The Weather is Heating Up; Keep Your Horse's Temperature Down

Authored By: Dr. David Marlin

A horse being cooled off in the vet box. USEA/Leslie Mintz Photo.

Leading equine researcher and scientist, Dr. David Marlin, has been studying thermoregulation and cooling of horses for over 20 years. Marlin shares his advice to keep you and your horse safe if you are training and competing in warm or hot weather

Acclimatization

If the weather suddenly becomes warmer, don’t attempt to try acclimatize your horse by exercising it in the hottest parts of the day if you are competing within a few days. When warm/hot weather appears suddenly, no horses will be acclimatized to training/competing in the heat. Acclimatization takes two to three weeks of regularly exercising in the heat. If you start now your horse is likely to be
worse by the weekend as in the first three to five days horses’ ability to deal with heat and exercise gets worse before they start to improve and competing could be a major health risk.

**Travelling**

If you are travelling with your horse in warm weather, leave very early or as late as possible, preferably after sunset. It’s not only that its cooler but the chance of hitting traffic is less. The worst thing for a horse is to be standing in a trailer that is stationary on hot roads at temperatures that may reach high 80s or 90s – unless of course you have air-conditioning. Horses may lose six to eleven lbs per hour in warm weather and so could be considerably dehydrated after a four to five hour journey in the hotter parts of the day.

**Competition**

You must accept that your horse will not be able to do the same amount of exercise in the heat as it would in cooler weather. Your horse will produce more adrenaline in hot weather and use up muscle energy stores (glycogen) more quickly. Dehydration also increases adrenaline which compounds the problem. Therefore, if you compete just as hard as you would in cooler weather your horse will tire earlier. If you don’t compete as hard your speed will be slower but your horse will be at a lower risk of heat related illness.

**Water**

Your horse must have clean water at all times. Your horse may drink considerably more in hot weather. If you use buckets you should consider putting another bucket in the stable. Allow your horse water right up until the time you are going to take him to compete. You can also allow him to drink after warming-up and before competing. He will have a very strong urge to drink immediately after exercise and you should allow him to do so. There are many myths about water and exercise. Cold water does not cause problems. Large volumes of water do distend the stomach, but that is also the mechanism by which the stomach knows to empty and allow the water through into the small intestine.

**Electrolytes**
If you have not been feeding electrolytes on a regular basis then do not try to suddenly load in large amounts (e.g. 100-200g). It will not replace any bodily deficits and it may cause feed refusal or gastro-intestinal upset. If you have not been feeding electrolytes regularly then start by feeding 50g of a balanced electrolyte split between at least two feeds. Do not be tempted to try and load the day before or the day of competition. If you are providing electrolytes at or during e.g. before or after competing or between rounds or phases then you can provide electrolytes in feed or in pastes or in water. If you provide electrolytes in water then your horses should have the option to drink plain water as well. You can offer the electrolyte water first and if this is refused offer then plain water. There is no difference in speed of uptake between electrolytes in water or dry electrolytes given in feed. If you provide electrolytes in water then aim for a ratio of around 5-6g electrolyte for every liter of water. In studies the acceptance decreases as the ratio increases above this (i.e. more horses will refuse if given water with 9-10g electrolyte per liter of water).

**Warming-up**

Horses need less time for soft tissues (muscle, tendon, ligament, etc) to “warm-up” in hot weather. You should aim to reduce the time you spend warming-up by around 50%. After warming-up you should try to find shade to stand in and you can cool your horse with water and ice (if available). Reducing your horses’ body temperature does not counteract the other physiological effects of warming-up. There is also no reason why you cannot go into competition with a horse that has been “wetted”. Covering the horse with water means that the horse evaporates this rather than has to use his own sweat.

**Cooling**

The most effective way to cool a horse is with cold water all over the body surface, especially in front of and behind the saddle if you are riding and being given water containers to pour on or all over if you are not riding and the tack is removed. The water really needs to be 60° or less. Warm water is not any good for cooling down horses except by evaporation and this is much less efficient when horses are not exercising. If ice is available, then use it to cool down the water. Water that is around 40° is ideal and very effective at cooling. It does not cause constriction of blood vessels and prevent the horse cooling down – this is a myth. You should not concentrate on large veins or arteries or large muscle groups (another myth) and in fact this will be much less effective. You do not need to scrape off water – another myth! If its sits there it will evaporate and contribute to cooling the horse.
It doesn't matter how you get it on – buckets and hoses best; sponges ok. Cold water does not cause muscle cramps or tying-up.

This is the only study I am aware of that shows NOT SCRAPING does NOT cause skin temperature to rise! Blue blocks show period of iced-water application. Periods in between represent no water application and NO SCRAPING. Skin temperature and all other body temperatures still fall even though there is NO SCRAPING! cooling evj 1998

**Blankets and Clothing**

If you do put on a sheet then make sure it's a white one. White material reflects some heat whilst dark colours absorb radiant heat. The same goes for your own clothing. If possible ride in white and wear a white helmet.
**Heat-stroke / Heat-exhaustion**

Signs that your horse may be suffering from the heat include:

- Lethargy
- Panting (faster shallow breathing)
- Nostril flaring
- Increased rectal temperature
- Decreased appetite and thirst
- Dark urine
- Reduced urination
- Reduced performance
- Dark mucous membranes
- Muscle spasms
- “Thumps” (synchronous diaphragmatic flutter)
- Abnormal (irregular) heart rhythm
- Slow recovery after exercise

This is often referred to as heat exhaustion, but if not managed properly and quickly can progress to heat stroke. This may include ataxia (being unsteady on the feet) and or collapse.

If your horse does go down then continue to cool it aggressively and send for a vet!

If you are concerned that your horse may have severe heat stroke then it’s important that you seek veterinary advice as soon as possible.

