

Livestock Health Series

Horse Health, Diseases and Vaccinations

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Introduction

A horse health management plan is vital to maximize the health, productivity and performance of horses. It is unfortunate that some horse owners do not implement a health management plan until a crisis arrives. The investment in disease and parasite prevention is less than the cost of disease treatment. Many horse health problems can be controlled with good management, proper nutrition, pasture management, dental care, parasite control, training/exercise routines, sanitation and vaccination against infectious diseases.

A good horse health management program will vary, depending upon the type of operation and geographical location in Arkansas. The purpose of this fact sheet is to provide horse owners a basis for developing their own health management plans. It is important to contact your veterinarian to determine if additional vaccinations, parasite control measures or management practices are required for your area.

Vital Life Signs

The first step in learning about horse health is to recognize the normal signs in a healthy horse. Normal vital signs are listed in Table 1. The vital signs (commonly referred to as T-P-R) include temperature, pulse rate and respiration rate.

Horsemen must recognize that each horse can vary a bit from the norm. The variation depends on the horse's conformation, metabolism, age, season of the year, normal use, exercise programs and general condition. Therefore, it is best to examine each horse on a regular basis and record its individual vital signs.

The horseman should also document the horse's individual peculiarities, including personality, appetite, behavior and reaction to common stimuli. Recognition of a change in the normal behavior of a horse may alert you that something is wrong and allow time to take measures to prevent anything serious from developing.

Table 1. Vital Signs

Age	Temperature	Pulse Rate	Respiration Rate
Adults	100 - 101.5 F	28 - 40	8 - 15
Foals	Up to 102 F	70 - 90	15 - 20
6 - 12 months	Up to 102 F	45 - 60	15 - 20
2 - 3 years	101 - 101.5 F	40 - 50	8 - 15

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Temperature of the average horse is approximately 100 to 101.5 degrees F. However, a horse may vary from the so-called normal temperature and still be healthy. Temperatures of foals will usually be higher than mature horses. Factors that may cause temperature variation in the individual horse include time of day, age and sex of the animal, ambient temperature, wind, precipitation, level and intensity of activity, as well as disease state.

Like temperature, both pulse and respiration rates can be influenced by any of the above-mentioned factors. Younger horses, especially foals, will have higher pulse and respiration rates than mature horses under the same conditions. Normal pulse rates for the resting horse are in the range of 28 to 40 beats per minute, while respiration rates are normally 8 to 15 breaths per minute. Fitness of the horse has an effect on these rates and on how rapidly the horse returns to normal after physical exercise. The respiration rate should always be lower than the pulse rate. A respiration rate higher than the pulse rate is known as an "inversion" and is indicative of a serious problem requiring immediate attention.

Common Diseases

It is important for horsemen to practice disease prevention when managing horse farms or keeping individual horses healthy. Every farm or stable should have an area where new or sick horses can stay in isolation. New horses should stay in isolation for two to three weeks. During this time, the horse should be observed closely for any signs of illness. If the horse is going to develop a disease, it should exhibit symptoms within three weeks or so. However, there are some exceptions. There are some diseases that remain latent and do not fit into the two- to three-week period.

Sick horses should stay in quarantine for the length of the illness or until they are no longer contagious. Consult with your veterinarian about the specific length of time horses should remain in isolation relative to each disease. One must disinfect any tools and equipment that have come in contact with ill or suspect horses before using them on healthy animals.

Equine Infectious Anemia

Equine infectious anemia, also referred to as swamp fever, is a serious viral disease that has caused much controversy among horse owners. The E-I-A virus is a member of the *Lentivirinae* subfamily of retroviruses.

The disease takes one of three forms: acute, chronic or inapparent. A horse suffering from the

acute form will have a high fever and will exhibit depression, weakness, poor appetite, weight loss, anemia and usually death. Fluid accumulation may appear under the skin and in the chest, abdomen and legs. The chronic form is less severe than the acute form, and an infected horse may survive; however, the result is a lingering, unthrifty horse that gradually becomes weaker.

Horses suffering from inapparent E-I-A are carriers of the virus but do not display symptoms of the disease. Such horses test positive to the Coggins Test but remain apparently healthy. Research has shown that some inapparent carriers will develop the acute or chronic form.

Transmission of EIA is primarily by biting insects and contaminated needles or other surgical instruments. There is no vaccine against EIA, and there is no specific treatment for infected horses. In Arkansas, positive horses must be sent to slaughter, donated to a research facility for EIA or be humanely destroyed. All horses in Arkansas are required to have a negative test (Coggins Test) for EIA. Horses must be tested every 12 months, or within 6 months of being sold.

