of Galisteo Basin Veterinary Services, in Santa Fe, New Mexico.

This deworming protocol left a small population of this other strongyle species alive. With constant exposure to dewormers, this population built up a resistance to the anthelminthic drug, "leaving a small percentage of highly resistant ones who then reproduced, creating even more resistant populations," she explains.

Changing the thought process about equine parasites has been an uphill battle, say our sources. Instead of clearing a horse entirely of parasites, due to drug resistance the new goal is to focus on those horses that are shedding the most. Small burdens of strongyles typically are not harmful in horses so, instead of treating with a dewormer, veterinarians now recommend monitoring.

"We have to try to identify the horses who are highly susceptible to parasites and who are shedding the most eggs into their environment," says Olds-Sanchez. "We target those horses more aggressively with properly dosed, properly timed, effective dewormers."

Why should you, a horse owner, care about dewormer resistance? "If we continue to see increased resistance to the newer drug classes that used to be 100% effective, we may end up with no effective dewormers for our horses, and parasite disease and even death will potentially increase," she says.

Parasite Types

Small Strongyles The most common of the parasites we'll discuss here, your horse has likely carried some small strongyles (cyathostomins) in his lifetime. Adult horses, even with moderate loads, might show no signs of disease. Sometimes they lose weight and experience diarrhea. Rarely, small strongyles can cause a very serious problem in the horse called larval cyathostominosis.

This condition primarily affects horses under age 4. They often show signs such as sudden weight loss and overwhelming diarrhea, as well as colic, dehydration, and ventral edema (fluid swelling under the abdomen). These horses can look like they're suffering from salmonellosis or Potomac horse fever, which the veterinarian should rule out.

The condition occurs after the strongyle larvae emerge from the intestinal walls, where they can remain dormant for months or, in areas with well-defined seasons, years. This means the horse stockpiles strongyles during grazing season, which can result in thousands of

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larvae emerging at once, inducing a huge inflammatory response in his gastrointestinal tract. Luckily, if treated quickly, these horses do well after a course of fenbendazole (from the benzimidazole deworming drug class) or moxidectin (a macrocyclic lactone). Vets are seeing small-strongyle resistance to other anthelminthic drugs, which are no longer useful for treatment.

Roundworms (ascarids) Known as the ascarid, *Parascarus equorum* is primarily a parasite of foals. It's very resistant to extreme weather and can withstand freezing temperatures and dry heat.

Because they cause disease in foals, ascarids are common on breeding farms. Affected youngsters can appear unthrifty, experience weight loss, and have a pot-bellied appearance. Furthermore, ascarid migrations through the thorax can cause respiratory disease.

A problem veterinarians face when they suspect a roundworm infection is how to treat it, because a "drench (large) dose" can result in a catastrophe. Yes, the parasites die off quickly, but they can die off so quickly that they cause a secondary intestinal impaction. Benzimidazoles carry less risk of a massive die-off and, therefore, veterinarians often recommend them for treating roundworm infections.

Tapeworms These worms differ from many others because they are not nematodes. Officially known as *Anoplocephala perfoliata*, these parasites commonly cause weight loss and emaciation in horses. Tapeworm infections can also cause colic. These worms attach at the ileocecal junction, where the end of the small intestine meets the cecum and horses ferment their food. Severe infections can lead to cecal impactions. Recent study results suggest that almost all ileocecal intussusceptions (where one part of the gastrointestinal tract telescopes into another) are associated with tapeworm infections.

Fecal egg counts rarely detect tapeworm eggs. A blood test is available to screen for infections, but authors of the current American Association of Equine Practitioners recommendations suggest treating horses at least twice a year for *A. perfoliata*. Praziquantel (another macrocyclic lactone) anthelminthics are readily available to rid your horse of tapeworm infection but should be used sparingly due to early evidence of small strongyle resistance to this dewormer class.



PAULA DA SILVA

Collect horses' fecal samples pre- and post-deworming and run fecal egg counts each year.

Pinworms Unlike many equine parasites, *Oxyuris equi* worms are not known to cause weight loss and unthrifty conditions. Instead, they settle at the very end of the intestinal tract, laying eggs around the rectum that cause intense itching. A rubbed-raw tailhead is often the hallmark of this infection. Thankfully, *O. equi* worms have not developed much anthelmintic resistance, and most dewormers should cure the infection.

> **"Deworming in very cold or very hot months, when the parasites are dormant, is a waste of medication."**
>
> DR. ALLISON WILLIARD

Neck Threadworms *Onchocerca cervicalis* worms make your horse's neck their home. Adults embed themselves in the horse's nuchal ligament, the fleshy attachment that runs from the withers to the poll. Adult threadworms often cause no issues, aside from some mineralization of the nuchal ligament. When the worms reproduce, however, problems arise.

After breeding, microfilaria (larvae) get released and migrate under the skin to settle in the bottommost aspect of the chest and abdomen, where flies are abundant. Their travels through the neck can cause infected horses intense itching. Dead microfilaria, especially, are horrendously itchy, often causing the horse to self-mutilate. Treatment with moxidectin or ivermectin (another macrocyclic lactone), however, usually clears the clinical signs.

Note that threadworm lesions can look like a few other conditions, including cancer, pythiosis (a skin infection caused by a funguslike microorganism), and proud flesh. Occasionally, your veterinarian will need to take a biopsy to make a definitive diagnosis of threadworm infection.

Large strongyles The parasite of yesteryear, large strongyles wreaked havoc on the equine industry in the 1950s and '60s.

"Years ago, large strongyles were a significant issue and a leading cause of colic and death in horses," says Olds-Sanchez. *Strongylus vulgaris* was the main culprit. These parasites are active blood feeders, leaving affected horses weak, anemic, and emaciated. Their migration patterns through blood vessels can also result in thromboembolism, causing death in an unlucky few.

"The introduction of effective dewormers was great for equine health in that we had a prevention or treatment for large strongyles," Olds-Sanchez adds.

