

Just the Facts... Mosquitoes can transmit many viral diseases to horses as well as to humans. The most prevalent mosquito-borne diseases in the U.S. are, **West Nile virus (WNV)**, **Eastern equine encephalitis (EEE)**, **Western equine encephalitis (WEE)** and **Venezuelan equine encephalitis (VEE)**. As their names suggest, EEE impacts areas in the U.S. East of the Mississippi and WEE is found in the Midwest and Western portions of the U.S. As of August 2014, WNV has been reported in all States except Alaska and Hawaii. VEE is mostly seen in Central and South America, but outbreaks of VEE have occurred in Southern portions of the U.S. Outside the U.S. EEE, WEE and VEE are found throughout the western hemisphere while WNV is found worldwide.

How do horses become infected?

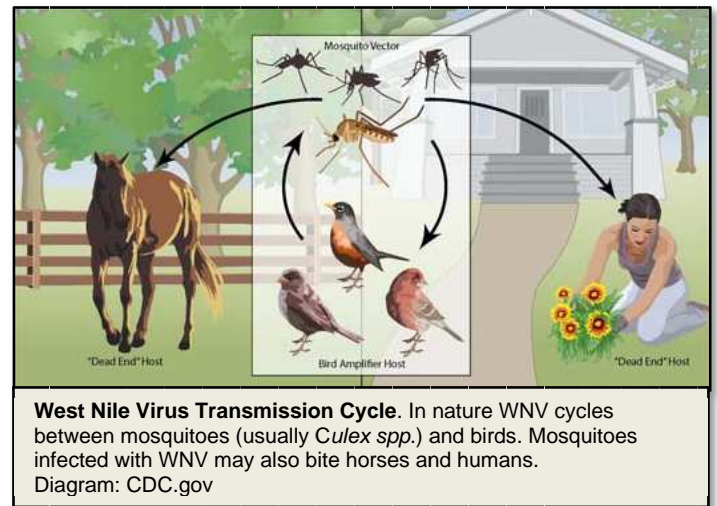
Horses contract these viral diseases through the bite of an infected mosquito. Mosquitoes acquire these viruses by feeding on infected birds (EEE, WEE, WNV). Infected mosquitoes can then transmit the virus to other birds, as well as to humans and horses. In the case of VEE, mosquitoes feed on infected rodents or other infected horses.

Have there been many cases of these diseases in horses?

- In 1999, the United States had their first 25 reported cases of equine WNV. Since 1999, all states have reported cases of WNV in horses with the exception of Alaska, Hawaii and Maine. For 2013 the USDA Animal and Plant Health Inspection Service' (APHIS) reported a total of 338 equine cases of WNV from 39 States. The mortality rate for horses that develop clinical symptoms of WNV infection is approximately 33%.
- In 2013, APHIS reported 181 equine cases of EEE from 22 States. The mortality rate for horses that develop clinical symptoms of EEE infection ranges between 75-95%.
- WEE affects horses less severely than EEE with a mortality rate of 20-40% in horses that show clinical symptoms.

What are the symptoms of WNV, WEE and EEE in horses?

- When infected by WNV, most horses only develop mild or inapparent infections. In more susceptible horses, the virus leaves the blood stream, crosses the blood brain barrier and enters the brain causing inflammation (encephalitis). The virus then interferes with normal functioning of the horse's central nervous system which leads to severe clinical symptoms. These symptoms include ataxia (stumbling, wobbly gait, and incoordination) circling, hind limb weakness, inability to stand, altered mental status, blindness and lip droop/paralysis. Clinical symptoms can involve behavioral changes including somnolence, listlessness, apprehension or periods of hyperexcitability may occur. Other common symptoms can include colic, lameness, anorexia and fever.
- Eastern and Western equine encephalitis symptoms are very similar in horses, although the disease progression of EEE may be shorter than WEE. The initial symptoms include fever, anorexia and depression. In severe clinical cases, this initial stage is followed by encephalitis, altered mental activity, hypersensitivity to stimuli, involuntary muscle movements, impaired vision, aimless wandering, head pressing, circling, an inability to swallow, ataxia, paresis, paralysis and convulsions may be seen.
- Infections with VEE may present as either encephalitic disease or as simply a febrile disease without profound neurologic signs. VEE infected horses may die after a very acute course, even without any neurologic signs.
- All three diseases have very similar clinical symptoms with each other as well as other diseases seen in horses (e.g., rabies, neurological form of Equine Herpes Virus, Equine Protozoal Myelitis).



