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NH DIVISION OF Public Health Services
Improving health, preventing disease, reducing costs *for all*
Department of Health and Human Services

Arboviral Disease in New Hampshire 2016

NH Division of Public Health Services (NH DPHS) recommends:

1. Vigilance during the summer months to consider mosquito-borne diseases, including West Nile Virus (WNV) and Eastern Equine Encephalitis (EEE), among patients with compatible clinical features. Laboratory confirmation should be arranged by calling (603) 271-4496 during business hours or (603) 271-5300 after hours. Forms and human testing information are available at http://www.dhhs.state.nh.us/dphs/cdcs/arboviral/index.htm.
2. Remind patients to avoid mosquito bites by use of insect repellents and wearing protective clothing, and environmental reduction of mosquito populations.
3. Report all arboviral illnesses, confirmed or suspected, to the Division of Public Health Services (DPHS) within 24 hours at 603-271-4496 (after hours 1-800-852-3345, x5300).

Background

Arboviruses transmitted in New Hampshire include West Nile virus (WNV) and Eastern Equine Encephalitis (EEE) virus, both transmitted to humans through the bite of an infected mosquito. In 2013, the first human case of locally-acquired Jamestown Canyon virus (JCV) was also identified. EEE and WNV are maintained in a bird-mosquito cycle with humans considered incidental hosts. JCV is maintained in a deer-mosquito cycle, and reports of human illness are rare. The greatest risk for human acquisition of arboviral diseases in NH is between July and October. Year-round transmission is possible in some geographic locations in the US.

Nationally during the last arboviral season (2015), there were 2,060 human cases of WNV reported, including 119 deaths. Neuroinvasive disease (meningitis and/or encephalitis) was recorded in 1,360 cases, while 700 cases were diagnosed with milder West Nile fever. There were also 5 human cases of EEE reported in the US. In NH, there were 3 WNV-positive mosquito batches, 1 veterinary case, and no human cases. For EEE, there were 2 EEE-positive mosquito batches.

While not transmitted locally in NH, Zika virus, chikungunya virus (CHIKV), and other arboviruses are possible among travelers returning from endemic regions. As of June 30, 2016, 4 travel-associated cases of Zika virus infection have been identified in NH. The Centers for Disease Control and Prevention recently reported that the Zika virus mosquito vectors *Aedes aegypti* and *Aedes albopictus* were detected in NH. NH DPHS has not verified these detections and does not have evidence that there are sustained populations of these mosquitoes. NH DPHS is investigating the CDC report and enhancing efforts to detect these vectors. At this time, local transmission of Zika virus by mosquitoes should be considered extremely unlikely. The most recent Zika virus HAN can be found here: http://www.dhhs.nh.gov/dphs/cdcs/alerts/documents/zika-virus-update-3.pdf.

When to Suspect Arboviral Illness

The incubation periods of both WNV and EEE following the bite of an infected mosquito range from 3 to 14 days. Most infections are asymptomatic or mild, including fever, headache, myalgias and arthralgias. Approximately 20% of those infected with WNV develop a mild illness known as West Nile Fever. Neurologic infection is manifest by altered mental status and/or neurological dysfunction (cranial and peripheral neuritis or other neuropathies, including acute flaccid paralysis syndrome). A minority of patients with severe disease develop a diffuse maculopapular or morbilliform rash. Approximately 1 in 150 WNV infections will result in severe neurological disease, with encephalitis more common than meningitis. Older patients are at increased risk of developing severe West Nile Virus infections. For EEE, approximately one-third of all people who develop clinical encephalitis will die from the disease. Among those who recover, many suffer from permanent brain damage. Severe disease can be seen in any age group, including children.

The typical laboratory findings of WNV and EEE are normal or elevated leukocytes, lymphopenia, anemia, and hyponatremia. Cerebrospinal fluid (CSF) exam may show pleocytosis (usually with a lymphocytic predominance), elevated protein, and normal glucose levels. For about one-third of WNV patients, magnetic resonance imaging (MRI) shows enhancement of the leptomeninges, the periventricular areas, or both, while MRI of EEE patients often reveals abnormalities of the basal ganglia and thalami.

Treatment is supportive, such as intravenous fluids, respiratory support, and prevention of secondary infections for patients with severe disease.

When to Report Suspected Cases of Arboviral Illness

Clinicians, hospitals, and laboratories should report within 24 hours any patient meeting the following criteria:

1. Any patient with encephalitis or meningitis from July through November, who meet criteria a, b and c below without an alternative diagnosis:
    a. Fever $\geq$ 38.0 C or 100 F, and
    b. CNS involvement including altered mental status (altered level of consciousness, confusion, agitation, lethargy) and/or other evidence of cortical involvement (e.g., focal neurologic findings, seizures), and
    c. Abnormal CSF profile suggesting a viral etiology (a negative bacterial stain and culture) showing pleocytosis with predominance of lymphocytes. Elevated protein and normal glucose levels.