Severe heat stroke/heat exhaustion can lead to renal failure, myopathy (muscle damage), laminitis, liver failure and can be fatal if not treated promptly. If you think your horse may be suffering heat related illness, move your horse into the shade and start to cool by pouring large amounts of water all over the body. If a hose is available then use that. If ice is available then use that to cool the water. Do not worry about scraping the water off, just apply more water. If your horse has developed heat exhaustion/heat stroke you may need to cool continuously for 10-15 minutes before you start to
see an effect. You are extremely unlikely to do any harm and your horse is at much greater risk from not being cooled. If shade is available nearby and the horse is steady on its feet then move into the shade whilst continuing to cool.

Keep your horse cool this summer when temperatures rise.

Summer is a great time to ride, but summer heat can be dangerous for horses, resulting in dehydration, lethargy, and general malaise. Severe heat stress can even cause diarrhea and colic.
In a release issued June 17, Janet Johnston, DVM, Dipl. ACVIM, ACVS, an emergency critical care veterinarian at University of Pennsylvania School of Veterinary Medicine's New Bolton Center, offers the following tips to help keep your horse healthy and cool as we approach the first day of summer:

1. **Choose cooler turnout times.** If your horse has a stall, but is turned out for part of the day, provide turnout during the cooler hours. Overnight is ideal, but if that’s not possible, have the horse go outside as early as possible during the day. Remember, the summer heat can also take a toll on the quality of your pasture. You might need to provide additional feed as the grass becomes sparse to maintain proper body condition and energy.

2. **Provide shade.** If your horse lives outdoors or if he must be outside during the day, provide relief from the sun. A run-in shed is best. Trees are a source of shade, but as the sun moves, so will the shade; ensure that, regardless of the time of day, the trees are offering shade.

3. **Move the air.** Fans are a great way to help keep the air moving in the barn, but use them wisely. Always ensure that your horse can’t get a hold of cords and plugs.

4. **Mist your horse.** If you are fortunate enough to have a misting system for your horse, use it. As moisture is absorbed from your horse’s skin, it will take away some of the heat. Frequent mistings are far more effective than a single dousing with a hose.

5. **Provide fresh, cool water and an electrolyte source.** Make sure your horse has plenty of fresh, cool water. A bucket hanging on a pasture fence will get warm and the water will no longer be appealing. Left long enough, the water will also become stagnant and unhealthy. If you are providing clean, cool water and your horse doesn’t seem to be drinking, then encourage it by providing a salt block, or even by misting hay with salt water. If your horse is sweating a great deal, water laced with electrolytes can help keep its body in balance. Whenever you offer electrolytes, however, be sure to offer a second source of fresh water, as well. Not all horses will drink electrolyte-laced water, so providing a source of water without them will ensure your horse keeps drinking. Also, too many electrolytes can be harmful.

6. **Slow down the work.** Don’t think that because your horse has been working intensely at 1:00 p.m. every day that it can take the heat when the temperature tops 90°F. If you have to work your horse in the heat, lighten
the work or spread it out over a couple of short sessions. This is especially important when the humidity is high, contributing to the poor quality of the air your horse is breathing. Cool your horse down slowly, and offer frequent sips of cool water. Take the tack off as soon as you’re done and sponge the horse off again with cool water.

7. **Stick to a schedule.** Within the parameters of keeping him cool, try to stay as close as possible to his normal schedule. Too much change at one time can be an invitation for colic.

Consider using a fly sheet to help protect white or gray horses from sunburn.

Photo: Thinkstock

8. **Avoid sunburn.** Horses, especially white horses, can suffer from sunburn. Even those with white socks and blazes, pink noses, or hairless patches from scarring can be susceptible. Using a fly scrim can help. In addition, applying sunblock to small, particularly vulnerable areas can be effective. Staying out of the sun’s harmful rays will, of course, be best. (Also be aware: If a horse has excessive sunburn it could indicate a rare, underlying liver disease.)

9. **Clip horses with longer hair coats.** Clipping is important, especially for those with pituitary pars intermedia dysfunction (PPID, or Cushing’s disease). While some coat can provide protection from the sun and
insulation, a long, thick coat tends to hold heat and makes it difficult for the horse to cool down. Be careful not to clip the hair too close, however, as it provides some protection from damaging rays.

10. **Know your horse and signs of heat stroke.** Heat stroke can happen anytime your horse is exposed to excessive heat that his body cannot handle. Heatstroke can happen if exercising in hot conditions, but be aware that it can also happen if standing in a hot stall or trailer.

You should know your horse’s normal temperature, heart, and respiratory rates. To find the heart rate of a horse, simply find a pulse and count the beats for 15 seconds, then multiply that number by four, which will give the beats per minute. Count the breaths per minute in a similar way.

Signs of heat stroke can include:

- An elevated heart rate that does not return to normal in a reasonable period of time;
- Excessive sweating or lack of sweating;
- Temperature that persists above 103°F;
- Depression and/or lethargy; and
- Signs of dehydration: dry mucous membranes, poor capillary refill, and poor skin turgor.

If you are concerned that your horse is suffering from heat stroke, call your veterinarian immediately and get your horse into a cooler environment.