Tetanus

Tetanus is caused by *Clostridium tetani*, a spore-forming, toxin-producing bacterium which is present in the soil on all horse facilities. Horses contract tetanus from the soil through deep puncture wounds, lacerations, surgical incisions and exposed tissues. Horses that are infected with tetanus seldom survive.

All horses should be vaccinated against tetanus using tetanus toxoid to produce active immunity. Available tetanus toxoid vaccines are relatively inexpensive, safe and induce solid, long-lasting immunity. Primary vaccination involves administration by intramuscular injection of two initial doses one month apart, followed by an annual booster.

Equine Encephalomyelitis (Sleeping Sickness)

In the United States, equine encephalomyelitis is caused by either eastern encephalomyelitis virus (EEE) or western encephalomyelitis virus (WEE). Outbreaks of WEE have been recorded throughout the United States, whereas the distribution of EEE is restricted to the eastern and southeastern states. Venezuelan equine encephalomyelitis occurs in South and Central America but has not been diagnosed in the USA for more than 20 years.

Mosquitoes, and occasionally other blood-sucking insects, acquire the encephalomyelitis virus from wild birds and rodents and transmit it to horses.

Humans are also susceptible to the disease if bitten by infected mosquitoes.

Vaccination with one of the many bivalent encephalomyelitis vaccines containing EEE and WEE initiates effective control of these diseases and is highly recommended for all horses. Primary immunization of unvaccinated horses involves intramuscular administration of two doses of EEE and WEE vaccines 3 to 4 weeks apart.

Annual revaccination is best completed in the spring, prior to peak insect vector season. Annual encephalomyelitis immunization can conveniently be combined with tetanus and, where appropriate, influenza, rhinopneumonitis and Potomac horse fever vaccines.

Influenza

Influenza is one of the most common infectious respiratory diseases of horses. The disease is highly contagious and spreads rapidly through groups of horses by coughing. The virus can travel distances of 35 yards to infect horses. Feeding, bedding and grooming equipment, tack, common facilities, trailers and handlers may also spread the virus.

Strict isolation of infected horses to a separate airspace is crucial for controlling the spread of an outbreak. Control of influenza is complicated by the fact that, following recovery, immunity to the virus persists for little more than one year. In addition, the influenza viruses are continually evolving and changing in an attempt to avert the immune defense of the horse.

Vaccination against influenza is highly recommended for all horses which have significant exposure to horses from outside facilities, such as boarding stables, breeding farms, racetracks, training centers, trail rides, shows and similar athletic events. Primary vaccination for influenza involves intramuscular administration of two doses, 3 to 4 weeks apart. Thereafter, booster vaccinations are indicated at 2- to 12-month intervals depending on the age of the horse, the risk of acquiring infection and the duration in which the risk is high. Revaccination of young, competitive horses every 3 months is recommended to provide optimal protection. A wider interval of 4 to 6 months may be adequate in mature horses more than 5 years of age which have been on a regular influenza vaccination program for several years.

Rhinopneumonitis

Rhinopneumonitis is now recognized to be two distinct diseases caused by equine herpesvirus type 1

(EHV-1) and equine herpesvirus type 4 (EHV-4). Both EHV-1 and EHV-4 infect the respiratory tract causing signs of mild fever and transient nasal discharge or more severe influenza-like disease characterized by high fever, lethargy, loss of appetite, nasal discharge and coughing. In addition, EHV-1 causes abortion in pregnant mares, the birth of weak foals and a paralytic neurologic disease.

The primary indications for equine herpesvirus vaccines are 1) prevention of EHV-1 abortion in pregnant mares and 2) prevention of respiratory disease in foals, weanlings, yearlings and young performance and show horses. It is strongly recommended that all pregnant mares be vaccinated during the fifth, seventh and ninth month of gestation using the approved, inactivated EHV-1 vaccine.

Immunity following vaccination appears to be short-lived, and it is recommended that foals, young horses and performance or show horses at high risk be revaccinated at 3-month intervals, as with influenza. Combination vaccines containing influenza and herpes viruses are convenient for booster vaccinations against these respiratory viruses in high-risk horses.

Strangles

Strangles is a highly contagious disease caused by the bacterium *Streptococcus equi*. The disease is most often a problem on breeding farms and affects primarily young horses (weanlings and yearlings), although horses of any age can be affected if not protected by previous exposure to the disease or by vaccination.