Bots As opposed to the parasites described throughout the rest of this article, bots are the larvae of the *Gasterophilus*, or botfly. These flies lay their eggs on the horse's legs and chest. When horses go to scratch their limbs, as the eggs can

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cause mild itching, they trigger the bot larvae to hatch and embed themselves in the horse's mouth. From there, the larvae travel to the stomach and go through their entire life cycle in the gastrointestinal tract, eventually passing in the manure, pupating, and then emerging as full flies.

Occasionally, veterinarians can see bots on the stomach walls during gastroscopic exams. Heavy infections can cause colic signs and irritation of the mouth and lips due to tissue burrowing. Treatment is relatively simple: Remove the bot eggs from affected horses' limbs, chest, and neck, and deworm with ivermectin or moxidectin.

Lungworms *Dictyocaulus arnfieldi* is the primary lungworm species that affects horses. As the name suggests, it can cause significant respiratory disease.

Donkeys carry *D. arnfieldi* naturally but are unaffected. The parasites can infect their equine pasturemates when larvae pass through donkey manure and get ingested by the horse. There, adults migrate to and mature in the lungs, causing increased respiratory rate, coughing, and respiratory distress. While you can treat the parasite with ivermectin, praziquantel, or mebendazole (a benzimidazole), lengthy infections can compromise the respiratory tract.

Nematode Life Cycle

Most of the parasites in this article are nematodes, and most nematodes have what is called a direct life cycle: The horse ingests eggs, and the parasite matures in the cecum and colon. After maturation, the adult releases eggs that are shed in the manure. Once in the environment, the larvae hatch and begin to molt. After the third molt, the larvae become infective. When the horse ingests them during grazing, the cycle begins again in another equine host.

Smart Strategies

What can you do in the face of a potential parasitic crisis? "An effective management strategy is usually threefold: strategic deworming, environmental cleanup, and good overall health," says Williard.

Strategic deworming involves using the appropriate dewormer at the appropriate time, ideally after an FEC and/or FECRT. "Deworming in very cold or very hot months, when the parasites are dormant, is a waste of medication and not nearly as effective as deworming during the spring and fall, when you can target more active parasites," Williard says.

Manure houses parasite eggs. By cleaning pastures and stables regularly, you can remove eggs from the environment, stopping the cycle and preventing exposure.

Underweight, ill, or weak horses won't be able to combat a parasitic infection, no matter the treatment. "A good overall herd health program will help your horse's innate immune system to do its job and help eliminate parasites," says Williard.

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Know your horse's poop habits—they can provide a wealth of information about his well-being



CHRISTA LESTÉ-LASSERRE, MA

Get your pitchfork out, put your gloves on: It's time to get an up-close look at that pile. Sure, it can get a little gross, but knowing your horse's normal poop, how much he produces, and any related changes is part of good husbandry. Often considered a nuisance, horse manure is rich in not only energy and soil-building nutrients but also information about your horse's health and well-being.

To help you better "read" your horse's poop, we've consulted the experts to compile some poop-inspection—poopspection, if you will—guidelines. May these tips shed light on your horse's gastrointestinal (GI) health as you sift through many piles of equine poop to come.

1 Know Thy Horse's Poop

Horses are "creatures of habit," says Michael Fugaro, VMD, Dipl. ACVS, owner of Mountain Pointe Equine Veterinary Services, in Long Valley, New Jersey. This includes their GI habits—how often they poop, what it looks like, and even where they poop. Observing your horses' defecating behaviors and manure quality regularly can help you get a feel for what's normal—an essential step in knowing what's abnormal, he says.

"The biggest things to consider are consistency and timing," says Fugaro. "So, for example, you can expect a certain number of well-formed piles for your particular horse every day."

Expect minor horse-to-horse differences, such as slightly smaller but more frequent piles or smaller-sized balls—especially with ponies or youngsters.

Checking individual poop habits might be harder to do with horses at pasture, but you can still be observant, says Lucas Pantaleon, DVM, Dipl. ACVIM, an equine internal medicine specialist in Versailles, Kentucky. While it might be challenging to know whose poop belongs to whom, you can check generally for quantity, pile size, and consistency. "Get to know your herd's normal habits," he says. "If the horses are getting the same pasture turnout, water source, and grain, and they're not on medications that could impact their feces, output should be fairly consistent across horses."

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The Rules of Poopspection



Some medications, such as antibiotics, affect the normal bacteria in the horse's intestines, whereas others can influence the movement of feed material through the digestive tract—both of which have a laxative effect.

Slight variations aren't necessarily concerning, Fugaro says. Like humans, horses can have mild, inconsequential stool changes. "It's just something to follow," he says.

2 Consider Poop in Thy Daily Wellness Checks

Once you have a grasp on what's normal, keep poopspection part of your regular daily routine, our sources say. This doesn't mean in-depth analyses but, rather, just a glance around to see if anything stands out as abnormal.

"It's definitely something I encourage clients to do to contribute to their general arsenal of visual diagnostics," Fugaro says.

When you're in the field or stall checking poop, you're also just getting to know your horse better and, well, more intimately, says Pantaleon.

"I don't think any kind of observation is excessive," he says. "And getting to know your horses so well that you understand their trends means you'll pick up any changes a little faster, keeping your vet informed and being more aware of other signs (like fever or lethargy). It's a useful exercise."

3 Alert Thyself to Small, Hard Poop Balls

What you want to see are piles of moist, spongy balls a little bigger than golf balls, our sources say. While the precise qualities might vary slightly between horses, you don't want to see balls that are smaller and harder than what they usually are for that horse.

"When the balls change to smaller and rock-hard, that's not normal, and it's a classic sign of dehydration," says Fugaro.

Small, hard balls are typical of feces removed from the rectum in colicking horses that are experiencing shock, he adds. This happens because the colon (the portion after the cecum, or fermentation vat, of the GI tract) squeezes the water out of the feces, allowing for reabsorption of water into the bloodstream to rehydrate the horse.