**About the Author**

**University of Pennsylvania School of Veterinary Medicine's New Bolton Center**

- **Powered By:**

  the **HORSE**
### Safety Standards Flow Chart

<table>
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<tr>
<th>D-1</th>
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<th>D-3</th>
<th>C-1</th>
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<th>H-A</th>
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<tbody>
<tr>
<td><strong>Heat</strong></td>
<td>Explain two ways to cool off a rider during a hot day</td>
<td>According to the USPC Safety Booklet, describe 3 signs of heat illness.</td>
<td>Have knowledge of heat index and explain how this might affect your personal preparation for an outside activity involving horses</td>
<td></td>
<td>Name 2-3 heat-related illnesses or conditions and explain how they are different</td>
<td>Discuss the symptoms of heat stroke how you would care for a rider suspected of heat stroke.</td>
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<tr>
<td><strong>Concussion</strong></td>
<td>According to the Centers of Disease Control and Prevention, give the definition of &quot;concussion&quot;</td>
<td>List 3-5 signs or symptoms of a concussion</td>
<td>Know 8-10 signs or symptoms of a concussion</td>
<td></td>
<td>Discuss concussion including symptoms and immediate care of a rider with suspected concussion</td>
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<tr>
<td><strong>Attire</strong></td>
<td>Name 2 pieces of clothing or equipment that you should wear for your safety when you ride</td>
<td>Give at least 2 examples of when a riding helmet needs replacing</td>
<td>List ways to determine if a riding helmet fits properly</td>
<td></td>
<td>List 4 circumstances where a helmet is required to participate in USPC activities</td>
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<tr>
<td><strong>Rider Fall</strong></td>
<td>Describe what you should do for yourself when you fall off a horse</td>
<td>List some common injuries that may happen when a rider falls off a horse</td>
<td>Explain what you should do in the event of another rider falling off in the immediate vicinity of where you are riding</td>
<td></td>
<td>Describe the steps you should take when a rider under your supervision falls off a horse</td>
<td>Discuss knowledge of how to manage the aftermath of a rider fall, including consideration of circumstance (e.g. in arena vs. in the open)</td>
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### HEAT-RELATED ILLNESS

#### Recognition

**Heat Stroke**

Heat stroke is the most serious HRI—it is life threatening. It occurs when the body becomes unable to control its temperature.

- Body temperature rises rapidly
- Sweat process fails
- Body is unable to cool down

Body temperature may rise to 108°F or higher within 10-15 minutes. Heat stroke can cause death or permanent disability if emergency treatment is not provided.

Warning signs of heat stroke vary but may include:

- An extremely high body temperature (104°F or above, rectally)
- Red, hot, and dry or moist skin
- Rapid, strong pulse
- Throbbing headache
- Dizziness
- Nausea
- Confusion
- Unconsciousness

*Temperature taken rectally is the most accurate method.

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*If you suspect heat stroke, seek medical attention immediately!"
HEAT-RELATED ILLNESS

Treatment

What should I do if I see someone with any of the warning signs for heat stroke?

If you see any of the warning signs for heat stroke, you may be dealing with a life-threatening emergency. Have someone call for immediate medical assistance while you begin cooling the ill person. Response time will be critical.

- Get the sick person to a shady area.
- Remove restrictive clothing, equipment, and helmet.
- Rapidly cool the sick person by:
  - Immersing him or her in a tub of cool water or ice water.
  - Placing the person in a cool shower.
  - Spraying him or her with cool water from a garden hose.
  - Sponging the person with cool water.
  - Applying ice bags at the neck, armpit, and groin area.
  - Wrapping the person in a cool, wet sheet and fan him or her vigorously if the humidity is low.
- Monitor body temperature and continue cooling efforts until the body temperature drops to 101°F–102°F. Remove the athlete from the water to prevent overheating once this is achieved.
- Give the sick person sips of cool water if they are alert.
- Do not give him or her alcohol to drink.
- If emergency medical personnel are delayed, call the hospital emergency room for further instructions.
- The sick person should be transported to the hospital for observation even if all treatment on the field is successful.

Return to play considerations.

HEAT-RELATED ILLNESS

Recognition

Heat Exhaustion

Heat exhaustion is a milder form of HRI that can develop after several days of exposure to high temperatures and inadequate or unbalanced replacement of fluids. Older adults, those with high blood pressure, and those working or exercising in a hot environment are most prone to heat exhaustion.

The warning signs of heat exhaustion include:

- Heavy sweating
- Paleness
- Muscle cramps
- Tiredness
- Weakness
- Dizziness
- Headache
- Nausea or vomiting
- Fainting

Other possible symptoms include:

- Cool and moist skin.
- Fast and weak pulse rate.
- Fast and shallow breathing.

If heat exhaustion is not treated, it may progress to heat stroke. Seek medical attention if symptoms worsen or last longer than one
**HEAT-RELATED ILLNESS**

**Treatment**
What steps can be taken to cool the body during heat exhaustion?

- Drink water, clear juice, or a sports beverage.
- Rest.
- Take a cool shower, bath, or sponge bath.
- Seek an air-conditioned environment.
- Remove restrictive clothing, equipment, and helmets.

Return to play considerations.

**HEAT-RELATED ILLNESS**

**Recognition**

**Heat Cramps**

- Heat cramps are muscle pains or spasms, usually in the abdomen, arms, or legs that might occur in association with strenuous activity.
- Athletes who sweat profusely during strenuous activity are prone to heat cramps.
- Athletes with high salt concentration in their sweat are also prone to heat cramps.
- Sweating depletes the body's salt and fluids. Low salt level in the muscles can cause painful cramps.
- Heat cramps may also be a symptom of heat exhaustion.
- If you have heat problems or are on a low-sodium diet, seek medical attention for heat cramps.
Heat Terms

*Familiarize yourself with these terms to help identify an extreme heat hazard:*

**Heat Wave** - Prolonged period of excessive heat, often combined with excessive humidity.

**Heat Index** - A number in degrees Fahrenheit (F) that tells how hot it feels when relative humidity is added to the air temperature. Exposure to full sunshine can increase the heat index by 15 degrees. See below for a heat index chart.

**Excessive Heat Watch** - Conditions are favorable for an excessive heat event to meet or exceed local Excessive Heat Warning criteria in the next 24 to 72 hours.

**Excessive Heat Warning** - Heat Index values are forecast to meet or exceed locally defined warning criteria for at least 2 days (daytime highs=105-110° Fahrenheit).

**Heat Advisory** - Heat Index values are forecast to meet locally defined advisory criteria for 1 to 2 days (daytime highs=100-105° Fahrenheit).

*Familiarize yourself with these terms to help identify symptoms of a heat illness:*

**Heat Cramps** - Muscular pains and spasms due to heavy exertion. Although heat cramps are the least severe, they are often the first signal that the body is having trouble with the heat.
**Heat Exhaustion** - Typically occurs when people exercise heavily or work in a hot, humid place where body fluids are lost through heavy sweating. Blood flow to the skin increases, causing blood flow to decrease to the vital organs. This results in a form of mild shock. If not treated, the victim’s condition will worsen. Body temperature will keep rising and the victim may suffer heat stroke.

