West Nile Virus
("Arboviral disease", excluding Dengue Fever)

Important Notice:
*All public health recommendations for routine investigations are based on "Control of Communicable Diseases Manual, 20th edition, 2016" (CCDM) unless otherwise stated. Use the CCDM as primary resource for case investigations that meet routine follow up. In cases of complicated situations or unique issues not addressed by this manual, please refer to the Administrative Rules of Montana (ARM) Chapter **37.114** or contact the designated subject matter expert at Communicable Disease Epidemiology section at the Montana DPHHS for further clarification.*

PROTOCOL CHECKLIST

- ☐ Confirm diagnosis, see case definition (see section 3.3 and 4.1)
- ☐ Verify submission for lab confirmation, if applicable (see section 4.2)
- ☐ Review background information on the disease and its epidemiology (see section 2)
- ☐ Prioritize reported cases for follow up, investigate and interview as appropriate (see section 1.2)
- ☐ Contact provider to gather more information, if necessary
- ☐ Notify state health department of case by entering available information into the Montana Infectious Disease Information System (MIDIS) within seven calendar days of initial report per (ARM) **37.114.204** (see section 1.3)
- ☐ Retrieve West Nile virus form per the Montana Communicable Disease Reporting Reference for Local Public Health Jurisdictions (see SharePoint → CDEpi → CDEpi Disease Forms)
- ☐ Review for use, specific technical assistance guidance documents (see SharePoint →CDEpi
  →CDEpi Technical Guidance [Diseases A to Z] → Arboviral Disease → Guidance Documents)
- ☐ Interview patient, cover the following:
  - ☐ Review disease facts with patient (see section 2.2)
  - ☐ Address patient's questions or concerns
- ☐ Follow-up on special situations, such as localized outbreaks (see section 5 and CCDM, review references and additional information or contact CDEpi at 406444-0273)
- ☐ Enter additional data obtained from interview into MIDIS (fax completed form to DPHHS)
- ☐ Attach any additional lab reports to case investigation in MIDIS (Manage Associations)
- ☐ When done with investigation, close case in MIDIS

1 DISEASE REPORTING

1.1 Provider notification to Public Health Authorities

Any person, including, but not limited to a physician, dentist, nurse, medical examiner, other health care practitioner, administrator of a health care facility or laboratory, public or private school administrator, or laboratory professional who knows or has reason to believe that a case exists of a reportable disease or condition defined in the Administrative Rules of Montana (ARM) **37.114.203** must immediately report to the local health officer.

1.2 Local Health Department Follow-up Responsibilities

Immediately after being notified of a case or a potential outbreak of a reportable condition, a local health officer must investigate and implement control measures as indicated by CCDM to prevent or control the transmission of disease per (ARM) **37.114.314**.

1.3 Local Health Department Reporting to State Public Health Authorities

West Nile virus (WNV) infection must be reported to the Montana Department of Public Health and Human Services (DPHHS) within seven days per (ARM) **37.114.204**. All other arboviral infections (including arboviruses of the *Bunyaviridae, Falviviridae, Reoviridae, and Togaviridae* families) must be reported within seven days, except Yellow Fever, which must be reported within 24 hours. This document may also serve as an investigation guideline for most other arboviral infections, excluding Dengue Fever. The disease-specific form needs to be submitted to DPHHS as part of the disease investigation process. Due to the broad nature of these guidelines call CDEpi with any questions you might have.

2 THE DISEASE AND ITS EPIDEMIOLOGY

2.1 Public Health Significance in Montana:

West Nile virus (WNV) is common in Montana, with about ten cases reported each year. WNV infection is more common during summer months and is often associated with exposure to certain species of mosquitoes capable of transmitting the virus.

2.2 Clinical Description of Illness

Refer to CCDM for relevant disease information and its epidemiology.

3 CASE DEFINITION

3.1 Clinical Description

Most arboviral infections are asymptomatic. Clinical disease ranges from mild febrile illness to severe encephalitis. For the purposes of surveillance and reporting, based on their clinical presentation, arboviral disease cases are often categorized into two primary groups: neuroinvasive disease and non-neuroinvasive disease.