Dry stool is often associated with impaction colic, and it's frequently the result of reduced water intake, says Pantaleon. It could also be caused by

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a sudden diet change (such as switching from pasture grass to dry hay).

At the first sign of smaller, harder stools, encourage your horse to drink more, says Fugaro. Ambient-temperature water and additives such as diluted Gatorade or dissolved molasses could tempt him to drink, though these sugary substances are not recommended for horses with metabolic issues. Constant access to a salt block or electrolytes added into feed might also make the horse more thirsty and consume more water, he says.



SHELLEY PAULSON

When cleaning your horse's stall, you want to see piles of moist, spongy golf-ball-sized manure.

4 Alert Thyself to Liquidy Poop

A little loose stool might not be much to worry about, says Fugaro. A soupy pile of formed balls could be a short-term reaction to a dietary change, a slight digestive upset, or even an emotional stress, he says. In this scenario, keep an eye on the manure to see how it evolves—stool should ideally be back to normal within 72 hours, he explains.

Full-blown liquid diarrhea, however, merits immediate attention. "The worst-case scenario is when it turns to nothing but water, and they're painting the walls with it," Fugaro says. This kind of diarrhea can be caused by colitis induced by infections and/or antibiotics in rare cases. "This is life-threatening, so owners need to catch it before it gets to this point."

Between the ball-soup and wall-paint consistencies is the cow-patty, says Fugaro. If horses are pooping like cattle, they need veterinary attention. Diarrhea can progress to the wall-paint stage in as few as two hours to up to two days.

Runny poop combined with other issues, such as fever, lethargy, or refusing to eat, could mean the horse is fighting a bacterial or viral infection, says Pantaleon.

"These signs suggest a high likelihood for infectious disease—*Salmonella*, *Clostridium difficile*, coronavirus, or Potomac horse fever, to name a few," he says. "In foals it could also mean rotavirus or *Lawsonia intracellularis* (responsible for equine proliferative enteropathy, which thickens the small intestine's lining)."

Intestinal parasites might also be a cause of diarrhea, he says. Or, runny poop could be related to chronic inflammatory diseases within the gastrointestinal tract or even certain cancers. In these cases the horse would have loose stools over a long period (several weeks) and would lose body condition because of a reduced ability to absorb nutrients.

5 Introduce Biosecurity Measures if Thou Art Suspicious

As mentioned, loose stools associated with fever or depression warrant concern for disease spread. Even if the cause doesn't turn out to be infectious, it's better to be safe than sorry.

"If you suspect a horse has an infectious disease, isolate him and implement biosecurity protocols right away (before the vet arrives) to minimize and potentially prevent disease spread," says Pantaleon.

Use a pre-established isolation stall, or choose a stall at the end of the row, and keep the stall beside it empty. Make sure people coming in and out of the stall use protective equipment such as disposable gloves, washable rubber boots, and even coveralls, and have them change clothes and take a shower before handling other horses. (Ideally, they should manage the affected horse at the end of their rounds.)

Handlers should avoid sharing equipment, including halters, grooming tools, muck tubs, and thermometers, he says.

6 Consider Thine Horse's Fecal Fiber Length

Each little spongy ball of poop is packed full of fiber strands. Pick one up (with a gloved hand, of course) and see for yourself! These strands are what's left of forage after it's been digested for 48 hours in the 100-foot equine digestive tract and finally pooped out onto your stall floor. And they're little upper-GI messengers.

"We can delineate a lot of information about how horses are grinding their food by looking at fiber length in feces," Fugaro says. For example, if fibers are gradually getting longer over time, the horse might be having dental issues that prevent him from chewing his food properly.

If the fibers seem to be mixed with a lot of grainy material, the horse might be ingesting sand—especially if he lives in a sandy area, says Fugaro. Fortunately, there's an easy home test to check that.

"You can float fecal balls in water inside a plastic bag," he says. "If sand collects at the bottom of the bag (after about 15 minutes), your horse could be consuming too much sand."

Ingesting sand can irritate, weigh down, and obstruct the gut, leading to sand colic. Talk to your veterinarian about treatment options such as psyllium to help clear it up.

7 Note What Thine Nose and Eyes Behold

Horse poop isn't all that stinky, and we're not just saying that because we're horse crazy. Herbivore feces in general create less unpleasant odor than carnivore feces, and horses have comparably less foul intestinal production than many other domestic animals. It still stinks a little, though. And that's okay.

What's not okay is when the odor evolves from its normal smell and becomes something unusual or extremely foul. If you walk into the barn and think, "Wow, that's a weird, strong smell," it could be a sign of trouble, our sources say.

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AMY K. DRAGOO

If your horse has loose stool plus fever, isolate him and implement biosecurity protocols right away to prevent potential infectious disease spread.

"In cases of severe colitis, the lining of the intestines actually becomes diseased and even necrotic, creating a classic putrid smell," says Fugaro.

Rotavirus in foals also has a telltale stink, says Pantaleon. "The foal isn't able to digest milk, so the milk gets fermented in the hindgut (the cecum, large intestine/colon, and beyond), creating a characteristic odor," he says.

Consider color, as well. Manure should be greenish brown; red or black indicates blood in the stool. While horses rarely have blood in their poop, it can happen. "Sometimes it's fresh red blood, and it's just due to broken blood vessels due to straining, similar to a human hemorrhoid," says Fugaro.

Dark/black poop suggests bleeding higher in the GI tract, as the blood gets digested in the colon, our sources say. However, this is extremely uncommon.

"You might see a black coffee-ground texture kind of feces as a result of bleeding ulcers from a section of the intestine (such as the stomach or colon) or from some other upper GI abnormality, but that's rare," says Fugaro. Unlike in humans, gastric (stomach) ulcers in horses usually don't lead to black stools.

8 Rely Not on Poop Habits Alone

Poopspection is a useful horse management skill, but always consider your findings in the context of other physical and behavioral signs.

"You really need to be looking at the whole picture," says Pantaleon.

