6.10 West Nile Virus Infection

http://www.phac-aspc.gc.ca/wn-no/index-eng.php

Case Definition

Confirmed Case

There are three different categories of West Nile Virus (WNV) in humans:

- West Nile Virus Asymptomatic Infection (WNAI)
- West Nile Virus Non-Neurological Syndrome (WN Non-NS or West Nile Fever)
- West Nile Virus Neurological Syndrome (WNNS or Severe West Nile Disease)

20% of individuals who acquire WNV will develop West Nile Fever, and approximately 1 in 150 will develop Severe West Nile Disease.

West Nile Virus Asymptomatic Infection (WNAI)

Confirmed Case

Confirmed case diagnostic test criteria in the absence of clinical criteria

Probable Case

Probable case diagnostic test criteria in the absence of clinical criteria

Confirmed Case Diagnostic Test Criteria

At least one of the following must be confirmed for a diagnosis:

- a significant (e.g. fourfold or greater) change in WN virus neutralizing antibody titres in paired acute and convalescent sera, or cerebrospinal fluid (CSF)
  OR
- isolation of WNV from, or demonstration of WN virus-specific genomic sequences in, tissue, blood, CSF or other body fluids
  OR
- demonstration of WNV antigen in tissue
  OR
- demonstration of flavivirus antibodies in a single serum or CSF sample using a WN virus IgM enzyme immunoassay (EIA) confirmed by the detection of WN virus specific antibodies using a PRN (acute or convalescent specimen)
  OR
- a significant (e.g. fourfold or greater) change in flavivirus haemagglutination inhibition (HI) titres in paired acute and convalescent sera or demonstration of

a seroconversion using a WN virus IgG EIA AND the detection of WN specific antibodies using a PRN (acute or convalescent serum sample)

Probable Case Diagnostic Test Criteria

At least one of the following must be confirmed for a diagnosis:

- detection of flavivirus antibodies in a single serum or CSF sample using a WN virus IgM EIA without confirmatory neutralization serology (e.g. PRN)
  OR
- a significant (e.g. fourfold or greater) change in flavivirus HI titres in paired acute and convalescent sera or demonstration of a seroconversion using a WN virus IgG EIA
  OR
- a titre of > 1:320 in a single WN virus HI test or an elevated titre in a WN virusIgG EIA, with a confirmatory PRN result
  OR
- demonstration of Japanese encephalitis (JE) serocomplex-specific genomic sequences in blood by NAT screening on donor blood, by Blood Operators in Canada

West Nile Virus Non-Neurological Syndrome (WN Non-NS)

Confirmed Case

Clinical criteria **AND** at least one of the confirmed case diagnostic test criteria

Probable Case

Clinical criteria **AND** at least one of the probable case diagnostic test criteria

Suspect Case

Clinical criteria in the absence of or pending diagnostic test criteria **AND** in the absence of any other obvious cause

Clinical Criteria

- history of exposure in an area where WNV activity is occurring

OR

- history of exposure to an alternative mode of transmission

AND

- at least two of the following:
  - fever
  - myalgia
  - arthralgia
  - headache
  - fatigue
  - lymphadenopathy
  - maculopapular rash

West Nile Virus Neurological Syndrome (WNNS)

Confirmed Case

Clinical criteria **AND** at least one of the confirmed case diagnostic test criteria

Probable Case

Clinical criteria **AND** at least one of the probable case diagnostic test criteria

Suspect Case

Clinical criteria in the absence of or pending diagnostic test criteria AND in the absence of any other obvious cause

Clinical Criteria

- history of exposure where and when West Nile virus (WNV) activity is occurring
  OR
- history of exposure via a different mode of transmission
  AND
- onset of fever
  AND
- recent onset of at least one of the following:
  • encephalitis (acute signs of central orperipheral neurologic dysfunction)
  OR
  • viral meningitis (pleocytosis and signs of infection, e.g. headache, nuchal rigidity)
  OR
  • acute flaccid paralysis (e.g. poliomyelitis-like syndrome or Guillain-Barré-like syndrome)
  OR
  • movement disorders (e.g. tremor, myoclonus)
  OR
  • Parkinsonism or Parkinsonian-like conditions (e.g. cogwheel rigidity, bradykinesia, postural instability)
  OR
  • other neurological syndromes

Clinical Presentation

WNAI: Blood is screened using a nucleic acid amplification test (NAT) to determine if the person has WNV. No physical symptoms/ailments are present and detectable.

