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Mosquito-borne Diseases in New Hampshire 2017

Key Points and Recommendations:

1. Be vigilant 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.
2. Remind patients to avoid mosquito bites by use of insect repellents and wearing protective clothing, and environmental reduction of mosquito populations.
3. Laboratory confirmation of WNV and EEE can 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>.
4. Report all arboviral illnesses, confirmed or suspected, to the Division of Public Health Services (DPHS) within 24 hours at 603-271-4496 (after hours, 603-271-5300).

Background

Mosquito-borne diseases 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 mosquito-borne diseases in NH is between July and October. Year-round transmission is possible in some geographic locations in the US.

Nationally during the last mosquito season (2016), there were 2,038 human cases of WNV reported, including 94 deaths. Neuroinvasive WNV disease (meningitis and/or encephalitis) was recorded in 1,140 cases, while 898 cases were diagnosed with milder WNV disease. There were also 6 human cases of EEE reported in the US. In NH, for WNV there was one positive mosquito batch, no veterinary cases, and no human cases. For EEE, there were no positive identifications.

While not transmitted locally in NH, Zika virus, chikungunya virus (CHIKV), and other mosquito-borne diseases are possible among travelers returning from endemic regions. As of June 15, 2017, a total of 14 travel-associated cases of Zika virus infection have been identified in NH since January 2016. The Centers for Disease Control and Prevention reported in 2016 that the Zika virus mosquito vectors (*Aedes aegypti* and *Aedes albopictus*) were detected in NH in the past; however, NH DPHS has not verified these detections and does not have evidence that there are sustained populations of these mosquitoes. NH DPHS will enhance efforts to detect these mosquitoes by deploying additional traps specific for catching these species of mosquitos during the 2017 season. At this time, local transmission of Zika virus by mosquitoes is extremely unlikely. Additional Zika virus information, including the most recent Zika virus HAN can be found here: <http://www.dhhs.nh.gov/dphs/cdcs/zika/index.htm>.

Signs and Symptoms

The incubation period for WNV following the bite of an infected mosquito ranges from 2 to 14 days, and the incubation period for EEE ranges from 4 to 10 days. An estimated 70-80% of human WNV infections are subclinical or asymptomatic. Most symptomatic persons experience an acute systemic febrile illness that often includes headache, weakness, myalgia, or arthralgia. Less than 1% of infected persons develop neuroinvasive disease, which typically manifests as meningitis, encephalitis, or acute flaccid paralysis. For EEE, approximately one-third of individuals infected will develop severe encephalitis and 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.

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 Mosquito-borne 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 Mosquito-borne Illness

All suspected mosquito-borne disease 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 Mosquito-borne Illnesses

Laboratory diagnosis of mosquito-borne 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 603-271-4496 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 websites at:
 - <http://www.cdc.gov/ncidod/dvbid/westnile/clinicians/>
 - <https://www.cdc.gov/easternequineencephalitis/index.html>

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

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: Benjamin P. Chan, MD, MPH, State Epidemiologist
Originating Agency: NH Department of Health and Human Services, Division of Public Health Services

Attachments:

- 1) NH Arboviral Case Report Form

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**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	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Disorientation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Convulsions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Highest Temp (if known) _____ °F				Delirium	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Paralysis/Paresis	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Headache	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Lethargy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Acute Flaccid Paralysis	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stiff Neck	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Stupor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Cranial Nerve Palsy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tremor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Coma	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Rash	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vomiting/Nausea	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Muscle Weakness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Location of Rash			
Diarrhea	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Hyperreflexia	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Hemorrhage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Confusion	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Muscle Pain	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Joint Pain	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Seizures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Rigidity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
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