For Fugaro, it's important to remember that home poop analysis isn't the "end-all of decisions, but one component of many" in considering a horse's condition.

"Owners shouldn't be fixating incessantly on changes in manure habits," he says. "On the flip side, subtle changes, are worth discussing with your veterinarian or at least keeping an eye on."

9 Do Not Call Thy Veterinarian in a Panic

Notice some poop changes this morning? Don't trip over your manure piles running to the phone. Except in cases of severe watery diarrhea, most poop changes alone aren't suggestive of an emergency.

"If you come into the stall and see one bout of diarrhea, but the horse is happy and eats all the grain, and you take his temperature and find there's no fever, then I'd say call the veterinarian but don't consider it urgent," says Pantaleon. "Just monitor him and see what his subsequent stools do."

Fugaro agrees. "Keep one eye open, but that doesn't mean push the panic button," he says.

A sudden onset of significant bowel changes in addition to other signs (fever, depression, pain) constitutes "more of an emergency," says Pantaleon.

Stool changes that aren't accompanied by other signs but continue for 48 to 72 hours might warrant a veterinary visit just to see if there's something going on worth investigating, adds Fugaro. "When it's just a change in consistency and nothing else, we can't really aggressively go and do something then and there," he says. "Better to wait and see how it progresses or if other signs appear."

Take-Home Message

Observant and attentive owners monitor their horses closely, recognizing both what they consume *and* their output. Less smelly and sticky than most other mammals' feces, horse poop is easy to inspect and contributes to your arsenal of wellness information about your animal. By following these rules—and keeping in mind that poop is just one of many factors to consider during an evaluation—you can ensure you're doing your best to get a global look at how your horse is faring.

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JANICE L. HOLLAND, PHD, PAS

Taking the Edge Off

Calming supplement ingredients that work and things to consider before choosing or administering a product

You've spent significant time training and preparing your horse for a clinic or competition, only to get there and have him behave poorly. He's excitable and unfocused and spooks at things that never bothered him at home.

Does this scenario sound familiar? I had it happen with my Thoroughbred gelding Duke. We had a well-known trainer running a multiday clinic at the barn where I boarded. Even though I had been out of town for a week, I really wanted to ride. But when I walked Duke into the ring—an arena we trained in daily—he started acting "squirrelly." We tried to work through it but ended up putting him back in his stall for the day. The next day we tried again, and he was great. Still a little "up" but listening and responding to my cues. For Duke, it just seemed he needed to be in the situation a second time to realize everything was okay.

In situations such as this, you might ask what you can do to keep your horse from being so nervous. One option many owners reach for is a calming supplement. These are not chemical tranquilizers but, rather, products designed to help horses retain focus.

Sue McDonnell, PhD, Cert. AAB, founding head of the Equine Behavior Program at the University of Pennsylvania School of Veterinary Medicine, in Kennett Square, says she typically gets multiple calls a week from veterinarians looking for calmative recommendations. The horses are most commonly "stall-bound layup patients," she says, but calming supplements might be useful "in a variety of scenarios, such as training or show situations, health care procedure difficulties or aversions, loading and trailering worries, anxious breeding stallions, separation stress, weaning stress, stereotypies, and more."



ISABELLE BEAU DE LOMENIE

Owners might reach for calming supplements to help horses retain focus under saddle or cope with stressful situations such as trailer loading or health care procedures.

Pinpointing Problems

Before reaching for a quick-fix calming supplement in one of these situations, however, start by evaluating your nervous horse and his environment.

Because horses are "fight or flight" animals, they often fall back on these instincts when faced with stressful scenarios. They are essentially hard-wired to try to flee from new circumstances or conditions beyond their normal routines. When they can't escape they often express their nervous energy in less-than-desirable ways.

As horse owners, we can try to find outlets for this energy. This could be as simple as allowing additional turnout time or longeing a horse before riding. In addition, exposing horses to a variety of situations can help desensitize them to and become more accepting of new circumstances. If you need help, consider working with an experienced trainer. These professionals can help horses

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overcome nervousness and give owners and riders training and management recommendations.

McDonnell says it's also important to evaluate the horse's health to make sure a medical reason isn't behind his behavior, because conditions such as gastric ulcers can lead to behavior issues. Horses that are in pain due to injury might also exhibit negative behaviors.

Evaluating a horse's diet before adding a calming supplement is also very important, because several dietary components can affect behavior. Imbalances and deficiencies in some nutrients can contribute to behavior disorders. In these cases a calming supplement that contains one of these nutrients might help. Work with an equine nutritionist to assess your horse's diet and determine whether dietary excesses or deficiencies are causing behavior problems. What follows are some of the more common and effective natural calming additives on the market. The first three are designed to address certain deficiencies, while the latter four are simply helpful additives.

Magnesium

Magnesium is a prevalent nutrient in calming supplements. It's often poorly absorbed from feedstuffs, so you might need to supplement it simply to meet a horse's needs. Magnesium is important for proper muscle contraction and nervous signal transmission. Misfiring of nervous system components can cause horses to appear nervous, irritable, or especially sensitive to new situations. Have a qualified equine nutritionist evaluate your horse's diet, then add magnesium if it's needed. If the horse is truly deficient, you should see an attitude change within a few days of starting magnesium supplementation.

L-Tryptophan

L-tryptophan is an essential amino acid, meaning it needs to be supplied in the horse's diet—the horse's body alone can't produce it. L-tryptophan is involved in synthesizing serotonin, a central nervous system hormone and neurotransmitter that can create feelings of relaxation and contentment and is often considered an "anti-stress" hormone.[1]

"A problem with suggesting L-tryptophan is that it is usually in horse products in combination with one to several other ingredients for which there is little or no solid evidence for their safety and efficacy," cautions McDonnell. "So the important message in my view for using L-tryptophan as an aid to calming is to find a product with L-tryptophan as the only active ingredient."

