



# U of M Horse Newsletter

Providing research-based information to Minnesota Horse Owners

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## Equine Glaucoma

By: Grace Meyer, DVM, former U of M Vet Student

Glaucoma is a relatively rare find in horses (occurring in less than 1 in a 1,000 horses) however, it is a severe problem for affected horses. Glaucoma is due to a rise in the pressure inside the eye, caused by problems with drainage of the aqueous humor in the eye. The aqueous humor is the clear fluid in the eye between the lens and the cornea. This fluid is produced by the ciliary body in the eye and should drain at a similar rate to its production. If untreated, glaucoma can result in pain and blindness from optic nerve damage. At the end stages, removal of the eye is often recommended to remove the source of pain.

Equine glaucoma usually develops in horses that also have chronic recurrent uveitis (moon blindness). The inflammation associated with uveitis clogs the drainage portals in the eye. Clinical signs of glaucoma include a cloudy blue cornea (sometimes with white lines crossing it; see photo below), redness in the white tissues around the cornea, signs of pain such as squinting and tearing, big pupils that don't shrink in bright light, an enlarged eye, and blindness.



An ophthalmic examination by a veterinarian is needed to diagnose glaucoma. Local anesthetic blocks will likely be done to facilitate the examination. Sedation may also be needed depending on the temperament of the horse. A diagnosis of glaucoma is made by measuring the pressure in the eye using a handheld tonometry instrument.

Therapy is directed at lowering the intraocular pressure. Topical therapy such as eyedrops or eye ointments should

be tried first, although some horses may not tolerate them. Horses often do not respond to the medications used in other species. Dorzolamine hydrochloride is a topical medication that is given 3 times a day. This drug reduces the production of aqueous humor in the eye. Timolol, a topical medication given every 12 hours, can mildly decrease the intraocular pressure by decreasing fluid production and is often given along with the dorzolamine. If uveitis is present, systemic non-steroidal anti-inflammatories (such as banamine) and topical corticosteroid ointment are used to reduce inflammation.

If topical therapy does not control the glaucoma, or topical therapy is difficult or impossible, there are several surgical options. One option is using a laser to perform "transscleral cyclophotocoagulation". In this procedure, a laser is used to destroy parts of the ciliary body which produce the fluid. This procedure is done under general anesthesia or standing sedation with local anesthesia. The surgery can reduce the intraocular pressure, decrease or eliminate the need for topical medication, and maintain comfort and vision.

Gonioimplantation can also be performed. A tiny drain is surgically placed in the eye to increase drainage of the aqueous humor; however, this procedure has a low success rate and is uncommonly done. Treatment of anterior uveitis is crucial to minimize the development of glaucoma in horses.

In summary, glaucoma is a relatively uncommon but serious ocular condition in the horse. It can lead to pain, blindness and eventual removal of the eye (enucleation) if not recognized and treated. Contact your veterinarian if you suspect your horse may have glaucoma.

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## Upcoming Events

### 4th Annual Horse Forage Field Day

Thursday, August 15  
6:00 to 8:00 pm

U of M Equine Center  
*Participants will rotate through 4 stations focused on improving hay and pasture utilization.*

\$10/person. Registration required and available at [www.regonline.com/HorseFieldDay2013](http://www.regonline.com/HorseFieldDay2013)

### 74th Annual Minnesota Nutrition Conference

September 17-18, 2013  
Mystic Lake Casino & Hotel  
Prior Lake, MN

Sept. 18 Equine Session will focus on forage utilization  
[www.mnnutritionconf.umn.edu](http://www.mnnutritionconf.umn.edu)

### U of M Releases 2 Apps for iPhones and iPads

"Hay Price Calculator" converts price per bale to price per ton. "Healthy Horse" estimates a horse's body weight, ideal body weight, and a body weight score based using new research-based equations. Both apps are available in iTunes for a small fee.