Neuroinvasive disease

Many arboviruses cause neuroinvasive disease such as aseptic meningitis, encephalitis, or acute flaccid paralysis (AFP). These illnesses are usually characterized by the acute onset of fever with stiff neck, altered mental status, seizures, limb weakness, cerebrospinal fluid (CSF) pleocytosis, or abnormal neuroimaging. AFP may result from anterior ("polio") myelitis, peripheral neuritis, or post-infectious peripheral demyelinating neuropathy (i.e., Guillain-Barré syndrome). Less common neurological manifestations, such as cranial nerve palsies, also occur.

Non-neuroinvasive disease

Most arboviruses are capable of causing an acute systemic febrile illness (e.g., West Nile fever) that may include headache, myalgias, arthralgias, rash, or gastrointestinal symptoms. Rarely, myocarditis, pancreatitis, hepatitis, or ocular manifestations such as chorioretinitis and iridocyclitis can occur.

Neuroinvasive

- Fever (≥100.4°F or 38°C) as reported by the patient or a healthcare provider, **AND** • Meningitis, encephalitis, acute flaccid paralysis, or other acute signs of central or peripheral neurologic dysfunction, as documented by a physician, **AND**
- Absence of a more likely clinical explanation

Non-neuroinvasive

- Fever (≥100.4°F or 38°C) as reported by the patient or a healthcare provider, **AND**
- Absence of neuroinvasive disease, **AND**
- Absence of a more likely clinical explanation

3.2 Laboratory Criteria for Diagnosis

Confirmed

- Isolation of virus from or demonstration of WNV antigen or nucleic acid in tissue, blood, CSF, or other boy fluid, **OR**
- Fourfold or greater change in WNV-specific quantitative antibody titers in paired sera, **OR**
- WNV-specific IgM antibodies in serum with confirmatory WNV-specific neutralizing antibodies in the same or a later specimen, **OR**
- WNV-specific IgM antibodies in CSF and a negative result for other arbovirus IgM antibodies in CSF for arboviruses endemic to the region where exposure occurred

Probable: The detection of West Nile Virus-specific IgM antibodies in CSF or serum but with no other testing

Comment(s): Arboviruses from the same genus have the potential to produce cross-reactive antibodies. In geographic areas where two or more closely related arboviruses occur, it may

be epidemiologically important to attempt to pinpoint the infecting virus by conducting cross-neutralization tests. Therefore, a positive IgM result may suggest infection, but is NOT confirmatory.

West Nile Virus IgM antibodies have been documented to persist for up to 500 days in serum. Therefore, the presence of IgM antibodies in serum may signify a past infection. CSF positive for WNV IgM antibodies or at least a fourfold increase between acute and convalescent WNV antibody titers provides additional laboratory evidence that WNV was the cause of the patient's recent illness.

A clinically compatible case with only a positive IgG is NOT an acute case, and should NOT be entered into MIDIS.

3.3 Case Classification

Confirmed

- Neuroinvasive: a case that meets the clinical criteria for neuroinvasive disease and one or more of the confirmatory laboratory criteria
- Non-neuroinvasive: a case that meets the clinical criteria for non-neuroinvasive disease and one or more of the confirmatory laboratory criteria

Probable

- A case that meets the clinical criteria for either neuroinvasive or non-neuroinvasive, and the probable laboratory criterion

Comment(s): Asymptomatic, presumptive viremic blood donors should be entered into MIDIS and classified as "Suspect." If the patient becomes symptomatic after blood donation, reclassify as "Probable" or "Confirmed."

4 ROUTINE CASE INVESTIGATION

In accordance with (ARM) **37.114.314**, conduct an epidemiologic investigation to determine the source and possible transmission of infection. Refer to the CCDM regarding additional aspects related to investigation.

4.1 Confirm the Diagnosis

Review the clinical presentation and laboratory results to confirm the diagnosis. Consult with the CCDM and CSTE case definition to determine if this is a case.

