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PUBLIC HEALTH ADVISORY

To: Health Care Providers
From: Siiri Bennett, State Epidemiologist
Subject: **Human Arbovirus Information for Healthcare Providers in Maine**
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Abstract:

The purpose of this health advisory is to alert clinicians to the potential for human arboviral disease activity in Maine and to consider testing for arboviral disease in patients presenting with unexplained encephalitis, meningitis or high fever ($\geq 100.4^{\circ}\text{F}$ or 38°C) during the summer and early fall.

Arboviral diseases, including Eastern equine encephalitis (EEE), Jamestown Canyon virus (JCV), and West Nile virus (WNV), are serious infections that are transmitted by the bite of an infected **mosquito**. Maine reported a fatal case of JCV infection, a relatively rare arboviral disease carried by mosquitoes, in a resident in 2018. Additionally, Powassan virus is an arboviral disease transmitted by the bite of an infected **tick**. Maine identified zero cases of Powassan virus disease in residents during 2018. Although rare, these diseases have potentially severe and even fatal consequences for those who contract them.

Human Arbovirus Update for Healthcare Providers in Maine

The purpose of this health advisory is to alert clinicians to the potential for human arboviral disease activity in Maine and to consider testing for arboviral disease in patients presenting with unexplained encephalitis, meningitis or high fever ($\geq 100.4^{\circ}\text{F}$ or 38°C) during the summer and early fall. Arboviral diseases, including Eastern equine encephalitis (EEE), Jamestown Canyon virus (JCV), and West Nile virus (WNV), are serious infections that are transmitted by the bite of an infected **mosquito**. Maine reported a fatal case of JCV infection, a relatively rare arboviral disease carried by mosquitoes, in a resident in 2018. Additionally, Powassan virus is an arboviral disease transmitted by the bite of an infected **tick**. Maine identified zero cases of Powassan virus disease in residents during 2018. Although rare, these diseases have potentially severe and even fatal consequences for those who contract them.

Background

Maine first detected EEE and WNV in 2001 in birds. In 2009, Maine experienced unprecedented EEE activity with 19 animals and 2 mosquito pools testing positive. In 2012, Maine reported the first human case of locally acquired WNV neuroinvasive illness. In 2014, Maine reported the first human case of locally acquired EEE neuroinvasive illness, with the first EEE death occurring in 2015. In 2018, Maine reported the first equine case of locally acquired WNV illness and reported two WNV positive mosquito pools collected from Bangor, which is the furthest north Maine has detected a positive pool.

Maine first identified JCV in 2017 with two cases, and providers reported one additional case in 2018. Maine first identified human Powassan cases in 2000, but it is still relatively uncommon. Maine identified five Powassan cases in the last five years, with zero cases in 2018.

Chikungunya, Dengue, and Zika virus are all travel-associated arboviral illnesses. While Maine does not have the mosquitoes that transmit these viruses, providers should also consider these viruses in symptomatic individuals who have travelled to an affected area. Maine reported three cases of Dengue, and two cases of Chikungunya in 2018--all travel-related.

Clinical Features of Arboviral Infections

EEE: EEE is the most severe arboviral infection found in the United States. Symptoms of EEE usually appear 4 to 10 days after the bite of an infected mosquito, and range from mild flu-like illness to high fever, encephalitis, coma, and death. The EEE case fatality rate is approximately 33% (50% in those who show symptoms) with significant brain damage in most survivors.

JCV: JCV is a relatively rare arboviral infection with symptoms that may include fever, headache, and flu-like illness. Symptoms usually appear 1-14 days after the bite of an infected mosquito. Severe cases involving the central nervous system may include meningitis or encephalitis.

Powassan virus: Many people who become infected with Powassan do not show any symptoms. Symptom onset ranges from about 1 week to 1 month after the tick bite, and includes: fever, headache, vomiting, weakness, confusion, loss of coordination, speech difficulties, seizures, encephalitis, and meningitis. Approximately 10% of Powassan virus encephalitis cases are fatal, and approximately half of survivors have permanent neurological symptoms.