How to Report Suspect Cases of Arboviral Illness

All suspected arboviral cases should first be reported to the New Hampshire Division of Public Health Services by telephone. A completed case report form (attached) must be faxed to the NH Infectious Disease Investigation Section (603-271-0545) *and* a copy submitted with the laboratory specimen(s) to the NH Public Health Laboratories (PHL). DPHS staff members are available 24/7 to help determine if the clinical presentation meets the case criteria and whether further testing would be appropriate. Specimen submission guidelines are attached.

For additional information on arboviral illness and maps of recent activity, please visit the NH DHHS website at http://www.dhhs.nh.gov/dphs/cdcs/arboviral/results.htm. For fact sheets on WNV and EEE, go to http://www.dhhs.nh.gov/dphs/cdcs/arboviral/publications.htm

Laboratory Testing for Arboviral Illnesses

Laboratory diagnosis of arboviral infections is generally accomplished by testing serum and/or cerebrospinal fluid (CSF) for virus-specific IgM and neutralizing antibodies. The NH Public Health Laboratory (PHL) can test for EEE, WNV and St. Louis encephalitis (SLE) IgM. Positive IgM results are sent to CDC for confirmatory testing.

The PHL can also test for Zika (IgM and viral RNA), CHIKV (PCR) and dengue (PCR). Please consult the Bureau of Infectious Disease Control at 271-4496 prior to sending specimens to the PHL for these tests.

For more information, including specimen collection instructions, please refer to:
http://www.dhhs.nh.gov/dphs/cdcs/arboviral/documents/arboguidelines.pdf

For additional information on WNV and EEE please refer to:

1. The NH DHHS website at: http://www.dhhs.nh.gov/dphs/cdcs/arboviral/index.htm
2. The Centers for Disease Control, Division of Vector-Borne Infectious Diseases website at: http://www.cdc.gov/ncidod/dvbid/westnile/clinicians/.

For qquestions, please call Bureau of Infectious Disease Control at (603) 271-4496 or 1-800-852-3345, extension 4496 during business hours (8 am to 4:30 pm). Nights or weekends call the New Hampshire Hospital switchboard at 1-800-852-3345 extension 5300 and request the Public Health Professional on-call.

For any questions regarding the contents of this message, please contact NH DHHS, DPHS, Bureau of Infectious Disease Control at 603-271-4496 (after hours 1-800-852-3345 ext.5300).

To change your contact information in the NH Health Alert Network, contact Thom Flynn at 603-271-7499 or email thomas.flynn@dhhs.nh.gov.

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From:	Elizabeth A. Talbot, MD – Deputy State Epidemiologist
Originating Agency:	NH Department of Health and Human Services, Division of Public Health Services

Attachments:

1) NH Arboviral Case Report Form

New Hampshire Case Report Arboviral Infection Encephalitis/Meningitis	**This form must be faxed to the New Hampshire Communicable Disease Control Section (603-271-0545) *and* a copy submitted with the laboratory specimen(s) to the NH Public Health Laboratories**

Prior to submission of suspect Chikungunya virus specimens for testing, a Public Health Nurse at the Bureau of Infectious Disease Control must be consulted in order to avoid a testing fee.
Please indicate the nurse contacted for tracking purposes: _____

PATIENT INFORMATION

Name: _____ Date of Birth: ____/____/____ ☐Male ☐Female
Last First MI mm dd yy

Home Address: _____ Homeless ☐Yes ☐No
Street City State Zip

Phone (H)_____ (W)_____ (Cell)_____

RACE ☐White ☐Black/African American ☐Asian ☐Native Hawaiian/Pacific Islander ☐American Indian/Alaska Native ☐Unknown

ETHNICITY ☐Unknown ☐Hispanic ☐Non-Hispanic

CLINICAL INFORMATION

Current Diagnosis: ☐Encephalitis ☐Meningitis ☐Other_____

Hospitalized? ☐ Yes ☐ No If yes, Hospital: _____

Date of Admission: ____/____/____ Date of Discharge/Transfer: ____/____/____

Physician/Provider: _____ Phone: _____

SYMPTOMS: Date of first symptoms ____/____/____ Date of first *neurologic* symptoms ____/____/____