4.2 Laboratory Requirements

An isolate of WNV does NOT need to be sent to MTPHL for confirmation.

For more information on analysis and specimen collection please contact the laboratory conducting the test or the Montana Public Health Laboratory (MTPHL) at 1-800-821-7284. The MTPHL Laboratory Services Manual can be accessed at: http://dphhs.mt.gov/publichealth/LaboratoryServices/PublicHealthLabTesting

4.3 Case Investigation

Contact the medical provider who ordered testing or is attending the case. Utilize the case reporting form to assist in obtaining all of the information necessary to complete a West Nile virus case report as outlined in (ARM) **37.114.205** regarding report contents.

Ask about possible exposures in the 2 to 14 days before symptom onset.

4.4 Contact Investigation

No contact investigation is needed because WNV is not transmitted by close contact. In cases of potential mother-to-infant transmission, monitor the infant for WNV signs and symptoms for 14 days after the last possible exposure. If the patient donated blood products, organs, or tissues in the last 30 days prior to onset, immediately inform the blood or tissue bank of the potential exposure. Follow up per CCDM.

4.5 Environmental Evaluation

Notify local environmental health and/or vector control of locally-acquired cases. An environmental evaluation may help in identifying and controlling factors favoring transmission. Work with local sanitarian or contact CDEpi with any questions at 406-444-0273.

5 CONTROL MEASURES

In accordance with (ARM) **37.114.501,** implement the control measures indicated in the CCDM for this disease. Contact DPHHS CDEpi for consultation and questions at 406-444-0273.

5.1 Case Management

If hospitalized, standard precautions are recommended. Patients do not require isolation. Infected people should be advised not to donate blood, tissues, or organs for at least a month following recovery, or 120 days from diagnosis.

5.2 Contact Management See section 4.4.

5.3 Environmental Measures See section 4.5.

5.4 Special Circumstances See section 3.3 Comment.

6 ROUTINE PREVENTION

6.1 Immunization Recommendations: not applicable.

6.2 Prevention Recommendations

Follow the "**5-Ds** of WNV Prevention"

DAWN & **DUSK** - When possible, avoid spending time outside at dawn and dusk.

DRESS- Wear shoes, socks, long pants, and a long-sleeved shirt when outdoors for long periods of time or when mosquitoes are most active. Clothing should be light colored and made of tightly woven materials to keep mosquitoes away from the skin.

DRAIN - Reduce the amount of standing water in or near your property by draining and/or removing it. Mosquitoes may lay eggs in areas with standing water.

DEET - For additional protection from mosquitoes, use an insect repellent containing DEET (N,Ndiethyl-m-toluamide) or picaridin (KBR 3023). Other insect repellents such as oil of lemon eucalyptus and IR3535 are also registered by the EPA but may be less effective than products containing DEET. It is important to follow the product guidelines when using insect repellant.

7 ESCALATION/ACTIVATION OF EMERGENCY OPERATIONAL PLANNING

Investigation guidelines are designed to assist local health jurisdictions in the steps and actions needed to report, investigate and control reported cases of communicable diseases. In the event individual case investigations or other reported cases lead to clusters and/or outbreaks, or investigations outside of a local health jurisdiction, local health jurisdictions need to contact DPHHS under the Administrative Rules of Montana 37.114.314 and 37.114.315 so DPHHS can consider emergency operational escalation or activation under the Communicable Disease Annex to the DPHHS Emergency Operation Plan.

8 REFERENCES AND ADDITIONAL INFORMATION

Important references:

A. "Control of Communicable Diseases Manual, 19th edition, 2008" (CCDM) American Public Health Association https://secure.apha.org/imis/ItemDetail?iProductCode=978-087553-0185&CATEGORY=BK
B. CDC West Nile Virus (WNV) website http://www.cdc.gov/westnile/index.html
C. MT DPHHS West Nile Virus (WNV) website: http://www.dphhs.mt.gov/publichealth/cdepi/surveillance/westnilevirus.shtml