**Heat Stroke** - A life-threatening condition. The victim’s temperature control system, which produces sweating to cool the body, stops working. The body temperature can rise so high that brain damage and death may result if the body is not cooled quickly.

**Sun Stroke** - Another term for heat stroke.

**Heat Index Chart**

The Heat Index is a function of temperature and relative humidity. The combination of the two results in an apparent temperature which gives an idea of what it would feel like under normal-to-low humidity conditions.

The heat index also applies to shady, light wind conditions, so it feels even hotter than the heat index if a person is in direct sun. In the midst of a hot, dry, wind a person would also feel hotter than the heat index value due to the wind effects.

Excessive and dangerous heat indices occur mostly during the summer months with the abundance of moisture and increased heat.

**Apparent Temperature Readings**

CAUTION -- 85 to 94°F -- physical activity may cause fatigue

EXTREME CAUTION -- 95 to 105°F -- possible heat cramps and/or heat exhaustion with prolonged exposure

DANGER -- Above 105°F -- possible heat stroke with prolonged exposure; heat exhaustion and heat cramps likely
Seasonal Care

Heat Advisory for Horses

By University of California, Davis, School of Veterinary Medicine • Jun 16, 2017 • Article #39324

The summer months can produce extremely high temperatures, especially in California. Here, University of California, Davis, Veterinary Medical Teaching Hospital staff members John Madigan, DVM, Dipl. ACVIM, ACAW; Gary Magdesian, DVM, Dipl. ACVIM, ACVECC; and W. David Wilson, BVMS, MS, MRCVS, offer 10 important tips to prevent heat-related problems in horses:

1. **Heat can kill.** High environmental temperatures and related heat issues, including dehydration, exhaustion, and heat stroke, can occur in horses and can produce illness and death. This is serious business and you must take steps to ensure your horse is protected when traveling in a trailer or being ridden on trail rides or competition events.

2. **Provide water.** Help your horse maintain hydration by allowing free access to water at all times. It is a myth that a hot horse drinking water will experience colic or other medical problems. Never let your horse pass up a chance to drink water. Only horses that have been

Photo: Anne M. Eberhardt/The Horse
deprived of water for a significant time (many hours or days) need to have water provided in smaller amounts over time. Let your horse drink on the trail or after a class at a show.

Hint: You can lead a horse to water, but you can’t make him drink. This is true, so offer some hay and your horse will often drink after eating the hay. Soup-consistency bran or pellet mashes are another means of getting extra water into your horse

3. **Provide as much shade as possible.**

4. **Limit what you do with your horse during peak heat.** Aim to:

   - Ride or compete with your horse in the early mornings when it is cooler;
   - Have the ride or event management consider a change in the program schedule to limit afternoon activities during peak heat;
   - Shorten your ride;
   - Go slower and provide frequent breaks for your horse, in shade; and
   - Encourage your horse to drink whenever they want water.

5. **Ventilation is key.** Provide open vents and windows in trailers which can open for cross ventilation (however, don’t let your horse stick its head out while on the road).

6. **Know signs of fatigue and overheating in your horse** and stop before more severe signs of heat exhaustion begin. Watch for:

   - Persistent high respiratory rate that does not come down with rest over 10 to 30 minutes (normal is 20-40 breaths per min);
   - Change in mentation, decreased energy level, and reluctance to keep going;
   - Dry mucous membranes (i.e., gums) in the mouth (they should feel “slimy”);
   - Prolonged capillary refill time (Push on your horse’s gum. They should be pink to start, then it will blanch to white after pressure, and return to pink in approximately one second. Check this
at the start of your day and frequently throughout the day. If it is prolonged, your horse is trying to tell you to stop, rest, provide water, and, if other signs of colic or muscle pain occur, you need to stay put and seek veterinary attention); and

- Lack of gut sounds. Listen at the start of your day (if you don’t have a stethoscope put your ear on your horse’s flank— behind the ribs). You should hear gurgling sounds on both sides of the belly— that is normal and good. Quiet gut sounds are a warning that your horse may be heading for dehydration or exhaustion.

7. **Consider using fans.** If your horse lives in a barn with limited ventilation, try to arrange more air circulation by carefully placing a fan in front of the stall or in the aisle way. Keep electric cords out of reach of horses.

8. **Hose (spray) off your horse or pour water from a bucket over your horse.** Cool water is fine, normal temperature (not hot) water is good, too. Evaporation produces cooling and continuous hosing is one of the most effective means of lowering body temperature.

9. **Have a water source while traveling.** Keep a supply of water available for your horse to drink. Obtain some clean five-gallon cans and fill them up with water before you travel.

10. **Electrolytes might be useful** if the horse has been sweating excessively. Only use if they can be followed by access to water to drink. Have a plan outlined by your veterinarian if you have not used electrolytes before. Only use electrolytes specifically made for horses.

**Tips for Trailering in the Heat**

If you need to trailer your horse, do so in the cool early morning or late evening hours when it is cooler. Don’t leave your horse in a parked trailer, especially if there is no shade. Just as with a parked car, temperatures inside a trailer can rapidly reach 140°F and the horse can quickly develop heat stroke. Provide as much ventilation and airflow as safely as possible on the road. Be very careful with hauling foals—they appear to be even more susceptible to heat than adult horses.
Help your horse cool out after exercise by hosing off the whole body, sweat-scraping him, and hosing him again.

Photo: Thinkstock

As tough as steamy summers can be on humans, they can be even tougher on horses. That's because instead of choosing how they'll deal with the heat, horses often have to depend on us to make the right management choices for them.

