

ARBOVIRAL INFECTION FACT SHEET

Agents: Several mosquito- and tick-borne alpha-flavi- and bunya- viruses; chiefly, St. Louis encephalitis virus (SLE), western equine encephalitis virus (WEE), Venezuelan equine encephalitis virus (VEE), eastern equine encephalitis virus (EEE), West Nile virus (WNV), LaCrosse virus (LAC) and other California serogroup viruses, Dengue virus, and Yellow Fever virus. This document will concentrate on viruses that circulate in Georgia, which include the following mosquito-borne viruses: EEE, SLE, WNV, and LAC. The mosquito vectors that can transmit Yellow Fever and Dengue viruses are found in Georgia, but local transmission of these agents no longer occurs.

Brief description: Most arboviral infections are asymptomatic and do not result in clinical disease. Symptomatic arboviral infection may result in a febrile illness of variable severity associated with neurologic symptoms ranging from headache to aseptic meningitis or encephalitis. Arboviral encephalitis cannot generally be distinguished clinically from other types of encephalitis. Symptoms can include headache, confusion, nausea, and vomiting. Signs may include fever, meningismus, cranial nerve palsies, paresis or paralysis, sensory deficits, altered reflexes, convulsions, abnormal movements, and coma of varying degree. Symptomatic West Nile virus infection may be accompanied by acute flaccid paralysis resembling poliomyelitis.

In the U.S., mosquito-borne arboviral infections usually occur in late summer and early fall, although in Southern regions such as Georgia year-round transmission is possible. St. Louis encephalitis and West Nile virus infections are more likely to produce encephalitis in the elderly than in children, whereas LaCrosse virus disease occurs almost exclusively in children younger than 15 years of age. Eastern equine encephalitis infection is usually most severe in young children and the elderly. The prevalence of different arboviral diseases is related to ecologic conditions that affect the abundance of infected vectors.

Reservoir: California group viruses overwinter in *Aedes* eggs. Mosquitoes become infected when biting infected birds. However, the true reservoir or means of winter carry-over is generally unknown for most arboviruses.

Mode of Transmission: By the bite of an infective mosquito. Direct person-to-person contact does not spread these viruses. In 2002, West Nile virus was found to be transmitted through blood transfusions and through the donation of infected organs. West Nile virus may also be transmitted through breastmilk, although the risk as yet is unknown and no changes have been made in breast-feeding recommendations.

Incubation Period: Usually 3-15 days following the bite of an infective mosquito.

Laboratory criteria for diagnosis:

- Fourfold or greater change in virus-specific serum antibody titer, or
- Isolation of virus from or demonstration of viral antigen or genomic sequences in tissue, blood, cerebrospinal fluid (CSF), or other body fluid, or
- Virus-specific immunoglobulin M (IgM) antibodies demonstrated in CSF by antibody-capture enzyme immunoassay (EIA), or
- Virus-specific immunoglobulin M (IgM) antibodies demonstrated in serum by antibody-capture EIA and confirmed by demonstration of virus-specific serum immunoglobulin G (IgG) antibodies in the same or a later specimen by another serologic assay (e.g., neutralization or hemagglutination inhibition).

Serologic Testing at the Georgia Public Health Laboratory:

1. Specimen:

Acute Serum: 5-10 cc whole blood collected 0-8 days after illness onset

Convalescent Serum: 5-10 cc whole blood collected 14-21 days after acute serum

Cerebrospinal Fluid: At least 2 cc

2. Specimen Preparation Instructions:

A. Serum: Collect one red-topped or serum-separator tube of blood. Centrifuge, separate serum from clot, dispense into two sterile tubes (at least 2 cc each) for transport, and refrigerate (*do not freeze*).

B. CSF: Send two tubes (if possible) without preservatives, containing at least 1 cc each. Keep specimens frozen, preferably on dry ice in a –70°C freezer (*do not send or store CSF samples at room temperature*).

