# Western Equine Encephalitis (WEE) Disease Guidelines

**Summary**
Western Equine Encephalitis (WEE) is an arbovirus (arthropod-borne virus) of potential significance to the equine population. WEE, along with Eastern Equine Encephalitis and Venezuelan Equine Encephalitis, is an alphavirus in the family Togaviridae.

In the United States, cases have principally occurred in the western US and very infrequently in parts of the Midwest. While large equine outbreaks have occurred historically, **no equine cases have been reported in the US since 1999**. The most important mosquito vector of this disease is *Culex tarsalis*.

*Note: WEE, just like EEE, is a reportable disease; consult your State Animal Health Official when disease is confirmed.*

**Clinical Signs**
The clinical signs of WEE are highly variable, and none are pathognomonic:

- Moderate to high fever 102.5–104.5°F (39.2–40.3°C)
- Lethargy
- Inappetence
- Signs of encephalitis include:
    - General neurologic symptoms: dysphagia, head pressing, tremors, weakness, ataxia, circling, blindness, dull or altered mentation, and seizures
    - Behavioral changes: somnolence, hyperexcitability, mania, self-mutilation
    - Cranial nerve dysfunction: nystagmus, facial nerve paralysis, and weakness of the tongue and pharynx
    - Coma
- Death

WEE generally affects horses less severely than EEE, with a mortality rate of 20–40% (compared to 90% with EEE). Horses that survive may have permanent neurologic deficits, including abnormal mentation and/or residual ataxia.

**Transmission**
Indirect transmission to horses occurs through bites from infected mosquitoes. Mosquitoes become infected after feeding on viremic avian hosts, which serve as natural reservoirs for the virus. Multiple animal species may seroconvert with or without the appearance of clinical signs; however, only those that develop significant and prolonged viremia can be considered amplifying hosts. Infected horses do not develop viremia of sufficient magnitude for

transmission and are therefore considered dead-end hosts. Horse-to-horse and horse-to-human transmission does not occur.

**Incubation Period**
2–21 days

**Diagnostic Sampling, Testing, and Handling**
**NOTE:** *Due to the lack of WEE cases in the US coupled with the regular occurrence of EEE in the US, practitioners should test for BOTH diseases simultaneously if there is a concern for either disease. Additionally, practitioners may consider additional risk-based testing (e.g., Venezuelan Equine Encephalitis in southern border states).*

**Serology**

- IgM-capture ELISA: This is the recommended test for suspected cases of acute WEE/EEE and is performed on single serum samples (red top tube) shipped refrigerated to laboratory by overnight courier. IgM titers ≥ 1:400 are confirmatory in horses exhibiting clinical signs consistent with WEE/EEE. Detection of IgM in CSF (if available) is even more conclusive, but death may occur in WEE/EEE cases prior to an intrathecal antibody response. While IgM titers are generally considered specific to natural infection (as opposed to vaccination) false positives may occur in horses vaccinated for WEE/EEE within the previous 30 days.
- PRNT titers (Plaque Reduction Neutralization Test): Acute and convalescent samples (red top tubes) collected 2–4 weeks apart and shipped refrigerated to the laboratory by overnight courier. Four-fold increase in titers between samples is considered confirmatory in horses exhibiting clinical signs consistent with WEE/EEE and not having been recently vaccinated. A single high PRNT titer in an unvaccinated animal may be indicative of WEE/EEE in horses exhibiting clinical signs consistent with WEE/EEE.
- Virus neutralizing (VN) antibody titers on paired serum samples taken 2–4 weeks apart may be performed in horses that survive, although this assay may have limited availability.

**CSF Analysis**

- CSF cytology on samples collected in EDTA generally display moderate mononuclear, neutrophilic, or mixed pleocytosis and elevated microprotein concentrations (usually >70 mg/dl).
- PCR and viral isolation may be attempted on CSF of clinically affected horses from an EDTA tube (or non-additive red top tube for PCR). Contact laboratory for further instruction regarding test availability and sample handing.

- IgM capture-ELISA may be performed on CSF. Negative results are possible if death occurs prior to intrathecal antibody production.

**PCR**

- PCR assays are available for CSF samples and brain tissue.

**Postmortem Findings**

**Histology Features**

- *Note: A rabies prevention protocol should be followed for ALL horses demonstrating signs of encephalitis that undergo postmortem examination. Any questions regarding testing of rabies-suspect animals should be sent to the applicable state health department prior to collection and submission of any samples.*
- Fix at least one-half of the brain for histopathology. Fresh brain should be submitted for concomitant PCR, virus isolation, immunochemistry, and rabies testing.
- For some neurologic cases, submission of the entire carcass to the diagnostic laboratory for postmortem examination is recommended due to the time and labor required to collect samples from the equine CNS.

**Shedding of Virus Following Resolution of Clinical Signs**

WEE-infected horses maintain very low levels of viremia and do not shed virus.

**Environmental Persistence**

Alphaviruses do not persist outside of the host and are susceptible to drying, ultraviolet light, and detergents.

**Specific Control Measures and Biosecurity Recommendations**

**Vaccination**

WEE is considered a core vaccine. See AAEP Vaccination Guidelines.

**Vector Management**

- Use insect repellents frequently; re-apply after rain
- Keep horses inside at dusk and dawn when mosquitoes are most active
- Eliminate or minimize standing water
- Stock tanks or ponds with mosquito-feeding fish
- Eliminate brush piles, gutters, old tires, and litter
- Remove all equipment in which standing water can collect

**Zoonotic Potential**

Horses are dead-end hosts for WEE and are not considered a source of infection for other horses, animals, or humans. Nonetheless, precautions are indicated when performing necropsy examinations on neurologic horses of unknown etiology.

**Additional Reading**

Toribio RE. *Arboviral Equine Encephalitides*. Vet Clin North Am Equine Pract. 2022 Aug;38(2):299-321. doi: 10.1016/j.cveq.2022.04.004. PMID: 35953146.

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