B Vitamins

Several B vitamins work together to promote nervous system health. Most horses with healthy hindgut microbial populations produce more than adequate amounts of these nutrients. However, high-starch diets, stress, and antibiotic administration can reduce the microbial population and, therefore, decrease vitamin production. Adding prebiotics and probiotics or supplementing with individual B vitamins can help.

Thiamine (vitamin B1) is one of the B vitamins that plays a role in fat and carbohydrate metabolism. Horses deficient in B1 often appear stressed and nervous, and supplementing the diet with this vitamin might bring about positive behavior changes.

> "When using L-tryptophan as an aid to calming ... find a product with L-tryptophan as the only active ingredient."
>
> DR. SUE MCDONNELL

Alpha-Casozepine

The milk peptide alpha-casozepine has shown promise as a calming supplement. Some of the amino acids within this protein are linked to the "calming effect" observed when young mammals nurse. Alpha-casozepine's structure is similar to that of some anxiolytic benzodiazepines (sedatives found in anti-anxiety medications), and it seems to work like one, as well. It does not appear to cause any of the negative side effects (agitation, incoordination, and even recumbency) sometimes seen with benzodiazepines, however. This peptide has also been studied in other animal species, such as rats, cats, and dogs, and researchers saw

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positive results on stress and anxiety. In McDonnell's lab research teams have conducted several alpha-casozepine studies and found that supplementation helps lower horses' stress levels under normal management situations and might help horses retain newly learned tasks.[2]

Ashwagandha

Ashwagandha (*Withania somnifera*) is an herb that's been used in both humans and animals as a natural antidepressant.[3] Anecdotal evidence suggests it can reduce stress and tension by reducing the fight-or-flight cortisol (the stress hormone) response. Some owners have reported a decrease in stereotypies such as cribbing and weaving after supplementing their horses' diets with ashwagandha. The herb might also help reduce pain, such as from athletic injuries or arthritis. Scientists have not yet performed peer-reviewed studies, however, to confirm this.



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Anecdotal evidence suggests the herb ashwagandha can reduce stress and tension by reducing the horse's "fight-or-flight" cortisol response.

Valerian Root

Valerian root is another common herb found in calming products. In humans it can soothe edginess, reduce anxiety, and work as a sleep aid. In horses it has also been used as an antispasmodic (for treating colic). However, some equine associations have banned this ingredient, so it might not be an option if you compete. In addition, valerian can enhance the effect of synthetic sedatives or tranquilizers, so avoid giving it to a horse that will need tranquilizer for procedures such as dental work or body-clipping.

Chamomile

Another common herbal remedy is chamomile, which is of the *Asteraceae* family. Apigenin, the plant nutrient that occurs in relatively large amounts in chamomile, is what brings about both the calming and sedative effects observed. Although there are several flowers in the family, the German and English varieties are the ones most commonly used for calming purposes. In humans chamomile is used to treat insomnia and anxiety. It has also worked as both an



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Non-steroidal anti-inflammatory drug (NSAID)

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Before using this product, please consult the product insert, a summary of which follows:

Indication: Zimeta™ (dipyrone injection) is indicated for the control of pyrexia in horses.

Dosage and Administration: Always provide the Client Information Sheet with the prescription. Administer Zimeta by intravenous injection, once or twice daily, at 12 hour intervals, for up to three days, at a dosage of 30 mg/kg (13.6 mg/lb). **See product insert for complete dosing and administration information.**

Contraindications: Horses with hypersensitivity to dipyrone should not receive Zimeta. Due to the prolongation of prothrombin time (PT) and associated clinical signs of coagulopathy, dipyrone should not be given more frequently than every 12 hours.

Warnings: For use in horses only. Do not use in horses intended for human consumption. Do not use in any food producing animals, including lactating dairy animals.

Human Warnings: Care should be taken to ensure that dipyrone is not accidentally injected into humans as studies have indicated that dipyrone can cause agranulocytosis in humans.

Not for use in humans. Keep this and all drugs out of reach of children. In case of accidental exposure, contact a physician immediately. Direct contact with the skin should be avoided. If contact occurs, the skin should be washed immediately with soap and water. As with all injectable drugs causing profound physiological effects, routine precautions should be employed by practitioners when handling and using loaded syringes to prevent accidental self-injection.

Precautions: Horses should undergo a thorough history and physical examination before initiation of any NSAID therapy.

As a class, NSAIDs may be associated with platelet dysfunction and coagulopathy. Zimeta has been shown to cause prolongation of coagulation parameters in horses. Therefore, horses on Zimeta should be monitored for clinical signs of coagulopathy. Caution should be used in horses at risk for hemorrhage.

As a class, NSAIDs may be associated with gastrointestinal, renal, and hepatic toxicity. Sensitivity to drug-associated adverse events varies with the individual patient. Consider stopping therapy if adverse reactions, such as prolonged inappetence or abnormal feces, could be attributed to gastrointestinal toxicity. Patients at greatest risk for adverse events are those that are dehydrated, on diuretic therapy, or those with existing renal, cardiovascular, and/or hepatic dysfunction. Concurrent administration of potentially nephrotoxic drugs should be carefully approached or avoided. Since many NSAIDs possess the potential to produce gastrointestinal ulcerations and/or gastrointestinal perforation, concomitant use of Zimeta with other anti-inflammatory drugs, such as NSAIDs or corticosteroids, should be avoided. The influence of concomitant drugs that may inhibit the metabolism of Zimeta has not been evaluated. Drug compatibility should be monitored in patients requiring adjunctive therapy.

The safe use of Zimeta in horses less than three years of age, horses used for breeding, or in pregnant or lactating mares has not been evaluated. Consider appropriate washout times when switching from one NSAID to another NSAID or a corticosteroid.

Adverse Reactions: Adverse reactions reported in a controlled field study of 138 horses of various breeds, ranging in age from 1 to 32 years of age, treated with Zimeta (n=107) or control product (n=31) are summarized in Table 1. The control product was a vehicle control (solution minus dipyrone) with additional ingredients added to maintain masking during administration.

