



## Mosquito-borne Encephalitis in Humans and Equine

### TRANSMISSION

Arthropod-borne viruses (e.g., “arboviruses”) include a group of viruses that can be transmitted to humans and horses by infected mosquitoes. These viruses may cause encephalitis (inflammation of the brain and spinal cord) and even death in some cases. Arboviruses have a worldwide distribution and several of them occur in the United States. In Florida, these viruses include: **St. Louis Encephalitis (SLE), Eastern Equine Encephalitis (EEE) and, West Nile Virus Encephalitis (WNV).**

These viruses are maintained in nature (i.e., natural cycles) through continuous transmission between reservoir hosts (birds and rodents) and mosquitoes. This is known as the “mosquito-bird-mosquito” cycle. This natural cycle usually remains undetected until some ecological change (i.e., heavy rains) disturbs the cycle and the virus escapes the natural foci. When this occurs, the chance for spread to humans and horses is enhanced. People and horses can develop clinical illness, but are considered to be “dead-end” hosts. This means they do not contribute to the disease transmission cycle because they do not maintain sufficient levels of the virus in their blood to infect mosquitoes or other mammals.

### SEASONAL ACTIVITY

Most cases of arboviral encephalitis in the United States occur from May to September when mosquitoes are most

active. However, in Florida, while most cases occur during this period, cases of WNV and EEE have been reported throughout the year. Where the virus resides or how it survives the winter is unknown. It may be introduced by migratory birds in the spring or it may remain dormant within the natural foci. With the onset of spring, the virus reappears in the birds and mosquitoes and may escape the natural cycle and transmit the virus to humans, horses and other hosts.

### TRANSMISSION CYCLE

Mosquitoes become infected when they feed on infected birds, which circulate high levels of the virus in their blood for a period of time. Infected mosquitoes can then transmit the viruses to humans and animals while biting to take a blood meal. The virus is located in the mosquito’s salivary glands. During blood feeding, the virus may be injected into a human or animal where it may multiply, causing illness. The disease is not directly transmitted between horses, from birds to horses, or from horses to humans.

### SIGNS AND SYMPTOMS IN HUMANS

The majority of human infections do not exhibit clinical disease. Some infections may result in nonspecific flu-like symptoms. Onset may be sudden with fever, muscle pain and a severe headache. Infection may, however, lead to encephelomyelitis with a fatal outcome. Fortunately, only a small proportion of infected persons progress to the severe encephalitic form, especially with EEE.

### SIGNS AND SYMPTOMS IN EQUINE

Arboviral infection can cause encephalitis, an inflammation of the brain, that is accompanied by a variety of neurologic disorders including:

- Ataxia, characterized by stumbling, staggering, wobbly gait more often affecting the rear limbs
- Weakness
- Lying down with difficulty and inability to rise
- Facial paralysis or twitching

- Teeth grinding
- Blindness
- Convulsions
- Death occurring in  $\geq 90\%$  of clinical cases of EEE

### TREATMENT

Because the arboviral encephalitides are viral diseases, antibiotics are ineffective and there are no effective antiviral drugs available for treatment. Therefore, the only treatment available is supportive care of the person or horse.

### PREVENTION

There are no commercially available human vaccines for these arboviral diseases in the United States. Equine vaccines are available for EEE and WNV. Current prevention relies on vaccination of horses and avoidance of exposure to mosquitoes, which includes:

- Eliminating mosquito-breeding sites such as stagnant water in birdbaths, flowerpots and old tires
- Keeping away from ponds, marshes or wetlands
- Staying indoors at dusk and dawn, the periods of greatest mosquito activity
- Applying insect repellents

### MOSQUITO CONTROL

There are several mosquito species in the United States that have tested positive for arboviral diseases and all are capable of transmitting these viruses to humans and horses. Communities are encouraged to eliminate areas of standing water and other potential mosquito breeding sites, reduce outdoor activity between dawn and dusk when mosquitoes are most





active, wear clothing that provides more skin coverage, and use mosquito repellent to avoid attracting mosquitoes. Insecticide applications by mosquito control programs may also be implemented to reduce the number of adult mosquitoes that transmit arboviruses. In addition, Florida has an aggressive arboviral surveillance program for monitoring the presence of these disease in mosquitoes, birds, horses and humans. For more information on mosquito control, pesticides or arboviruses, log on to the Florida Department of Agriculture, Division of Agricultural Environmental Services web site at: [www.flaes.org/](http://www.flaes.org/) then go to the Bureau of Entomology and Pest Control, then Florida Arbovirus WNV/EEE.