	YES	NO	UNK		YES	NO	UNK		YES	NO	UNK
Fever ≥100 °F	☐	☐	☐	Disorientation	☐	☐	☐	Convulsions	☐	☐	☐
Highest Temp (if known)	_____ °F			Delirium	☐	☐	☐	Paralysis/ Paresis	☐	☐	☐
Headache	☐	☐	☐	Lethargy	☐	☐	☐	Acute Flaccid Paralysis	☐	☐	☐
Stiff Neck	☐	☐	☐	Stupor	☐	☐	☐	Cranial Nerve Palsy	☐	☐	☐
Tremor	☐	☐	☐	Coma	☐	☐	☐	Rash	☐	☐	☐
Vomiting/ Nausea	☐	☐	☐	Muscle Weakness	☐	☐	☐	Location of Rash	_____		
Diarrhea	☐	☐	☐	Hyperreflexia	☐	☐	☐	Hemorrhage	☐	☐	☐
Confusion	☐	☐	☐	Muscle Pain	☐	☐	☐	Joint Pain	☐	☐	☐
Seizures	☐	☐	☐	Rigidity	☐	☐	☐				

Other_____

OUTCOME ☐Recovered ☐Residual Symptoms ☐Died ☐Unknown If patient died, date of death ____/____/____

LABORATORY INFORMATION/TEST RESULTS (attach laboratory sheets)

Acute specimens (serum or CSF) must be collected within 3 to 10 days after onset of symptoms. Convalescent specimens should be collected 2-3 weeks after acute sample. If CSF is collected and submitted, please include serum sample.

CSF (specify units) Date ____/____/____ Abnormal? ☐Yes ☐No ☐Unknown Glu_____ Prot_____ RBC_____

WBC_____ Diff. Segs%_____ Lymphs%_____ Gram stain_____ Bacterial Culture_____

Fungal/Parasitic tests_____ Viral test results (Culture/Serology/PCR)_____

CBC (specify units) Date ____/____/____ WBC_____ Diff.Segs%_____ Lymphs%_____

MRI Date ____/____/____ Result_____

CT Date ____/____/____ Result_____

EMG Date ____/____/____ Result_____

ANTIVIRAL TREATMENT ☐Yes ☐No ☐Unk If Yes, list below. **Date Started**

_____ ____/____/____

RISK FACTOR INFORMATION FOR PRELIMINARY OR CONFIRMED POSITIVE CASES OF ARBOVIRAL ILLNESS

Patient Name: _____ **DOB:** ____/____/____

1. Does the patient's residence have screened windows? ☐Yes ☐No ☐Unknown
2. During the two weeks before onset of illness does the patient recall being bitten by mosquitoes?

   ☐Yes ☐No If yes, dates and places _____
3. Is the patient a smoker? ☐Yes ☐No ☐Unknown

   If yes, do they smoke outdoors? ☐Yes ☐No ☐Unknown
4. On average, how much time has the patient spent outdoors each day in the two weeks prior to onset? _____

   List any unusually long periods spent outside during the two weeks prior to onset:_____
5. Does the patient use any prevention measures to avoid mosquito bites? ☐Yes ☐No ☐Unknown

   If yes, list _____

   Does the patient use mosquito repellent when outdoors: ☐Always ☐Sometimes ☐Rarely ☐Never

   Does the repellent contain DEET (N, N-diethyl-meta-toluamide, or N, Ndiethyl-3-methylbenzamide), Picaridin, or Oil of Lemon Eucalyptus? ☐Yes ☐No ☐Unknown
6. During the two weeks before onset did the patient travel outside the county of residence?

   ☐Yes ☐No ☐Unknown If yes, specify when and where: _____
7. Has the patient traveled outside of New Hampshire in the two weeks prior to onset? ☐Yes ☐No ☐Unknown

   If yes, specify when and where: _____
8. Has the patient traveled outside the U.S. in the two weeks prior to onset? ☐Yes ☐No ☐Unknown

   If yes, specify when and where: _____
9. Does the patient have any underlying medical conditions? ☐Yes ☐No ☐Unknown

   If yes, specify: _____
10. What is the patient's occupation? _____

BLOOD DONATION/TRANSFUSION/TRANSPLANT HISTORY/PREGNANCY

11. Has the patient received an organ transplant or blood product transfusion in the month prior to onset?

    ☐Yes ☐No ☐Unknown

    If yes, specify when and where: _____
12. Has patient donated blood products or been a living organ donor in the one month prior to onset? ☐Yes ☐No ☐Unknown
13. Is the patient currently pregnant? ☐Yes ☐No ☐Unknown ☐Not applicable

    If yes, weeks pregnant_____ due date____/____/____
14. Is the patient breastfeeding or planning to breastfeed? ☐Yes ☐No ☐Unknown

COMMENTS: _____

_____

REPORTED BY: **DATE OF REPORT:** ____/____/____

Last Name_____ First Name _____Title(ICN, Resident, Attending)_____

Work address_____City_____State_____Zip Code_____

Phone_____Pager_____

FOR DHHS USE:

Initial Report Taken by:_____ Report Completed by:_____

Case Status: ☐Confirmed ☐Probable ☐Not a Case ☐Unknown ☐Other State