In recent years, there have been several outbreaks of strangles in older horses in certain regions of Arkansas. Affected horses have fever, depression, sore throat, pain when eating, cloudy nasal discharge and enlarged lymph nodes that ultimately abscess and drain white, creamy discharge on the skin surface. Enlarged lymph nodes may compress the pharynx and trachea causing swallowing problems or breathing difficulty, hence the name "strangles." Some horses develop serious secondary problems, including internal abscesses ("bastard strangles"), pneumonia and swelling of the limbs.

Many horse owners have been reluctant to vaccinate for strangles because the older vaccines caused injection-site reactions. New vaccines have reduced reactions and have been proven more effective. Strangles vaccination is not routinely recommended except on premises where strangles is a persistent endemic problem or for horses being transported to high-risk facilities.

Table 2. Suggested Immunization Schedule for Horses^a

Diseases/Vaccine	Foals/Weanlings	Yearlings ^b	Performances/Show Horses ^b	On-Farm Horses ^b	Broodmares ^b	Comments
Tetanus Toxoid	1st dose: 3-4 mo. 2nd dose: 4-5 mo.	Annual	Annual	Annual	Annual, 4-6 wk. before foaling	Conveniently
Encephalomyelitis (EEE, WEE)	1st dose: 3-4 mo. 2nd dose: 4-5 mo.	Annual, spring	Annual, spring	Annual, spring	Annual, 4-6 wk. before foaling	Conveniently
Influenza	1st dose: 3-6 mo. 2nd dose: 4-7 mo. 3rd dose: 5-8 mo. (see text) Repeat at 3 mo. intervals	Every 3 mo.	Every 3 mo.	Biannually	At least biannually with one booster timed 4-6 wk. pre-foaling	A series of at least 3 doses is recommended for primary immunization for foals (see text). Use combination vaccines for pre-foaling and spring boosters.
Rhinopneumonitis (EHV-1 & EHV-4)	1st dose: 2-3 mo. 2nd dose: 3-4 mo. 3rd dose: 4-5 mo. (see text) Repeat at 3 mo. intervals	Every 3 mo.	Every 3 mo.	Optional: biannually if elected	5th, 7th, 9th mo. of gestation (Inactivated EHV-1 vaccine) (see comments)	If primary series is started before 3 months of age, a 3-dose primary series is necessary. Vaccination of mares pre-breeding and 4-6 weeks pre-foaling with EHV-1 and EHV-4 is also recommended.
Rabies	1st dose: 3-4 mo. 2nd dose: 4-5 mo.	Annual	Annual	Annual	Annual, before breeding	Rabies vaccination recommended in endemic areas.
Strangles	1st dose: 8-12 wk. 2nd dose: 11-15 wk. 3rd dose: 14-18 wk. (depending on product used) 4th dose: weaning 6-8 mo.	Biannual	Optional: biannual if risk is high	Optional: biannual if risk is high	Biannual with one dose timed 4-6 wk. pre-foaling	Vaccines containing M-protein extract are preferred over whole cell vaccines. Use when endemic conditions exist or risk is high.
Potomac Horse Fever (PHF)	1st dose: 3-4 mo. 2nd dose: 4-5 mo.	Biannual	Biannual	Biannual	Biannual with one dose timed 4-6 wk. pre-foaling	PHF vaccination recommended only in known endemic areas. Foals from vaccinated mares should be vaccinated at monthly intervals up to 6 mo. of age to ensure protection.
West Nile Virus (WNV)	1st dose: 3-4 mo. 2nd dose: 4-5 mo.	Annual, spring	Annual, spring	Annual, spring	Annual, spring	Annual, 4-6 wk. before foaling

^a All horses should be vaccinated against tetanus and encephalomyelitis. Other vaccines recommended depending on risk of infection.

^b Assuming primary series was completed during foalhood; otherwise follow label directions for primary immunization. Stallions and barren mares should follow the same program as broodmares with biannual Rhinopneumonitis booster vaccination substituted for Rhinopneumonitis program recommended for pregnant mares. Products containing EHV-4 may be indicated in foals, weanlings, yearlings, performance/show horses and pleasure horses, because a large proportion of EHV respiratory infections are caused by EHV-4.

