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# Mosquito Borne Diseases: Eastern and Western Equine Encephalomyelitis and West Nile Virus – Prevention is Just a Vaccine Away!

Jenifer Nadeau
*University of Connecticut Department of Animal Science*

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# FACT SHEET

Department of Animal Science, University of Connecticut

**Effective Horse Management - Fourth in the Horse Health Series**

# Mosquito Borne Diseases: Eastern and Western Equine Encephalomyelitis and West Nile Virus – Prevention is Just a Vaccine Away!

Dr. Jenifer Nadeau, University of Connecticut Equine Extension Specialist
Dr. Sandra Bushmich, University of Connecticut Extension Veterinarian

Mosquitoes cause three of the major diseases that affect horses today. Eastern and Western Equine Encephalomyelitis have been around for many years and can be caused by mosquitoes or arthopods, and by now you have probably heard of West Nile Virus that recently emerged and became a problem in the last few years. Knowing the cause, clinical signs, treatment and prevention of these diseases are important, since letting these diseases go untreated can lead to the demise of your favorite horse.

Eastern equine encephalomyelitis (EEE) is definitely still a concern in the United States. Western equine encephalomyelitis (WEE) is recognized in reservoir bird hosts in the eastern United States, but clinical disease is rarely identified. The Togaviradae virus found in wild birds, transmitted to horses and humans via the bite of an infected mosquito, causes EEE and WEE. Horses do not develop high enough levels of the EEE or WEE virus in their blood to be contagious to other animals or humans. Horses are sentinels for human beings in a given area, because generally, increased numbers of horse cases precede cases in human beings by 2-5 weeks. Clinical signs in people include fever, headache, confusion, stupor and seizures, with a 5-15% mortality rate.

The acute (sudden) clinical signs of EEE and WEE are nonspecific and include mild to severe fever (103-106° F) that lasts 24 to 28 hours and may not be detected, poor appetite, and stiffness. Many cases of WEE do not progress beyond this point. With EEE, progression is nearly certain. An incubation period of 1-3 weeks then occurs. As the disease progresses, clinical signs include propulsive walking, depression, and somnolence to aggression and excitability. Some horses may become frenzied after any stimulation. The later signs indicate the increased severity of brain dysfunction and include head pressing, propulsive walking, blindness, circling, head tilt and facial and appendicular (limbs) muscle fasciculations (trembling or twitching). Paralysis of the pharynx, larynx and tongue are common. Defecation and urination become difficult. Complete paralysis and death is often preceded by recumbency (lying down, unable to get up) for 1-7 days. This final stage may appear 2 to 4 days after the first signs appear. Animals that are comatose rarely survive. If animals do survive, they show gradual improvement of function over weeks to months. **You should call your veterinarian immediately if you suspect that your horse has EEE or WEE.** Treatment for EEE or WEE is supportive care. Horses will have immunity from these diseases for up to 2 years after infection, but may have permanent brain damage. The mortality rate for EEE is 75-100%. The mortality rate for WEE is 20-50%. A vaccine is available for EEE and WEE, it is a combination vaccine. This combination vaccine can be a "3- way" or "4-way" combination. The "3-way" combination vaccine, or 3 in 1, protects against EEE, WEE, and tetanus. The "4-way" combination vaccine or 4 in 1, protects against EEE, WEE, tetanus, and influenza. According to a prominent Connecticut veterinarian, at this time it is recommended that vaccination occur once per year in central and northern Connecticut. Along the coast, several veterinarians vaccinate every six months since mosquitoes will be present for a longer period of time. If you plan to go south in the fall or winter, you should vaccinate twice per year. These vaccines are thought to protect for 6-8 months, so vaccination in April to protect the horse until October is usually recommended.