For advice on making those choices, we've turned to two equine veterinarians practicing in Florida, where heat plus humidity can deliver a double whammy to horses. At the University of Florida, in Gainesville, Amanda House, DVM, Dipl. ACVIM, is a clinical associate professor in the veterinary school and a state extension specialist. And Heather Farmer, DVM, owner of Equine Performance Veterinary Practice, in Lake County, Florida, tends to equine competitors that must work and perform throughout the summer.

**Turnout Tips**

According to House, horses can live outdoors during summer months 24/7 if, in addition to adequate forages, they are provided with two must-have ingredients: fresh water and shade.

Water, in particular, must be plentiful and readily available. Position troughs in pastures so one horse can't block others from the water source; if using water buckets, provide one more bucket than you have
horses turned out. Check water levels periodically, as even automatic waterers can clog. Clean buckets daily, and dump, clean, and refill troughs every two to three days, since stagnant water provides an ideal breeding ground for mosquitoes. Provide free-choice access to vitamin/mineral salt blocks in pastures if they're not available in each horse's stall.

As for shade, "being able to escape from the direct heat of the sun is really critical," says House, adding that "in this part of Florida we have large oak trees that provide excellent shade." Besides trees, she says, a shelter such as a run-in shed can help horses escape the elements.

In Farmer's experience most horses prefer to seek solace from sun under trees, where there's usually a little breeze, rather than in a windowless lean-to or run-in shed. And "as long as there isn't lightning or a real downpour, most are happy enough staying out in the rain," she says.

For times when horses aren't standing in the shade, Farmer says mesh fly sheets with ultraviolet (UV) protection work well to help shield a horse from the sun's rays as well as biting insects, without making making their wearers any hotter. She also recommends fly masks, "because flies are so annoying in the summertime that horses' eyes tear constantly; and because without masks, horses that like to roll and 'itch' in the sand can end up with corneal ulcers."

Masks also block light well enough to help prevent sunburn on sun-sensitive, nonpigmented areas such as those seen around some Paint horses' eyes, says Farmer, and "long-nose" masks provide at least some protection to easily burned noses.

Especially where shade is limited or absent, Farmer suggests limiting turnout to four hours or less each day. "(Turn out from) early morning until noonish, then again for a couple of hours after 5:00," she advises. Once or twice during turnout on particularly hot days in these shadeless pastures, check horses for dehydration: Does a fold of pinched skin snap back quickly or slowly when released (the latter indicating dehydration)? Are gums a healthy pink color and wet to the touch, or are they pale and tacky? Also observe respiration (a normal respiratory rate for an adult horse is eight to 12 breaths per minute), because "a horse that isn't dissipating heat adequately by sweating will breathe faster, trying to cool down by exhaling," Farmer says. If your horse shows any of these signs of dehydration, bring him in from the sun, hose him, and sweat-scrape off most of the moisture; when his breathing slows, he can be turned out again.
**Barns: Go with the Flow**

For heat relief in the barn, says Farmer, "the biggest thing is to keep air moving." Your prime ally? The fact that heat rises. Louvered roof vents or cupola vents let out hot air, and an exhaust fan can amplify the effect. Open doors and windows allow intake of fresh outside air, which warms, rises, and draws in yet more air. Installing window- or table-type fans--mounting them securely so fans and cords can't be reached by curious muzzles--promotes air circulation and, thus, equine comfort.

Airflow also plays an important role in insect control. "Flies aren't very good at flying in wind," Farmer says, "so fans in or above the stalls help," creating a current in which flies cannot fly (or alight on horses) well.

In stalls, just as in paddocks and pastures, horses need constant access to clean, fresh water. Some horses habitually dunk hay or dribble grain into their water, which can gunk up the bottom of a bucket or block a waterer's fill hole; combat this by dumping and cleaning buckets and checking waterers regularly. On waterers with a pedal horses must press with their noses for fresh water, make sure debris isn't jammed under the pedal. Checking these water sources also allows you to monitor your horse's water intake and discover if he's not drinking enough sooner than later (a 1,100-lb horse at rest should typically drink 4-9 gallons per day).

**Workouts and Cool-Downs**

University of Guelph researchers determined that horses succumb to heat stress three to 10 times faster during workouts than their two-legged counterparts. Horses are large and possess higher percentages of active muscle than humans do during exercise--muscle that produces a lot of heat during use. Also, less sweat evaporates from equine athletes' bodies as compared to human athletes simply because the horse produces much more sweat than can be evaporated.

To avoid heat stress, House says horse owners should "focus on exercising and training in the coolest hours: very early morning or later in the evening."

When such timing isn't possible, Farmer advises shortening workouts--instead of 45-minute sessions, maybe go for 20 or 25 minutes--and monitoring breathing. "If you feel the horse's sides heaving in and out, or you see his nostrils flare excessively, it's time to let him walk--not stand still, but walk quietly until
his breathing is normal again," she says. If, after about 10 minutes of walking, "everybody else's horses are breathing normally but yours is still huffing and puffing, you may want to have his cardiovascular fitness evaluated--and have your vet check that there isn't some underlying physical problem."

After working, begin cool-down by walking, helping your horse's muscles stay supple while his respiratory rate recovers. Then remove his tack and hose his neck and chest areas first, Farmer says. "The jugular vein is right there (in the neck); cooling that off you cool the blood coming back to the heart, which cools the body internally," she says. "Then hose off the whole body, sweat-scrape him, and hose again. That pulls heat out faster than just hosing and letting water sit on the skin," which heats up quickly, counteracting the desired cooling.

An alcohol bath followed by drying in front of a fan can accelerate heat dissipation; alcohol dries the skin, however, so save this for when a horse has been worked particularly harder than usual.

A horse whose respiration hasn't slowed much despite hosing (if, for instance, the water from the hose is warm, as often is the case in summer) might require additional help. Wrap bags of ice in a couple of towels for five minutes, then spread the chilled towels across the horse's back, says Farmer. Or use towels that have been soaked in ice water to wash him off.