3. Lab Form: GPL Microbial Immunology Request Form (#3432) for Arbovirus Testing
4. Lab Test Performed: antibody determination

5. Lab: Submit specimens to Immunology at the Georgia Public Health Laboratory for testing.

Case classification:

- **Probable:** a clinically compatible case (encephalitis, meningitis, paralysis, or febrile illness) occurring during a period when arboviral transmission is likely, and with the following supportive serology: 1) a single or stable (less than or equal to twofold change) but elevated antibody titer of virus-specific serum antibodies; or 2) serum IgM antibodies detected by antibody-capture EIA but with no available results of a confirmatory test for virus-specific serum IgG antibodies in the same or a later specimen.
- **Confirmed:** a clinically compatible case that is laboratory confirmed

Comment:

The seasonality of arboviral transmission is variable and depends on the geographic location of exposure, the specific cycles of viral transmission, and local climatic conditions.

Reporting should be etiology-specific:

- St. Louis encephalitis virus infection
- Eastern equine encephalitis virus infection
- LaCrosse encephalitis virus infection
- West Nile virus infection
- Other viral infections transmitted by mosquitoes, ticks, or midges (e.g., Yellow Fever, Dengue, Venezuelan equine encephalitis virus and Cache Valley encephalitis virus)

All arboviral infections, including encephalitis, meningitis, paralysis, and febrile illness, are immediately reportable to the Georgia Division of Public Health.

Period of communicability: Not directly transmitted from person to person. Virus is not usually demonstrable in the blood of humans after onset of disease, although virus may persist in human tissues for an unknown period of time following infection. Mosquitoes remain infective for life.

Treatment: Because the arboviral infections are viral diseases, antibiotics are not effective for treatment, and no effective antiviral drugs have yet been developed. Treatment is therefore supportive.

Investigation: Determine travel and vaccination history of all positive cases. Perform environmental assessment of area where exposure is believed to have occurred to look for possible vector mosquito breeding areas.

Reporting: Report cases **IMMEDIATELY** by phone to the local health department, District Health Office, or the Epidemiology Branch at 404-657-2588. If calling after regular business hours, it is very important to report cases to the Epidemiology Branch answering service (770-578-4104). After a verbal report has been made, please transmit the case information electronically through the State Electronic Notifiable Disease Surveillance System (SENDSS) at <http://sendss.state.ga.us>, or complete and mail a GA Notifiable Disease Report Form (#3095).

References:

1. Centers for Disease Control and Prevention. Arboviral Infections of the Central Nervous System – United States. *MMWR* 1998; 47(25): 517.
2. Centers for Disease Control and Prevention. Case Definitions for Infectious Conditions Under Public Health Surveillance. *MMWR* 1997; 46(RR10): 1-55.
3. Centers for Disease Control and Prevention. Eastern Equine Encephalitis Virus Associated with *Aedes albopictus* – Florida, 1991. *MMWR* 1992; 41(07): 115-121.
4. Centers for Disease Control and Prevention. Outbreak of West Nile-like viral encephalitis—New York, 1999. *MMWR* 1999; 48(38); 845-9.
5. Centers for Disease Control and Prevention. Update: West Nile-like viral encephalitis—New York. *MMWR* 1999; 48(39); 890-2.
6. Chin J, ed. Arthropod-borne Viral Encephalitides. In: Control of Communicable Diseases Manual. 17th ed. Washington, DC: American Public Health Association, 2000: 39-45.
7. Centers for Disease Control and Prevention. Public health dispatch: Investigations of West Nile virus infections in recipients of blood transfusions. *MMWR* 2002; 51(43): 973-974.
8. Centers for Disease Control and Prevention. Possible West Nile virus transmission to an infant through breast-feeding – Michigan, 2002. *MMWR* 2002; 51(39): 877-878.

Links:

- CDC Arboviral Encephalitides – <http://www.cdc.gov/ncidod/dvbid/arbor/arboinfo.htm>
- Environmental Protection Agency – <http://www.epa.gov/pesticides/citizens/pesticides4mosquitos.htm>