WEST NILE VIRUS

Case definition

Case Classification – West Nile Virus Neurological Syndrome (WNNS)

CONFIRMED CASE – West Nile Virus Neurological Syndrome (WNNS)

Clinical criteria AND at least one of the confirmed case diagnostic test criteria (†see below)

PROBABLE CASE – West Nile Virus Neurological Syndrome (WNNS)

Clinical criteria AND at least one of the probable case diagnostic test criteria (†see below)

SUSPECT CASE – West Nile Virus Neurological Syndrome (WNNS)

Clinical criteria in the absence of or pending diagnostic test criteria (†see below) AND in the absence of any other obvious cause

Clinical Criteria-West Nile Virus Neurological Syndrome (WNNS)

History of exposure in an area where West Nile virus (WNV) activity is occurring

OR

history of exposure to an alternative mode of transmission

AND

onset of fever

AND

recent onset of at least one of the following:

- encephalitis (acute signs of central or peripheral neurologic dysfunction)

OR

- viral meningitis (pleocytosis and signs of infection, i.e. headache, nuchal rigidity)

OR

- acute flaccid paralysis (i.e. poliomyelitis-like syndrome or Guillain-Barré-like syndrome)

OR

- movement disorders (i.e. tremor, myoclonus)

OR

- Parkinsonism or Parkinsonian-like conditions (i.e. cogwheel rigidity, bradykinesia, postural instability)

OR

- other neurological syndromes

Case Classification – West Nile Virus Non-Neurological Syndrome (WN Non-NS)

CONFIRMED CASE – West Nile Virus Non-Neurological Syndrome (WN Non-NS)

Clinical criteria AND at least one of the confirmed case diagnostic test criteria (†see below)

PROBABLE CASE – West Nile Virus Non-Neurological Syndrome (WN Non-NS)

Clinical criteria AND at least one of the probable case diagnostic test criteria (†see below)

SUSPECT CASE – West Nile Virus Non-Neurological Syndrome (WN Non-NS)

Clinical criteria in the absence of or pending diagnostic test criteria (†see below) AND in the absence of any other obvious cause

Clinical Criteria – West Nile Virus Non-Neurological Syndrome (WN Non-NS)

History of exposure in an area where WN virus (WNV) activity is occurring

OR

history of exposure to an alternative mode of transmission

AND

at least two of the following:

- fever
- myalgia
- anthralgia
- headache
- fatigue
- lymphadenopathy
- maculopapular rash

Case Classification – West Nile Virus Asymptomatic Infection (WNAI)

CONFIRMED CASE – West Nile Virus Asymptomatic Infection (WNAI)

Confirmed case diagnostic test criteria (†see below) in the absence of clinical criteria

PROBABLE CASE – West Nile Virus Asymptomatic Infection (WNAI)

Probable case diagnostic test criteria (†see below) in the absence of clinical criteria

Clinical Evidence – West Nile Virus Asymptomatic Infection (WNAI)

This category could include, for example, asymptomatic blood donor

†Case Diagnostic Test Criteria – West Nile Virus

It is currently recommended that health jurisdictions/authorities use the Confirmed Case Diagnostic Test Criteria to confirm index cases (locally acquired) in their area each year; for subsequent cases, health jurisdictions/authorities could use the Probable Case Diagnostic Test Criteria to classify cases in their area as "confirmed", for the purposes of surveillance. Throughout the remainder of the transmission season health jurisdictions/authorities may wish to document PRN antibody titres to West Nile virus in a proportion of cases, to be determined by that health jurisdiction/authority, in order to rule out the possibility of concurrent activity by other flaviviruses. (For further information on diagnostic testing algorithms for West Nile virus, see the section entitled Laboratory Specimen Diagnostic Testing Algorithm in Appendix 4 of the National Guidelines for Response to West Nile virus.)

Confirmed Case Diagnostic Test Criteria – West Nile Virus

AT LEAST ONE of the following:

- a significant (i.e. fourfold or greater) change in WN virus neutralizing antibody titres (using a plaque reduction neutralization test (PRN) or other kind of neutralization assay) in paired acute and convalescent sera, or cerebral spinal fluid (CSF)

  OR

- isolation of WN virus from, or demonstration of WN virus-specific genomic sequences in, tissue, blood, CSF or other body fluids

  OR

- demonstration of WN virus antigen in tissue

  OR

- demonstration of flavivirus antibodies in a single serum or CSF sample using a WN virus IgM Enzyme Immunoassays (EIA), confirmed by the detection of WN virus specific antibodies using a PRN (acute or convalescent specimen)

  OR

- a significant (i.e. 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 – West Nile Virus

AT LEAST ONE of the following:

- detection of flavivirus antibodies in a single serum or CSF sample using a WN virus IgM EIA without confirmatory neutralization serology (i.e. PRN)

  OR

- a significant (i.e. 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 virus IgG EIA, with a confirmatory PRN result (Note: a confirmatory PRN or other kind of neutralization assay is not required in a health jurisdiction/authority where cases have already been confirmed in the current year.)

  OR

- demonstration of Japanese encephalitis (JE) serocomplex-specific genomic sequences in blood by nucleic acid amplification test (NAAT) screening on donor blood, by blood operators in Canada (i.e. Canadian Blood Services, Héma-Québec)

The Public Health Laboratory at the Queen Elizabeth II Health Sciences Centre will be consulted on appropriate specimens etc.

Causative agent

West Nile virus, which is an arbovirus of the family *Flaviviridae*, genus *Flavivirus*.

Source

Infected birds.

Incubation

Usually 3 to 12 days after being bitten by a mosquito.