Effective cooling and recovery can be especially difficult, House says, for "horses with longer hair coats that don't shed out completely--for instance, older horses with (the metabolic condition) equine Cushing's disease. Clipping their coats for spring and summer helps ensure that they can be adequately cooled down."

**Top Summer Concerns**

Before summer heat hits its peak, have a veterinarian conduct a general wellness exam on your horse. "We vaccinate in spring and fall, at minimum; if your vet's already at the barn for that, have her or him take a couple of minutes to listen to the heart, listen to the lungs, maybe also evaluate weight and diet," Farmer says. "Checking twice a year, you'll catch most problems when they're really minor. And if a horse isn't sweating, you can take steps to improve things before the season gets really hot."

The most common heat-related problem Farmer sees in horses is fatigue caused by hard work plus insufficient fluid intake and/or insufficient replacement of electrolytes lost through sweating. The culprit
is most likely a distracted human who didn't refill an empty water bucket or replace a salt block. Because, given the opportunity, most horses will correct this problem on their own. "If you provide a salt block with electrolytes, they'll eat what they need to replenish what they've lost," Farmer says. "Or if you hang one water bucket with electrolytes mixed in and another with just fresh water, they'll pick the bucket they need to drink from."

But horses, too, can get distracted, particularly at competitions, drinking less than they need to "because they're busy watching everything going on," says Farmer. Others can become picky about water that tastes different than their usual supply. For a reluctant drinker at a horse show, bring along a couple of barrels of water from home or accustom the horse to a flavoring agent (maybe electrolytes or a capful of honey) in water at home, then mix in the same flavoring at the show.

Another problem--more common in the Southeast, though not unheard-of elsewhere--is anhidrosis. This condition is characterized by an inability to sweat, usually accompanied by high body temperature and increased breathing rate. Because sweating is how the body cools itself, a horse that can't sweat might overheat enough to cause severe internal damage.

The first corrective step for anhidrosis is to adjust workload so the horse doesn't need sweat's cooling effect as often. Farmer also has had some degree of success in treating the condition with a feed supplement designed to increase sweat production; talk to your vet about such solutions. If that doesn't help, she suggests a course of electrolytes delivered via noninvasive dermal patch.

For many horses that cannot sweat, hot-weather riding is out of the question. The physical stress is "too much for their bodies to take," Farmer says. "The respiratory rate will get very high very quickly, and it's not worth the risk." Owners of anhidrotic horses should take a break from riding during the hottest months, especially August, she notes.

**Take-Home Message**

Keeping any horse healthy and safe in hot weather is a challenge, but one you can meet with knowledge, planning, careful observation, and prompt response to signs of discomfort or struggle. In other words, contrary to the popular slogan, *do* sweat the small stuff.

**About the Author**
In hot and humid climates your horse might appreciate being hosed down with cool water.

Photo: Thinkstock

With summer’s sunny days can come extreme heat. Such situations can cause worry for owners as they struggle to help their horses adjust, stay healthy, and remain comfortable. But with a well-thought-out management plan, horses can stay cool and comfy in the midst of summer.

To help get you started on the right track, TheHorse.com caught up with Nancy Loving, DVM, an equine practitioner in Boulder, Colorado, to find out what the most important things to consider are when caring for horses in extreme heat.

When dealing with hot temperatures, Loving said the most important thing an owner can do is provide his or her horse with plenty of fresh water.

"Clean water should always be available; an average horse needs five to seven gallons of water per day in cool weather, while in hot weather, requirements for maintenance and to compensate for losses in sweat
may prompt intake of 20 gallons or more per day," she explained. "Horses in a herd should have access to a couple of water tanks spaced a distance apart so dominant horses don't prevent a thirsty, more timid horse from drinking.

Adding an electrolyte supplement to your horse's diet could help keep him drinking and restore the electrolyte balances disrupted by sweating, and horses should have access to a salt block or receive a daily salt supplement (no more than a tablespoon per day) to allow them to meet their dietary sodium chloride requirements.

Additionally, she added that for a horse that doesn't drink well, offering a watery gruel of a supplement (such as a complete feed pellets) rather than feeding them dry can help increase the horse's water intake.

Insects are another concern that accompany increasing temperatures, Loving said.

"Hot weather brings insects so don't forget to use fly sheets, insect repellant, and during active insect times of day, it can help to bring your horse into the barn and use fans to create air flow that foils the ability of flying insects to hover around your horse," she added, as many biting flies are poor fliers.
Fans can not only help keep your horse cool, but also create air flow that foils flying insects' ability to hover around your horse.

Photo: Erica Larson, News Editor

Loving also encouraged owners to provide their turned out horses "with a stand of shade trees or a loafing shed (run-in shed) with good ventilation. Having areas to get out of the direct sun offers respite, particularly if they have air circulation, also wards off the insects.

"In hot and humid climates your horse might appreciate being hosed down with cool water," she added.

One concern many horse owners have in hot temperatures is heat stress, but Loving explained that this ailment typically affects horses in hard work rather than those lounging in a pasture.

"Heat stress is typically a concern for horses exercising in rigorous athletic pursuits (such as distance riding, speed and/or sprint events) in hot and humid weather," she said. "Light riding isn't likely to bring
on a state of heat stress, unless there are extenuating circumstances like extreme heat and humidity and/or over-riding for the conditions of the day."

Loving explained that horses that sweat for prolonged periods are more at risk of heat stress due to the effects of dehydration and electrolyte imbalances along with internal heat generated by the working muscles during physical exertions.

"If you think you horse is experiencing heat stress, strip off his tack and equipment," she explained. "Take a rectal temperature to determine the extent of internal heating--rectal temperatures higher than 103.5°F (about 39.8°C) indicate heat stress."

Loving advised, "Move the horse out of the direct sun when possible. Immediately soak the horse down with cool water, scraping it away and applying it continuously -- this cooling process should stop once the chest feels cool to the touch and/or rectal temperature drops below 103.5°F."