West Nile Virus (WNV) is a potentially deadly disease that can affect horses and humans. This flavivirus, similar to WEE and EEE, is found in wild birds and transmitted to horses and humans via the bite of an infected mosquito, and just began appearing in 1999. No evidence suggests that horses can transmit the virus to humans or other horses. Some people get mild flu-like symptoms such as fever, headache, body aches or even a mild rash when infected. In some individuals, West Nile Virus can cause *encephalitis*, which is a severe infection of the brain, or *meningitis*, which is an infection of the lining of the brain and spinal cord. Signs and symptoms of these serious infections include a sudden and severe headache, high fever, stiff neck, muscle weakness, tremors, convulsions, confusion and loss of consciousness or coma. In a minority of cases, these infections can cause death. There is a 4-47% mortality rate in humans.

In horses, the virus usually appears in the blood three to eight days after a horse is infected with WNV and clinical signs appear shortly after that. In a small percentage of cases, WNV overwhelms the immune system and penetrates the blood-brain barrier resulting in inflammation of the brain and spinal cord called West Nile encephalitis. Clinical signs include: loss of appetite and depression, fever (101° F or higher for two or more days), weakness of hind limbs, paralysis of hind limbs, muscle fasciculations (twitching or trembling), impaired vision, ataxia (incoordination), head pressing, head tilt, aimless wandering, convulsions, paralysis of the muzzle or tongue, droopy ear,

vertigo, drowsiness, narcolepsy, inability to swallow, circling, hyperexcitability or coma. Horses that are recumbent and reluctant to rise are least likely to survive. **You should call your veterinarian immediately if you suspect that your horse has WNV.** Treatment for WNV is supportive therapy including the administration of anti-inflammatory medications (sometimes including corticosteroids) and intravenous fluids. There is a 30-40% mortality rate in horses. A fully licensed vaccine is available for horses. Vaccination in Connecticut is similar to that for EEE and WEE: at this time it is recommended that vaccination occur once per year in central and northern Connecticut. Along the coast, several veterinarians vaccinate every six months since mosquitoes will be present for a longer period of time. If you plan to go south in the fall or winter, you should vaccinate twice per year. These vaccines are thought to protect for 6-8 months, so vaccination in April to protect the horse until October is usually recommended.

It can be difficult to tell whether you are dealing with EEE or WNV. Typically, horses with WNV have lower fevers than horses with EEE (101° F for WNV vs. 103-106° F for EEE). EEE is also more progressive in clinical signs. EEE cases generally have more severe neurological symptoms related to brain and spinal cord damage than horses with WNV. Horses that have EEE typically do not respond to Banamine or steroids that will help in cases of WNV.

Prevention of all three of these diseases should be aimed at vaccinating and reducing the mosquito population:

- **Keep up to date on your horse's vaccinations** and vaccinate against EEE, WEE, and WNV annually in the spring. Vaccinate once a year if you live in northern or central CT. Twice per year if you live near the coast or plan to go south with your horse in the fall or winter.
- **Use insect repellents** to prevent bites.
- **Avoid outdoor activities at dawn and dusk** or turning out horses at dawn and dusk when mosquitoes are most active. When you must be outdoors at dawn and dusk, wear long sleeves and long pants in addition to using insect repellent.
- **Use fans** in buildings (mosquitoes are poor fliers in wind).
- **Cover horses** with fly sheets.
- **Feed animals away from stagnant water**.
- **Remove standing water** such as water in old tires, pet bowls, kiddie pools, birdbaths, flower pots, buckets, etc. Overturn wheelbarrows and muck buckets not in use. When possible, drill holes in containers that must be left outside. Drain water tubs and turn them over when paddocks or fields will be unoccupied more than a week. During summer months, empty and scrub out water troughs once a week to dump out breeding larvae or contact your local health department, mosquito-control program or pest-control operator for information on larvicides approved by the Environmental Protection Agency. Fill in ditches, depressions, and other areas that tend to collect stagnant, dirty water.
- **Keep gutters clear** of leaves and debris along barns and outbuildings.
- **Avoid turning lights on inside or near stables after dusk** and place incandescent bulbs around the perimeter of the barn to lure mosquitoes away from the horses.

The old saying "an ounce of prevention is worth a pound of cure" is certainly true when it comes to these diseases. Taking the time to help prevent these diseases will save you a lot of heartache, money and time caring for your sick horse. Implement a mosquito control program on your property today, and remember to vaccinate!

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