Transmission

Transmitted via the bite of an infected mosquito, receipt of infected blood, organs or tissues, from infected mother to baby before birth or via breast milk (one report in the literature). There have also been reports of percutaneous transmission to laboratory workers handling infected birds.

Communicability

Not transmitted from person-to-person. Infected mosquitoes probably remain infected for life.

Symptoms

Most people with West Nile virus infection are asymptomatic, or have a mild illness such as fever, headache, stiff neck, nausea, vomiting, muscle weakness, and alteration in the level of consciousness.

Clinical Evidence – West Nile Neurological Syndrome (WNNS)

A significant feature of West Nile viral neurologic illness may be marked muscle weakness that is more frequently unilateral but can be bilateral. WNV should be considered in the differential diagnosis of all suspected cases of acute flaccid paralysis with or without sensory deficit. WNV-associated weakness typically affects one or more limbs (sometimes affecting one limb only). Muscle weakness may be the sole presenting feature of WNV illness (in the absence of other neurologic features) or may develop in the setting of fever, altered reflexes, meningitis or encephalitis. Weakness typically develops early in the course of clinical infection. Patients should be carefully monitored for evolving weakness and in particular for acute neuromuscular respiratory failure, which is a severe manifestation associated with high morbidity and mortality.

For the purpose of WNV Neurologic Syndrome Classification, muscle weakness is characterized by severe (polio-like), non-transient and prolonged symptoms. Electromyography (EMG) and lumbar puncture should be performed to differentiate WNV-associated paralysis from acute demyelinating polyneuropathy (i.e. Guillain-Barré syndrome). Lymphocytic pleocytosis (an increase in white blood cells with a predominance of lymphocytes in the CSF) is commonly seen in acute flaccid paralysis because of WNV, whereas pleocytosis is not a feature of Guillain-Barré syndrome.

Other emerging clinical syndromes, identified during 2002, included, but were not limited to, the following: myelopathy; rhabdomyolysis (acute destruction of skeletal muscle cells); peripheral neuropathy; polyradiculoneuropathy; optic neuritis; and acute demyelinating encephalomyelitis (ADEM). Ophthalmologic conditions, including chorioretinitis and vitritis, were also reported. As well, facial weakness was reported. Myocarditis, pancreatitis and fulminant hepatitis have not been identified in North America but were reported in outbreaks of WNV in South Africa. “Aseptic” meningitis without encephalitis or acute flaccid paralysis occurring in August and September when WNV is circulating may be due to non-polio enteroviruses circulating at the same time. This should be considered in the differential diagnosis.

A person with WNV-associated acute flaccid paralysis may present with or without fever or mental status changes. Altered mental status could range from confusion to coma with or without additional signs of brain dysfunction (i.e. paralysis, cranial nerve palsies, sensory deficits, abnormal reflexes, generalized convulsions and abnormal movements). Acute flaccid paralysis with respiratory failure is also a problem.

Clinical Evidence – West Nile Virus Non-Neurological Syndrome (WN Non-NS)

It is possible that other clinical signs and symptoms could be identified that have not been listed and may accompany probable case or confirmed case diagnostic test criteria. For example, gastrointestinal symptoms were seen in many WNV patients in Canada and the USA in 2003 and 2004.

Muscle weakness may be a presenting feature of WNV illness. For the purpose of WNV Non-Neurological Syndrome classification, muscle weakness or myalgia (muscle aches and pains) is characterized by mild, transient, unlikely prolonged symptoms that are not associated with motor neuropathy.

Clinical Evidence – West Nile Virus Asymptomatic Infection (WNAI)

This category could include asymptomatic blood donors whose blood is screened using a nucleic acid amplification test (NAT) by blood operators (i.e. Canadian Blood Services or Héma-Québec) and is subsequently brought to the attention of public health officials. The NAAT that will be used by blood operators in Canada is designed to detect all viruses in the Japanese encephalitis (JE) serocomplex. The JE serocomplex includes WN virus and nine other viruses, although from this group only WN virus and St Louis encephalitis virus are currently endemic to parts of North America. Blood operators in Canada perform a supplementary WN virus-specific NAT following any positi ve result from donor screening.

Diagnostic testing

Serum for EIA.

Treatment

Supportive therapy.

PUBLIC HEALTH MANAGEMENT & RESPONSE

Case management

Determine case status.

Contact and educate the individual and/or family.

Discuss the role of Public Health. Provide information to the individual or family and provide the general information sheet.

Educate on mosquito protection to avoid mosquito bites, including repellents (DEET) and protective clothing.

- Educate on mosquito control.
- Inquire about travel.
- Inquire about areas of work/activities ,where the individual resides.
- Inquire about mosquito bites.
- Inquire about donation or receipt of blood products, tissue or organs.
- Obtain any additional clinical information to complete the special surveillance form.

Surveillance forms

novascotia.ca/dhw/populationhealth/surveillanceguidelines/West_Nile_Virus_Case_Report_Form.pdf

General Information Sheet

REFERENCES

Public Health Agency of Canada. [2009]. Case Definitions for Communicable Diseases under National Surveillance. *CCDR 2009; 35S2, 1-123*. Retrieved from ***phac-aspc.gc.ca/publicat/ccdr-rmtc/09pdf/35s2-eng.pdf***

Control of Communicable Diseases Manual, 17th edition. 2000. James Chin, editor. American Public Health Association.

Report of the Committee on Infectious Diseases, 2000. American Academy of Pediatrics. West Nile Virus: ***cdc.gov/ncidod/dbmd/diseaseinfo***. West Nile Virus. Middlesex-London Health Unit.