She cautioned to be mindful of too rapid cooling, as in some cases, this can lead to muscle cramping. She suggested interspersing periodic walks for five to 10 minutes in order to allow for the release of heat from inside the horse's muscles.

With some careful consideration and help from their owners, most horses should adjust to the warmer temperatures without much problem. If you have concerns about how your horse is handling the heat, your veterinarian will be able to help you pinpoint and resolve the problem.

About the Author

Erica Larson, News Editor
Erica Larson, news editor, holds a degree in journalism with an external specialty in equine science from Michigan State University in East Lansing. A Massachusetts native, she grew up in the saddle and has dabbled in a variety of disciplines including foxhunting, saddle seat, and mounted games. Currently, Erica competes in eventing with her OTTB, Dorado.

'Pinch Grafting' for Equine Lower Limb Wounds (AAEP 2011)

“Enjoy riding your horse this summer, but make sure to prepare yourself and your horse properly before attempting the beat the heat,” Walker said.

Photo: Thinkstock

Summer means hot, humid weather in many parts of the country, including Louisiana. And horse owners in those areas need to take steps to ensure their horses stay cool and comfortable, says Louisiana State University AgCenter equine specialist Neely Walker, MS, PhD.

Just like humans, horses cool off by sweating. So, in hot and humid weather, they must consume more water. Owners should ensure horses have access to copious quantities of fresh, clean water to prevent overheating. Horses that are worked in temperatures above 70°F can easily consume up to 25 gallons of water a day, Walker said.
Another way to prevent heat stress is to ensure that barns, paddocks, and stalls are properly ventilated. Barn doors and windows can be kept open, when safe, to allow airflow, Walker said, and fans can be installed to increase air circulation around horses in stalls.

When feeding, owners should pay attention to protein content. Excessive protein can cause additional metabolic heat during the digestion process, Walker said, which can make it more difficult for a horse to cool down. Crude protein should not exceed 12% to 14% of the total ration for a working adult horse, Walker said. The protein content in the ration for an idle mature horse should be closer to 10%.

Horses’ rations also need salt: about 0.5% for idle mature horses and 1% for working horses daily. While premixed complete rations contain salt, provide free choice salt or mineral blocks because each horse’s salt requirement varies, Walker said. As long as horses have free choice of water available, excess salt consumption is not typically a problem.

“Enjoy riding your horse this summer, but make sure to prepare yourself and your horse properly before attempting the heat the heat,” Walker said. “Be aware and take breaks to monitor your horse’s physical condition.”

Walker advises riding in a covered arena or in the early morning or evening when temperatures are cooler. It is also important to take time to properly cool down horses after riding, she said.

Signs of heat stress include weakness, stumbling, increased respiration, and a body temperature in the range of 102°F to 106°F. If you suspect heat stress, Walker recommends offering small amounts of water regularly and moving the horse to a shaded, well-ventilated area. If necessary, hose the horse with water, starting at the feet and working upward. If the horse’s temperature stays above 106°F, contact a veterinarian immediately.
One external cooling method for horses with an elevated body temperature involves applying cool water (much like a rider would when hosing a horse out after a ride) or cool wet towels to the horse.

Photo: Anne M. Eberhardt/The Horse

They might be on opposite ends of the spectrum, but hyperthermia and hypothermia in horses are more alike than one might think. At the 2013 Western Veterinary Conference, held Feb. 17-21 in Las Vegas, Nev., Amelia S. Munsterman, DVM, MS, Dipl. ACVS, ACVECC, reviewed these two equine environmental emergencies and how to best manage affected horses.

Munsterman, a clinical lecturer in equine emergency and critical care at the Auburn University College of Veterinary Medicine, explained that both conditions result from circumstances that overwhelm horses' normal thermoregulatory mechanisms.

"Both conditions result in an aberrant core temperature, accompanied by an exaggerated acute phase inflammatory response and multi-organ failure," she said.

She noted that several factors can predispose a horse to developing hyperthermia and hypothermia, including:

- Age;
- Illness;
• Metabolic disorders;
• Injury;
• Electrolyte imbalances; and
• Lack of acclimatization in a new climate.

Munsterman reviewed each condition and described treatment options for a veterinary audience.

**Hyperthermia**

By definition, hyperthermia describes a core body temperature that exceeds a horse's thermoregulatory set point; essentially, it's an elevated body temperature. Extreme hyperthermia is referred to as heat stroke, Munsterman said, and occurs when the horse's body temperature rises to about 105.8°F. In compromised horses, she noted, the temperature at which an animal develops heat stroke can be lower. A combination of heat and humidity can place horses at risk for developing hyperthermia, Munsterman said.

Normally, when a horse becomes hyperthermic, his blood temperature rises, Munsterman said. This change alerts the hypothalamus (the part of the brain that operates much of the autonomic nervous system, including body temperature regulation) that the horse is hot and needs to be cooled, and the animal's natural cooling mechanisms—including sweating and exerting heat via the respiratory tract—kick in.

However, problems occur when the horse's compensatory mechanisms are overwhelmed and heat stroke sets in. At this point, and through a variety of physical pathways, the horse essentially develops an uncontrolled and overwhelming inflammatory reaction, called the systemic inflammatory response syndrome (SIRS). If left unchecked, SIRS can lead to multiple organ failure, including the kidneys, liver, and lungs.

Clinical signs of heat stroke include:

• Increased core body temperature;
• Central nervous system dysfunction (including depression, agitation, seizures, and coma);
- Tachycardia (increased heart rate);
- Tachypnea (increased respiratory rate);
- Systemic hypotension (low blood pressure);
- Electrolyte abnormalities; and
- Metabolic derangements.

Systemic complications of heat stroke include:

- Encephalopathy (brain disorders or disease);
- Rhabdomyolysis (tying up);
- Acute renal failure;
- Myocardial (heart muscle) injury;
- Liver dysfunction;
- Intestinal ischemia (lack of blood flow to parts of the intestines); and
- Coagulopathy (blood's ability to clot is impaired).