Table 1: Adverse Reactions Reported During the Field Study with Zimeta

Adverse Reaction	Zimeta™ (dipyrone injection) (N=107)	Control Product (N=31)
Elevated Serum Sorbitol Dehydrogenase (SDH)	5 (5%)	5 (16%)
Hypoalbuminemia	3 (3%)	1 (3%)
Gastric Ulcers	2 (2%)	0 (0%)
Hyperemic Mucosa Right Dorsal Colon	1 (1%)	0 (0%)
Prolonged Activated Partial Thromboplastin Time (APTT)	1 (1%)	0 (0%)
Elevated Creatinine	1 (1%)	0 (0%)
Injection Site Reaction	1 (1%)	0 (0%)
Anorexia	1 (1%)	1 (3%)

See Product Insert for complete Adverse Reaction information.

Information for Owners or Person Treating Horse: A Client Information Sheet should be provided to the person treating the horse. Treatment administrators and caretakers should be aware of the potential for adverse reactions and the clinical signs associated with NSAID intolerance. Adverse reactions may include colic, diarrhea, and decreased appetite. Serious adverse reactions can occur without warning and, in some situations, result in death. Clients should be advised to discontinue NSAID therapy and contact their veterinarian immediately if any signs of intolerance are observed.

Effectiveness: The effectiveness phase was a randomized, masked, controlled, multicenter, field study conducted to evaluate the effectiveness of Zimeta™ (dipyrone injection) administered intravenously at 30 mg/kg bodyweight in horses over one year of age with naturally occurring fevers. Enrolled horses had a rectal temperature ≥102.0°F. A horse was considered a treatment success if 6 hours following a single dose of study drug administration the rectal temperature decreased ≥2.0°F from hour 0, or the temperature decreased to normal (≤101.0°F).

One hundred and thirty-eight horses received treatment (104 Zimeta and 34 control product) and 137 horses (103 Zimeta and 34 control product) were included in the statistical analysis for effectiveness. At 6 hours post-treatment, the success rate was 74.8% (77/103) of Zimeta treated horses and 20.6% (7/34) of control horses. The results of the field study demonstrate that Zimeta administered at 30 mg/kg intravenously was effective for the control of pyrexia 6 hours following treatment administration.

Refer to the Product Insert for complete Effectiveness information.

Storage Information: Store at Controlled Room Temperature 20° and 25°C (68° and 77°F); with excursions permitted between 15° and 30°C (59° and 86°F). Protect from light. Multi-dose vial. Use within 30 days of first puncture.

How Supplied: Zimeta is available as a 500mg/mL solution in a 100mL, multi-dose vial.

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Staying Legal


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Before giving your performance horse a calming supplement, confirm that it's legal for use in competition. A variety of governing bodies oversees breeds and disciplines, and each group constantly updates its lists of banned and approved substances. Violation of these policies can result in penalties ranging from a warning to being banned from competition. It is the rider and trainer's responsibility to ensure compliance, so check rule updates often, especially prior to competition.

Additionally, some supplement components can cause false positives. I remember several years ago, when I working as part of a drug testing team, competitors were concerned about peppermints causing false positives. The common "starlight" mints weren't the issue; a more natural form of peppermint treat was. Thus, it's important to remember that just because a product is "natural," it isn't necessarily legal. Also, just because a product "doesn't test" does not mean it's legal, especially if association rules state that calming and performance-enhancing agents are not allowed.

Two major governing bodies over multiple disciplines are the United States Equestrian Federation (USEF) and Fédération Équestre Internationale (FEI). You can find current rules for legal medications at usef.org/forms-pubs/2Zp2C_YKs4s/drugs-medications-guidelines and inside.fei.org/fei/cleansport/ad-h/prohibited-list. Several breed organizations have specifications, as well. For example, the American Quarter Horse Association (AQHA) lists regulations for breed shows at aqha.com/-/get-the-2020-aqha-rulebook.

Again, the onus for compliance falls on the owner/rider and trainer. What can make this complicated is that regulations can differ between organizations, and occasionally there are exceptions for horses that fall into specific categories. In addition, some organizations have very broad statements such as "the use of calming agents and sedatives is prohibited," and it is up to the individual to interpret.—*Janice L. Holland, PhD, PAS*

anti-inflammatory and antidiarrheal—potential added benefits for nervous horses. However, many equine organizations ban the use of sedatives, even natural ones such as chamomile.

Take-Home Message

Horse owners should completely evaluate what might be causing a horse's undesired behavior before trying a calming supplement. First eliminate health conditions, training issues, and dietary imbalances as causes. If you do decide to try a calming supplement, make sure it's one that's backed by research showing it works, is safe, and is legal for use in your breed and/or discipline competitions.

McDonnell also recommends only using those supplements with ingredients that have shown positive results in blinded, peer-reviewed research.

"Putting trust in an unproven or ineffective treatment can increase safety risks both for people and horse," she says. "And from a horse welfare standpoint, only known effective and safe treatments should be used."

Also, first try any supplement at home on a normal day to evaluate how it works on your horse before using it in a stressful situation on the farm or away from home. Try only one product at a time to determine if it works and to ensure it produces no side effects.

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ERICA LARSON

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Conditioning Arthritic Horses: Do's and Don'ts

8 considerations when your performance horse starts showing signs of wear

Let's start with the good news: In general, horses are living longer and staying active later in their lives than ever. This means we have more quality time with and rides on our beloved equine partners.

The bad news? As horses—particularly sport horses—age, they begin to suffer from related health issues. One of the most common is osteoarthritis (OA), which can make those rides uncomfortable for horses.

But there's more good news: We can take steps to help keep horses moving and even competing as long (and as comfortably) as possible.

We asked two authorities on older horse care for their tips on conditioning horses with osteoarthritis. Nicola Jarvis, BVetMed, Cert. AVP (Equine Medicine, Equine Surgery Soft Tissue), MRCVS, a senior veterinary surgeon at Redwings Horse Sanctuary, in Hapton, Norfolk, U.K., and Karyn Malinowski, MS, PhD, professor and founding director at the Rutgers Equine Science Center, in New Brunswick, New Jersey, offer exercise, management, and veterinary intervention recommendations to help these horses perform to the best of their abilities.