**Diagnosis cannot be based on symptoms alone;
consult your veterinarian to determine a definitive diagnosis.**

Are there specific treatments for horses infected with WNV, WEE, EEE or VEE?

There are no specific treatments for horses infected with WNV, WEE, EEE or VEE. However, the symptoms and complications of these diseases can be treated with supportive therapy that is consistent with standard veterinary practices for animals infected with a viral agent. There is no reason to euthanize a horse just because it has been infected with a virus. Data suggests that horses can recover from these infections, especially those infected with WNV and WEE. Consult your veterinarian for more details about symptoms and supportive care.

Can I get infected with these diseases by caring for an infected horse?

These viruses are transmitted by infectious mosquitoes. There is no documented evidence of person-to-person or horse-to-person transmission. Normal veterinary infection control precautions should be followed when caring for a horse suspected to have any viral infection.

Can a horse infected with one of these viruses infect horses in neighboring stalls?

There is no documented evidence that WNV, EEE or WEE are transmitted between horses or that infected horses can infect mosquitoes. Horses infected with VEE can infect mosquitoes that feed on them. There are also reports of VEE being transmitted through open wounds or animal bedding. Horses with suspected viral infections should be protected from mosquito bites as much as possible.

Are there equine vaccines available for these diseases?

USDA licensed vaccines are currently available for WNV, EEE, WEE and VEE. Horse owners in the U.S. should consider vaccinating their horses. Limited studies have been performed that examine vaccine protection for pregnant mares. None of the licensed vaccines are specifically labeled for administration to pregnant mares at this time. Consult your veterinarian for more details on types and timing of vaccinations for your horses and pregnant mares.

Will vaccinating my horse against one viral disease provide protection against the others?

No, the EEE and WEE vaccines do not protect against WNV and vice versa. The EEE and WEE belong to a different family of viruses for which there is no cross-protection.

Consider having your horse vaccinated against WNV, EEE, WEE and VEE. Discuss this option with your veterinarian.

What else can I do to protect my horse from mosquito bites and the diseases they transmit?

- Eliminate mosquito breeding sites. Mosquitoes can breed in any puddle that lasts more than 7 days.
- Keeping horses in barns at night with the doors closed may help in reducing the occurrence of mosquito bites. Window and door screening should be well maintained. Use of fans in the barn may also reduce the biting ability of mosquitoes.
- Use of insect repellents may offer some protection, but the duration of effectiveness is relatively limited. Be sure to use only those products that are approved and labeled for animal use and follow label directions carefully. A formulation that contains a synthetic pyrethroid compound (such as permethrin) may offer the best combination of safety and efficacy.

Where can I get more information on horses and mosquito-borne diseases?

- APHC Western Equine Encephalitis Fact Sheet 18-045-0714: http://phc.amedd.army.mil/PHC%20Resource%20Library/WesternEquineEncephalitis_FS-18-045-0714.pdf
- APHC Eastern Equine Encephalitis Fact Sheet 18-020-0414: http://phc.amedd.army.mil/PHC%20Resource%20Library/EasternEquineEncephalitis_FS-18-020-0714.pdf
- The U.S. Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services at http://www.aphis.usda.gov/animal_health/animal_dis_spec/horses/
- Centers for Disease Control and Prevention: Eastern Equine Encephalitis information: <http://www.cdc.gov/EasternEquineEncephalitis/>
- West Nile Virus information: <http://www.cdc.gov/westnile/>



Equine vaccines are available for WNV, EEE, WEE and VEE. Discuss this option with your veterinarian. Photo: Ellen Stromdahl, APHC