Rabies

Rabies is an infrequently encountered neurologic disease of horses which results when horses are bitten by infected (rabid) wildlife such as skunks, raccoons, foxes and bats. Bites are most often on the muzzle, face and lower legs. Even though the incidence of rabies in horses is very low, the disease has considerable public health significance. Several rabies vaccines are approved for horses and seem to be safe and effective.

Potomac Horse Fever

Potomac Horse Fever (equine monocytic ehrlichiosis) is caused by a parasite, *Neorickettsia risticii*, and was originally described in 1979 as a sporadic disease affecting horses residing in north-eastern states of the U.S. near the Potomac River.

Although the disease remains most prevalent in the eastern states, it has now been identified in many regions of the U.S., including parts of Arkansas.

The disease is not directly contagious from horse to horse, and it is transmitted by an insect vector or by drinking water that contains infected insects such as mayflies, caddisflies and dragonflies. Potomac horse fever is a seasonal disease, with most cases being identified in late spring to early fall and being located near lakes or rivers.

Vaccination is strongly recommended for horses in or being transported to areas that have a history of the disease. A two-dose primary series administered 3 to 4 weeks apart results in peak protection 3 to 4 weeks after the second dose. Revaccination at 6- to 12-month intervals is recommended.

Equine Protozoal Myeloencephalitis

Equine Protozoal Myeloencephalitis (EPM) is a neurologic disease of horses caused by the protozoan *Sarcocystis neurona*. This disease agent is common throughout most of the continental United States. Some serological surveys suggest that as many as 50 percent of the horses in the U.S. may have been exposed to this disease-causing organism. However, the number of horses that come down with disease is low. Outbreaks of the disease are typically sporadic and isolated. It can be attributed to levels of stress in the horses or infection patterns as dictated by the source of the infection, the opossum.

The opossum acts as the definitive host for the disease. It transmits the infectious agent by shedding it through its feces. Horses usually become exposed when they ingest contaminated feed, water, hay or pasture forage. This disease can affect horses of any age or breed, but the horse becomes a dead end host and cannot continue to transmit the disease.

Once inside the horse's body, the protozoan eventually moves to the brain or spinal cord and attacks the central nervous system causing neurologic signs to develop. Clinical signs most commonly seen with the disease typically begin with a slow onset but can appear acutely. These signs may be asymmetric and can be varied depending upon what part of the brain or spinal cord the organism has infected. Signs can range from subtle incoordination, weakness, poor balance or stability, droopy lip or eyelid, muscle atrophy, dragging a toe, complete paralysis and death.

Diagnosis of EPM can be difficult. Since many horses are exposed to the protozoan, many will already have a positive blood test. Other testing can be performed on the fluid from the spinal column. However, since spinal taps can be of some risk and difficult to perform, many times treatment is begun based on a positive blood test plus the demonstration of clinical signs.

Treatment for EPM can be expensive, but it has been shown to be effective against the disease. Recovery may be variable depending on how

progressed the disease was before treatment was initiated. Prevention measures should focus on controlling opossums around stables and storing feed in sealed containers.

West Nile Virus

West Nile is caused by a virus that is readily transmitted by mosquitoes. Birds aid in the dissemination of this disease. They act as reservoirs and propagators for the virus. Mosquitoes pick up the virus from infected birds and pass it on to other hosts such as horses and humans. According to the Center for Disease Control, "over 110 species of birds are known to have been infected with West Nile." Some birds become ill and die when infected with the virus, while others may show no significant symptoms and survive to perpetuate the disease.

Clinical signs are variable in the horse and are associated with neurologic disease. Signs can include muscle weakness, stumbling, poor motor coordination, loss of appetite, lethargy, fever, impaired vision, circling, head pressing, recumbency, convulsions, coma and death. These symptoms may also be seen with other diseases such as eastern encephalitis, equine protozoal myeloencephalitis (EPM) and rabies.

Prevention of West Nile is best accomplished by vaccination along with an integrated mosquito control program. Timing can be important for the yearly vaccination. In order to stimulate protective antibody levels, it should be given approximately 4 weeks before exposure to mosquitoes is expected.

As was stated above, mosquitoes are an essential link in the propagation and spread of this disease. Therefore, actions taken to minimize mosquito populations are very important. The mosquito population can be minimized by eliminating standing water to prevent mosquito breeding. If possible, keep horses stabled or provide screened housing during dusk, dawn and night when mosquito feeding peaks. Repellants can be used on horses to decrease mosquito feeding as well as fogging the premises with insecticide to control adult mosquitoes.

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