#### **FLORIDA ARBOVIRAL SURVEILLANCE/RESPONSE PLAN**

State and local agencies keep a close watch on arboviral activity in mosquitoes, sentinel chicken flocks, horses and dead birds. The Florida Department of Health, in cooperation with several other state agencies, including the Florida Department of Agriculture and Consumer Services, has implemented an Arboviral Surveillance/Response Plan to monitor arboviral activity throughout the state. The plan provides for a tiered level of response aimed at preventing and controlling certain mosquito populations during times of increased arboviral activity when the risk to human exposure is enhanced.

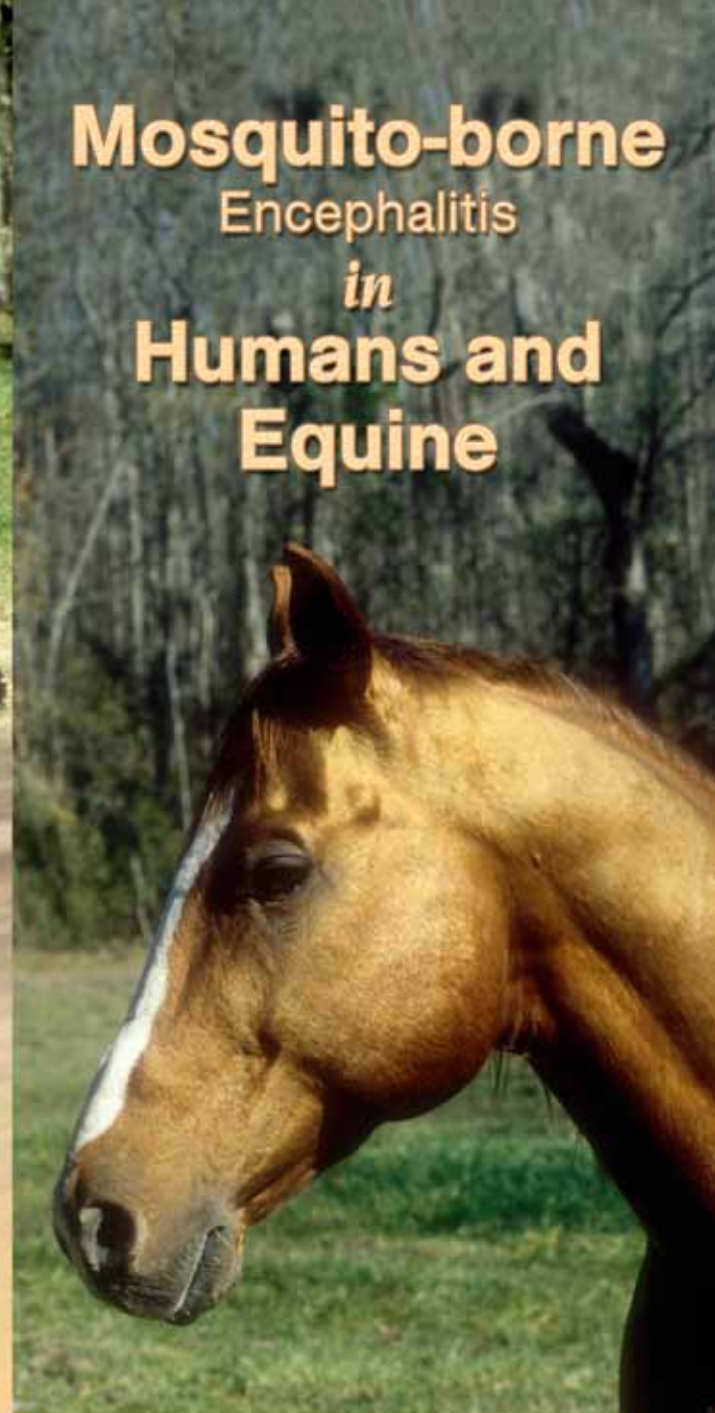
For more information on press releases and public educational activities, visit the Department of Health's web site at [www.doh.state.fl.us](http://www.doh.state.fl.us), select "Diseases and Conditions" and then "Arboviral Encephalitis." Additionally, information about arboviral activity in horses may be viewed on FDAC's web site at [www.doacs.state.fl.us/ai/](http://www.doacs.state.fl.us/ai/) select "Animal Disease Control," then under "Current Diseases," select "Eastern Equine Encephalitis" and/or "West Nile Virus."



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