WN Non-NS: There is a large variety and severity of symptoms associated with this form of WNV. They include the clinical criteria listed above. Some clinical symptoms may emerge that are not characteristic of the disease, such as

gastrointestinal symptoms. This was evident in WNV cases in Canada and the US in 2003 and 2004.

WNN: A highly prominent feature of this form of WNV is severe muscle weakness, developing early in the course of the viral infection. This symptom may occur on its own, or altered reflexes, fever, encephalitis or meningitis may also develop. Other clinical criteria are listed above.

Muscle weakness and paralysis may also be a symptom of Guillain-Barre Syndrome. It is important to differentiate between WNNS and Guillain-Barre Syndrome by doing a lumbar puncture; pleocytosis, an increase of lymphocytes in the cerebrospinal fluid (CSF), is seen in acute flaccid paralysis due to WNV, but is not generally a feature of Guillain-Barre syndrome. WNNS requires constant monitoring, as development of acute neuromuscular respiratory failure is associated with high morbidity and mortality.

Diagnosis

Clinical signs and symptoms must be confirmed by laboratory findings

Epidemiology

Occurrence

Outbreaks of WNV have been reported in North America, Europe, Asia, and Africa. In Canada, cases have been decreasing from 2008 to 2010; 36 cases were reported in 2008, 13 in 2009, and 5 in 2010. Most of the cases were from Saskatchewan. Other cases have been found in Manitoba, Alberta, British Columbia, Ontario, and Quebec. Very few have been reported in Atlantic Canada. As of 2015, no cases have ever been reported in Newfoundland and Labrador. This is due the vectors' inability to survive over winter.

Reservoir

Mainly birds, especially the common crow

Transmission

The primary carriers of WNV are the mosquito species *Culex pipiens*, *Culex tarsalis* and *Aedes vexans*. *Culex pipiens* inhabits areas of the Newfoundland's west coast.

Incubation Period

The incubation period is between 3 and 12 days.

Period of Communicability

This disease cannot be spread through person-to-person contact. There has been maternal-placental transmission, but this has been rare. Carrier

mosquitoes, however, are likely to spread the disease throughout their life course.

Control Measures

Management of Cases

Treatment is supportive. Many therapies for treating WNV are under investigation. Information on clinical trials regarding WNV treatment can be found at: www.cdc.gov/ncidod/dvbid/westnile/clinicalTrials.htm

Management of Contacts

Contact investigation should be initiated and a search for the source of the infection.

Management of Outbreaks

The following steps can be applied to managing a WNV outbreak:

- Determine number of mosquitoes in area effected by WNV outbreak
- Identify breeding place of mosquitoes carrying the virus and exterminate it
- Identify infected animals and provide serological information to determine prevalence of infection and geographical area involved
- Immunize cattle, sheep, and other animals at risk of being infected
- Ensure that approved mosquito repellents are used by humans at risk of acquiring WNV

Education and Preventive Measures

The following websites provide information regarding preventive measures against acquiring WNV. They provide information on insect repellent use, application of repellents to mosquito nets, and other means of personal protection:

Health Canada Fact Sheet – Insect Repellents:

http://healthycanadians.gc.ca/product-safety-securite-produits/pest-control-products-produits-antiparasitaires/pesticides/about-au-sujet/insect_repellents-insectifuges-eng.php

Proper Application of Insect Repellent

- Insect repellent does not have to be applied in large doses.
- It should be rubbed on all exposed skin surfaces
- It should not be applied under clothing or on open wounds
- It should not be applied in closed spaces with poor ventilation, like tents
- It should not be applied near food.

There is currently no vaccine available for the prevention of WNV in humans at this time.

Reporting Requirements and Procedures

- Physicians, laboratories and communicable disease control nurses (CDCNs), and infection control practitioners (ICPs) must immediately report suspect or confirmed cases to the Regional Medical Officer of Health (RMOH)
- RMOH office will notify local physicians, nurse practitioners, environmental health officers, community health nurses, CDCNs, and ICPs, in the particular region as required for follow-up and case investigation
- RMOH reports to provincial office as per list A
- CDCN enters the case into the electronic reporting system and completes an outbreak report form if indicated
- Provincial Disease Control
    - Reports the aggregate case data to Public Health Agency of Canada on a weekly basis during the summer and early fall