Munsterman suggested veterinarians perform a complete blood count, serum chemistry (including a measure of liver function), urinalysis, and coagulation monitoring on horses with heat stroke.

He said that when dealing with a hyperthermic horse, the No.1 treatment goal is to return the animal's body temperature to around 101.3°, at which point the hypothalamus can take over and continue the cooling process.

"First and foremost, move the horse out of the sun, and provide both free-choice water and an electrolyte solution of the horse has a normal mentation," Munsterman said. Next, attention should be turned to cooling the horse.
Munsterman cautioned that during cooling, it's important to reduce shivering and vasoconstriction (narrowing of the blood vessels) using massage or a tepid water bath, as these can be counterproductive to the cooling process.

"Cold water, even cool water can be recognized by the hypothalamus due to skin receptors, causing shivering to counter the cold the animal is feeling," Munsterman explained. "It is an effort to prevent simulation of the skins thermoreceptors. Shivering will only increase heat production."

Munsterman discussed several cooling methods that can be used on hyperthermic horses:

- **External**—One external cooling method involves applying cool water (much like a rider would when hosing a horse out after a ride) or cool wet towels to the horse. Because wet towels and hair coat can actually be insulators, change towels often and scrape water from the horse's coat regularly. Another external cooling method is using fans, often in conjunction with cool water application, Munsterman noted. Additionally, she cautioned that while adding isopropyl alcohol can aid in cooling, "the fumes can be extremely dangerous for both horses and humans."

- **Internal**—In cases of extreme heat stroke, Munsterman said an internal lavage is more effective than external cooling methods. Cooling lavages are often gastric or rectal in nature, although Munsterman noted that a peritoneal (abdominal) cooling lavage can be used in sterile conditions. She stressed that horses' electrolyte and protein levels should be monitored carefully during lavages.

  Watch for and treat potential related problems and complications, such as hypotension, seizures, rhabdomyolysis (tying-up), or laminitis, she said.

  Expect the horse to get cooler than you intended, Munsterman said, and also expect a fever several hours, days, or even weeks later. The fever, she noted, actually indicates the hypothalamus is working properly. Many horses that don't develop a fever eventually die, she cautioned.

  "The prognosis after heat stroke is variable, based on the severity of the hyperthermia and organ systems involved," Munsterman said.
Munsterman noted that owners can reduce the risk of heat stroke by properly acclimatizing horses (or helping them adapt) to new or changing environmental conditions, a process that can take anywhere from a few weeks to several months.

**Hypothermia**

On the other end of the spectrum, hypothermia is defined as a core body temperature below normal limits, Munsterman said. It's caused by exposure to cold temperatures (be it air, water, or mud, she said) coupled with a predisposing factor that inhibits the normal physiologic response, such as:

- Old or very young age;
- Endocrinopathic disorders;
- Malnutrition;
- Neuropathies or trauma; and
- Sepsis.

Horses with hypothermia can be "grouped" into grades, based on their body temperature:

- Mild—a body temperature of 89.6-98.6°F;
- Moderate—a body temperature of 82.4-89.6°F; and
- Severe—a body temperature of less than 82.4°F.

When horses are exposed to cold, their hypothalamus sends signals to activate the body’s warming mechanisms, such as shivering. As hypothermia progresses, the warming system is essentially overwhelmed and organ dysfunction sets in.

"The progression of multi-organ failure has been well-documented in other species, and these descriptions may apply to the horse, as well," Munsterman said.

Clinical signs of hypothermia include:
• Low body temperature;

• Cardiac dysfunction;

• Respiratory dysfunction;

• Central nervous system abnormalities;

• Renal dysfunction;

• Coagulopathy; and

• Ileus (lack of gastrointestinal motility), among others.

"Treatment for hypothermia revolves around returning the core temperature to closer to normal," Munsterman said. To achieve this, there are several methods veterinarians can choose from, depending on each patient’s individual circumstances:

• Passive external rewarming—This method, which relies on the horse's ability to produce heat via shivering, is only effective in mild cases of hypothermia, Munsterman said. It generally involves wrapping the animal in a blanket and sheltering his body from further cooling with by a tarp, which helps prevent further heat loss. She noted that using this method alone is generally ineffective when dealing with severe hypothermia.

• Active external rewarming—This option uses forced warm air, warm water baths, heating pads, hot water bottles, or heat lamps to encourage warming, she said. However, these methods can be counterproductive in some cases, she said, as they can cause vasodilation and increased circulation to the extremities, pulling heat away from the core. She also noted that active external rewarming can burn the horse if not applied properly or carefully. This method is often used in conjunction with another rewarming option.

• Active internal rewarming—Munsterman said active internal rewarming is commonly combined with an external rewarming method. Active internal rewarming options include warmed intravenous (IV) fluids and body cavity lavage, similar to that used for hyperthermic horses.

Munsterman advised monitoring the horse's body temperature closely monitored via a rectal thermometer and discontinuing rewarming efforts when the body temperature reaches about 95°F. At that point, she
said, the body can take over and the horse can warm up on his own, provided passive rewarming techniques are continued.

Munsterman noted that during rewarming, horses' organ function should be assessed regularly. Additionally, horses should be started on IV fluids to replace fluid losses. Most horses will require supportive care as well.

Complications from hypothermia include sepsis, pneumonia, and compartment syndrome (increased pressure in muscle compartments), Munsterman said.

Munsterman said the prognosis, while temperature dependant ("More severe cases will have more fatalities," she said), is often excellent for survival.

Take-Home Message

Hyperthermia and hypothermia are environmental emergencies that require aggressive and immediate medical attention. The prognosis is variable; however, many horses survive.

About the Author

Erica Larson, News Editor

Erica Larson, news editor, holds a degree in journalism with an external specialty in equine science from Michigan State University in East Lansing. A Massachusetts native, she grew up in the saddle and has dabbled in a variety of disciplines including foxhunting, saddle seat, and mounted games. Currently, Erica competes in eventing with her OTTB, Dorado.