WNV: Symptoms of WNV infection usually appear 3 to 15 days following the bite of an infected mosquito. Most people infected with WNV are asymptomatic. Symptoms can range from a mild flu-like illness to headache, high fever, neck stiffness, altered mental status, convulsions, paralysis, coma, and sometimes death. Fewer than 1% of people who are infected with WNV will develop serious neurological illness, and about 10% of those who do will die.

Risk Groups

Many people infected with arboviral illness remain asymptomatic. The following groups of people are at higher risk for clinically significant arboviral infection:

- Residents of and visitors to areas with mosquito or tick activity
- People who engage in outdoor work and recreational activities

- Persons over age 50 and younger than age 15

Diagnostic Tests for Arboviral Infections

Diagnosis relies on a high index of suspicion and on results of specific laboratory tests. EEE, JCV, Powassan, WNV, or other arboviral infections should be considered in any individual – but especially those over age 50 or younger than age 15 – with an onset of unexplained encephalitis, meningitis, or high fever in the summer and fall. The local presence of EEE and WNV in animals and mosquito pools should further raise the index of suspicion. Maine CDC releases health alerts to providers whenever an arboviral disease is detected for the first time in a human, non-human mammal, or mosquito pool. Providers can find up to date information on reported arboviruses in the weekly arboviral report posted online.

If providers suspect arboviral infection based on clinical evidence, they should submit serum samples and CSF for arboviral testing. Maine's Health and Environmental Testing Laboratory (HETL) and many reference laboratories perform arboviral testing. All samples of CSF submitted to HETL should be accompanied by a serum sample. Ideally providers should submit an acute and a convalescent serum sample for each patient. HETL can test for Chikungunya, Dengue, EEE, Powassan, Saint Louis Encephalitis (SLE), WNV, and Zika. If providers suspect Powassan, they should submit EDTA whole blood (purple cap) for PCR testing along with the serum and CSF. Testing for Jamestown Canyon virus is performed at CDC Fort Collins, and providers should coordinate samples submission through HETL.

- Acute serum samples should be collected within 14 days of onset of symptoms
- Convalescent serum samples should be collected 10 days to 4 weeks following the acute specimen

Arboviral Updates since 2018

- Federal CDC and its partners published a paper demonstrating the first evidence of EEEv transmission through solid organ transplantation. Three solid organ transplant recipients developed encephalitis one week after transplantation from a common donor. Providers should be aware of EEEv as a cause of transplant-associated encephalitis. DOI: <https://doi.org/10.1093/cid/ciy923>
- Federal CDC recently released an MMWR with updated guidance for Dengue and Zika diagnostic testing which includes new recommendations for testing symptomatic patients who live in or recently traveled to an area with risk of either Dengue or Zika. DOI: <http://dx.doi.org/10.15585/mmwr.rr6801a1>
 - Federal CDC now recommends both molecular and serologic testing for dengue and Zika for:
 - Anyone who lives in or recently traveled to areas where [Zika](#) and [dengue viruses](#) are circulating and has or recently experienced symptoms consistent with dengue or Zika
 - Federal CDC does not recommend Zika or Dengue virus testing for:
 - Non-pregnant asymptomatic people. This existing federal CDC recommendation remains unchanged.
 - Preconception screening. This existing federal CDC recommendation remains unchanged.
 - Guidance for asymptomatic pregnant women with possible Zika exposure remains unchanged.

Additional Information

- For more information on arboviral diseases: www.maine.gov/dhhs/vectorborne
- Zika and Dengue testing guidance (including existing recommendations): www.cdc.gov/zika/hc-providers/testing-guidance.html
- HETL Laboratory Submission Sheet: www.maine.gov/dhhs/mecdc/public-health-systems/health-and-environmental-testing/micro/documents/wnv-sle-eee.pdf
- Weekly arboviral reports will be posted throughout the season at: www.maine.gov/dhhs/mecdc/infectious-disease/epi/vector-borne/arboviral-surveillance.shtml
- Maine CDC disease consultation and reporting line: **1-800-821-5821** (available 24/7)