Do: Know Your Foe

It's just OA, right? That common creaky, achy condition we ourselves get in our knees, backs, and other joints over time. Sure, but it's important to understand some of its complexities and why it can be so challenging to manage in horses.

"Osteoarthritis is a slowly progressive disease process within the horse's joint, which leads to damage of the articular cartilage (within) the joint, the bone beneath the cartilage, and local soft-tissue structures," Jarvis says. "There are many initiating factors that could lead to OA in later life, such as general 'wear



With proper exercise, veterinary intervention, and management, older equids like 23-year-old roping horse "Deck" can continuing performing.

SUSAN KORDISH

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SUSAN KORDISH

Exercise arthritic horses in scenarios that will promote longevity rather than place them at undue risk for more joint pain.

and tear' over the years, uneven weight-loading through the joint due to poor conformation or hoof care, or a traumatic incident."

Unfortunately, there's currently no cure for arthritis—veterinarians can't completely stop or reverse the condition's effects. So owners of arthritic horses and their veterinarians are left to simply manage the pain caused by the condition, and that's the biggest challenge, Malinowski says.

"Every horse will perceive the pain level differently," she says. "Some will exercise right through it, while others will not."

Finding and implementing appropriate treatments with a veterinarian's help is key, and we'll cover that in a moment. But there's something else that's important to remember about OA.

"We know that horses with arthritic joints do benefit from movement and regular exercise," Malinowski says. Therefore, "horse owners should exercise these horses as long as the animal is able to do so without obvious discomfort."

Don't: Assume it's Only Arthritis

"The prevalence of OA is thought to be greater than 50% in horses older than 15 years," Jarvis says, so there's a good chance you'll deal with it at some stage.

Classic OA signs include heat, swelling due to excess joint fluid, lameness/pain, stiffness, deformation caused by bony changes, and crepitus—that popping, grinding, and crackling sound and sensation in an affected joint.

"For early OA, the older horse may appear to stiffen up if stabled overnight but then seem sound later in the day or (might act) 'cheeky' for the farrier when they are normally well-behaved, indicating they feel discomfort when flexing a limb or being asked to weight-bear just on one limb," Jarvis says.

But, of course, these clinical signs can also point to other musculoskeletal issues—from soft tissue injury to fracture—some of which have very different treatment and management protocols than OA.

Consequently, "diagnosing why the horse might be sore or lame is always the best answer," Malinowski says.

Have your veterinarian conduct a thorough lameness exam when you start to notice changes in soundness to ensure you're dealing with OA and not a more acute condition that requires a different treatment approach.

Do: Embrace Exercise, but Plan Workouts Carefully

It might seem counterintuitive but, indeed, keeping an arthritic horse moving

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and exercising is in most cases preferable to letting him turn into a pasture puff.

"Maintaining muscle mass around the affected joint helps to stabilize (it), preventing joint laxity (looseness) and abnormal loading," Jarvis says, which can lead to additional soundness issues.

However, it's important to exercise the arthritic horse in scenarios that will promote longevity, rather than place him at undue risk for more joint pain, based on the severity of his disease.

"It is important that the exercise is tailored to the individual horse after consulting your vet," Jarvis says. "Exercise can range from daily walks in hand to a gentle hack, but all should be accompanied by a warmup and cool-down."

Malinowski agrees, suggesting a slow and lengthy (15- to 20-minute) warmup at the walk before progressing to the trot and canter. Give your horse walk breaks as needed, and encourage correct movement and balanced gaits. Also, be sure he is moving well and comfortably before beginning more complex tasks.

"The horse should be moving freely before moving on to higher level movements, like dressage or reining or jumping," she adds.

Other considerations to remember:

- "For horses with OA, concussive road work is unhelpful, regardless of whether they are shod or unshod," Jarvis says. Rather, confine most exercise to the softer footing typically found in grassy fields or well-maintained arenas.

Try to keep OA horses between 4 and 6 on the BCS scale

Also, avoid slick footing, which places horses at risk of slipping or falling.

- For some arthritic horses it might be necessary to limit exercise to flatter surfaces, because hills can place significant stress on joints, she adds.
- Sharp turns and sudden starts and stops can be jarring for horses with OA, Jarvis says, so be gradual in your requests during work.
- Consider alternative exercises as needed, Malinowski says. For instance, "swimming is great! The horse gets to move without the concussion of landing on a limb which may be arthritic."
- Finally, keep realistic expectations about exercise levels, and remember that OA will progress over time. "An arthritic horse may get to the point that it can no longer perform higher-level movements or jumping without discomfort," Malinowski says.

Adds Jarvis, "Once OA is more advanced, simply pottering about in a level, (even-footed) paddock is helpful for the aged horse."



DUSTY PERIN

Your older horse might benefit from limb icing after exercise.

Do: Work With Your Veterinarian to Provide Appropriate Support

Not surprisingly, the treatment that's best-suited for a particular horse depends on a number of factors, Jarvis says.

"The options will vary dependent on how many joints are affected by OA, the severity of the condition, concurrent conditions, and, of course, budgetary restrictions," she says.

"Intra-articular medications (such as corticosteroids or hyaluronic acid), either to support the joint or to directly reduce inflammation, can be useful if only one or two joints are affected by OA or to treat a horse during a flare-up," she adds.

If the arthritis is more widespread, however, veterinarians often recommend a systemic oral non-steroidal anti-inflammatory medication (NSAID), such as phenylbutazone (Bute) or firocoxib (Equioxx). How frequently you should administer medications and at what dose depends on the horse; your veterinarian will review administration instructions with you when he or she prescribes the medication. Don't change the dose or frequency without checking with your vet.

A word of caution: Remember that the chronic use of NSAIDs can result in gastric ulcers, Malinowski says.