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## Ventilation Systems for Horse Barns - Part III

**Supplemental Heat.** During winter conditions, indoor temperatures may drop below acceptable levels and water lines could freeze. For these situations, a small gas-fired or electric space heater is needed to maintain the minimum desired temperature. The heater should be sized at roughly 4,000 BTU/hour (gas) or 1 kW (electric) per horse. It should be noted that these space heaters are the number one cause of fires, so safety precautions need to be taken.

**Insulation.** All housing needs to be well constructed (as air tight as possible for mechanical ventilation systems) and have insulated walls and ceiling. The insulation will keep the building cooler in the summer and prevent moisture condensation as well as keeping the building warmer in winter. For open sided and enclosed naturally ventilated barns, roof insulation with an R-value of 2 to 4 is strongly suggested to prevent condensation from forming on the underside of the roof in winter plus reduced heat load in summer. For mechanically ventilated barns, a minimum R-value in the mid-teens (15) is needed in the walls and mid-twenties (25) in the ceiling. A vapor barrier or retarder (sheet of plastic)

needs to be placed on the warm side of the insulation in both the walls and ceiling to keep moisture from moving through the interior surfaces into the cavity which could deteriorate the building material.

**Summer Management.** For mechanically ventilated barns in the summer it is best to keep the barn closed up and the exhaust fans and inlets operating to limit temperature rise inside the barn. Internal circulation fans can be used to increase airflow over horses but these do not exchange air in the building like the sidewall exhaust fans and should only be used to provide additional animal cooling. Under some special conditions, evaporative cooling systems, such as direct animal sprinklers or air inlet evaporative pads in the walls, have been installed in horse buildings. If a mechanical ventilation barn was only designed for the fall, winter, or spring periods (equal or less than 125 cfm/1,000 lbs of horse), then during the summer, open up the building and use natural ventilation. As soon as large doors and/or windows are opened up, exhaust fans are no longer of any benefit and should be turned off. If circulation or mixing fans are in the barn, they should be used to help

move air over animals but keep in mind that air exchange will be dependent completely on wind forces for these types of barns.

**Air Inlet(s) Location.** Contrary to popular belief, the way to eliminate dead air spaces in a mechanically ventilated barn is to place well distributed air inlets throughout the barn, not exhaust fans. Exhaust fan(s) location has little to no impact on the barn's air distribution. In a properly designed and operating mechanically ventilated barn, there will be a slight negative pressure and fresh air will enter the barn through any inlets and will provide fresh air to animals. To obtain good air quality in a boxstall setting, make sure there is one or more air inlets located near the boxstall.

**Additional Information.** The MidWest Plan Service sells a *Horse Facilities Handbook* for \$43.00 plus shipping and handling. Go to <http://www.mwps.org>; click on livestock, then horses. Detailed information can also be obtained in the Penn State publication *Horse Stable Ventilation* which can be found at <http://pubs.cas.psu.edu/freepubs/pdfs/ub039.pdf>

By: Larry Jacobson, PhD and Chuck Clanton, PhD, Univ. of Minn.

## Ask the Expert: Carcass Burial

By: Krishona Martinson, PhD, Univ. of Minn.

**Q:** Where it is illegal to bury a chemically euthanized horse and why?

**A:** Legal options for horse carcass disposal in Minnesota include burial, composting, cremation, rendering, fur farm use and pet food. The Minnesota Department of Agriculture (MDA), Department of Natural Resources (DNR), Pollution Control Agency (PCA), and Board of Animal Health (BAH) regulate carcass disposal. Burial can be the

most cost effective way of disposing of a carcass (if you own equipment to prepare the site), but may not be an available option in all areas of the state. The BAH states that the carcass must be five feet above the high water level, covered with three feet of soil, and not in soils that are within 10 feet of bedrock. If your burial site meets these requirements, then burial of a chemically euthanized horse is a legal option. These regulations are

in place to prevent contamination of groundwater and to prevent exposure of the carcass to burrowing, digging, or scavenging animals, especially birds like bald eagles.

In some areas of the state (because of high water tables and the abundance of bedrock) it is not possible to meet the BAH criteria listed above. Therefore, in these areas of the state, burial of any equine carcass is not a legal option.