Infectious Disease Epidemiology Section
Office of Public Health, Louisiana Dept of Health & Hospitals
800-256-2748 (24 hr number) – (504) 568-5005
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La Crosse Encephalitis

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Epidemiology

La Crosse Encephalitis (LAC) virus is a California serogroup virus belonging to the *Bunyaviridae* family. The California serogroup viruses have been found throughout North and South America, Europe and Asia. La Crosse encephalitis in the U.S. is found from Minnesota to Texas east to New York and Georgia, with traditional foci in the great-Lakes states and increased incidence in the mid-Atlantic states. The California serogroup viruses are transmitted to humans through the bite of an infected mosquito.

The natural reservoir for the virus small vertebrate hosts (chipmunk, squirrels) and the virus is cycled in woodland habitats by the treehole mosquito, *Aedes triseriatus*. This vector can also breed in artificial containers such as tires or buckets. The virus can overwinter in the mosquito and can be passed transovarianly or venerally. Mosquitoes remain infected for life.

Persons with contact to treehole breeding sites are at greatest risk for contracting the virus such as forest workers, hikers or those with a residence in a woodland habitat. Children (under 16 years) are at greatest risk for developing severe symptoms.

The disease is thought to be considerably under-reported. Annually, about seventy cases are reported nationally and around one is identified in Louisiana.

Clinical Description

The incubation period for LAC is 5 to 15 days.

Symptoms range from mild flu-like illness to encephalitis. Most infections are asymptomatic. Children are at greatest risk for developing severe disease. Neurological sequelae, including poor balance, memory and speech, occur in 12% of CNS cases. The case fatality rate is less than 1%, the lowest mortality rate of the domestic arboviral encephalitis, however the neurologic impairment may be disruptive of school performance in children.

Surveillance

All La Crosse infections are reportable conditions.

Report and Confirm Early Cases

Patients presenting with the following clinical syndromes should be suspected of having La Crosse illness particularly during the transmission season (May to November).

(1) Viral encephalitis, characterized by:
• Fever ≥38 °C or 100 °F, and
• CNS involvement, including altered mental status (altered level of consciousness, confusion, agitation, or lethargy) or other cortical signs (cranial nerve palsies, paresis or paralysis, parkinsonian signs, tremors, ataxia or convulsions), and
• An abnormal CSF profile suggesting a viral etiology (a negative bacterial stain and culture with pleocytosis [WBC between 5 and 1500 cells/mm^3] and/or elevated protein level [≥40 mg/dl]).

(2) Aseptic meningitis characterized by:

- Fever ≥ 38 °C or 100 °F, and
- Headache, stiff neck and/or other meningeal signs, and
- An abnormal CSF profile suggesting a viral etiology (a negative bacterial stain and culture with pleocytosis [WBC between 5 and 1500 cells/mm^3] and/or elevated protein level [≥40 mg/dl]).

Specimens to obtain:

Acute phase (collected within 8 days of illness onset): 2 mL serum in labeled red top tube
and CSF (if collected): 2 mL without preservatives

Convalescent phase (collected within 14-21 days of illness onset) At least 2 mL serum in labeled red top tube

Specimen labeling, packaging and mailing
-Label: patient's name, date of birth, medical record number, and date of specimen collection
All specimens should be accompanied by the appropriate form: *"Lab submission form for Arboviral Testing in Humans"*

Unless there is an emergency, avoid sending samples over the weekend or on holidays. Hold the samples for delivery until the next business day. In case of emergency, make prior arrangements with the laboratory (Virology Section 504-568-4039 or Infectious Disease Epidemiology Section 504-568-5005).

-Storage:

- **CSF**: Keep specimens refrigerated. Do not send or store at room temperature.
- **Sera:** Centrifuge, separate from clots, dispense into two sterile tubes (at least 2 cc each) for transport, and refrigerate (do not freeze).

-Packaging**:** Package CSF and sera in separate bags for transport to OPH. Pack blue ice or other coolants along with serum sample. Do not freeze. Do not use dry ice.

Ship to the following address:
Office of Public Health Virology Laboratory
325 Loyola Avenue, Room 709
New Orleans, LA 70112

Reporting test results:
All arboviral testing results will be faxed to the submitter (physician, hospital laboratories) by OPH lab.

Laboratory Tests

Test Methods

Testing at the State Public Health Laboratory is performed for Eastern Equine Encephalitis (EEE), Saint Louis Encephalitis (SLE), and California Virus group including La Crosse encephalitis using an **immunofluorescence technique (IFA)**. Private laboratory positives should be confirmed at the State Lab, arrangements should be made to have the samples forwarded.

If the IFA is positive at the State Lab, the sample will be forwarded to the Centers for Disease Control (CDC) for confirmatory testing. This testing will include, a **Plaque Reduction Neutralization Test (PRNT)**. The serum of the suspect is incubated with the live La Crosse virus then added to a cell culture. If there are antibodies against the virus in the test serum, there is reduction in virus damage compared to control with no antibodies (hence the term "Plaque Reduction"). This requires handling cell cultures and live virus and it may take several days to a week to evaluate the result.

Make sure to differentiate from IgG and IgM

IgG antibodies from a viral infection will last for years, even a lifetime. Therefore interpretation of an IgG positive test with an IgM negative result is consistent with an old infection and is not usually useful for the diagnosis of a recent clinical infection.

IgM antibodies do not cross the blood brain barrier therefore IgM antibodies in CSF strongly suggest central nervous system involvement. **IgM in blood may persist,** therefore there must be a strong clinical correlation for onset of symptoms consistent with the laboratory evidence. Convalescent blood samples should be drawn; a four-fold increase in the IFA IgM titer for La Crosse would further support the recognition of a current infection.

Fatal Encephalitis Cases

Fatal viral encephalitis cases of unknown etiology must be reported to the Infectious Disease Epidemiology Section (IDES).

- At least 5 cc of whole blood and 5 cc of serum may be frozen and held until decisions are made as to what specimens and tests are needed for further testing.
- Freezing at or below -20 degrees C is sufficient for short-term storage.

For specimen collection questions: During business hours, please call 504-568-5005 and ask to speak the Arboviral Surveillance Coordinator. After hours, call (800) 256-2748 or 504-568-5005 and request to speak to the epidemiologist on call.