If your veterinarian recommends an NSAID, ask if he or she also recommends a gastric support product to help reduce the drug's effects on the stomach lining.

Another option, of course, is an oral joint supplement. While manufacturers haven't always had research to back up their product claims, more are having independent clinical studies conducted on their supplements. Ask your veterinarian if he or she has a supplement recommendation, and look for products backed by research if you opt to try one.

Don't: Forget About Ice

Researchers are constantly learning new things about horses and their care and management. Some of these findings, of course, dispute what we've done for decades (rotational deworming, for example), while others confirm these age-old techniques have a place in modern-day horse care.

One of those latter concepts is ice.

"Ice is always a universal helper to reduce inflammation, whether it be muscular or skeletal," Malinowski says.

Ask your veterinarian whether your horse might benefit from icing (either in an ice/water slurry or via commercial ice boots) after exercise.

Don't: Overlook Hoof Care

Proper hoof care is key to helping arthritic horses stay sound and comfortable in work.

"It is essential that the feet are well-balanced to ensure even weight-loading through the joints," Jarvis says. "Long toes and collapsed heels also put

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unnecessary strain on the joints, ligaments, and tendons, so regular trims are required and can ease breakover (how the horse's heel lifts off the ground and rotates over the toe during movement)," promoting soundness in the long run.

Your veterinarian and farrier might even recommend special shoeing to reduce impact on your horse's joints.

Do: Keep Your Horse at a Healthy Weight

What does nutrition have to do with OA? A lot.

"An overweight horse will struggle with excessive loading through the joints, and obesity is frequently linked with many inflammatory and degenerative diseases such as OA in humans and other species," including horses (TheHorse.com/163759), Jarvis says.

Especially if your horse is still performing more technical or strenuous work, aim to keep him at an appropriate weight and body condition (ideally, 4 to 6 on the 1-to-9 Henneke scoring scale, which we detailed in the February 2020 issue) to avoid stressing his joints excessively and keep him exercising for as long as possible.

> **"Exercise can range from daily walks in hand to a gentle hack, but all should be accompanied by a warmup and cool-down."**
>
> DR. NICOLA JARVIS

Don't: Work Your Horse During Flare-Ups

The caveat to "keep your horse moving" is when he has a flare-up, Jarvis says.

Horses with affected joints might suffer a flare-up "after playing out at pasture or slipping, leading to a swollen joint and obvious lameness," she says. "These flare-ups should be treated promptly, as the inflammation ultimately causes further damage to the joint."

Joint injections and/or anti-inflammatory medications are potential treatments for flare-ups; always work with your veterinarian to treat them.

Take-Home Message

A horse's ridden or even competitive career doesn't have to end just because of an OA diagnosis. It might just take a little more care and planning to keep him healthy, happy, and comfortable.

Get a definitive diagnosis, work with your veterinarian to provide appropriate support, plan workouts carefully, and implement management techniques to support healthy joints.

And above all, says Malinowski, "keep the horse moving on a daily basis."

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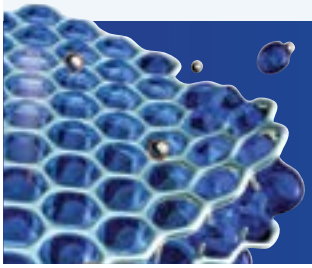
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References: 1. Zimeta™ (dipyrone injection). Full Prescribing Information. Kindred Biosciences, Inc. Burlingame, CA). Revised 08/2019. 2. Montesso PR, et al. Randomized blinded controlled clinical trial of dipyrone as a treatment for pyrexia in horses. Am J Vet Res. 2019;80(3):294-299.

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VIEWPOINT

STEPHANIE L. CHURCH, Editor-in-Chief
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Conserving Connection



We're all adapting to a striking new reality right now. As horse owners, we've seen the COVID-19 pandemic upend our "normal" when spring recreational and competition riding was just getting started. As humans, we've seen it transform the way we go about our daily lives, being more mindful of friends, family, strangers, the risks we might pose to them, and vice versa.

We're in a time where these changes, while uncomfortable for us, are crucial for halting the outbreak.

Aside from virtual communications with coworkers, family, friends, and my gym buddies, one thing has been vital to my wellness right now: time with my horse, Happy. I spend most of the day looking forward to my permitted 45 minutes with him at the Lexington, Kentucky, farm where I board—even though it means rushing around while taking critical biosecurity steps to keep the barn staff and other boarders healthy. Being around Happy calms and distracts me for a bit. It keeps me grounded.

Indeed, for those of us at *The Horse* who have horses, COVID-19 has impacted us in different ways.

Jennifer is our web producer, and her family's eight Appaloosas and two Quarter Horses live at their farm in nearby Lawrenceburg. For them the impact has been minimal; they've been ordering and picking up feed and supplies from the local mill and providers. She's disappointed her shows have been canceled but acknowledges the found time for farm-related spring cleaning and work.

Michelle, our digital managing editor, keeps her four horses—equal parts trail and dressage mounts—at home, near Bend, Oregon. She misses taking lessons but says the stay-at-home order has slowed her down and given her more freedom to spend time with her horses, taking extra moments to scratch or groom.

Our managing editor, Alex, also has a time slot where she can ride the Warmblood mare she's leasing at another Lexington barn. Shows, field trips, and group lessons are off the table, and the outbreak means more disinfection-related chores. But she's marveled about how quiet it's been at the barn and how boarders have quickly adapted to communicating and signing up for ride times via a shared messaging app.

My barn family has also been using a messaging app, for logistics, support, and much-needed levity.

We're all grieving the loss of normal right now and, even though it can't be in person, connection is critical. I hope you and yours are healthy and safe and that you're connecting with friends virtually. I also hope you are getting to connect with your horse on the ground or (safely!) in the saddle. Simply talking to Happy as I check on him, graze him, and walk around the farm has done more for our communication than a thousand transitions in the arena.

Please tell us how you're adapting to a COVID-19 horse world.

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