Vector-borne and Zoonotic Diseases

West Nile Virus

Notification Timeline:

From Lab/Practitioner to Public Health: As soon as possible (not more than 48 hours)
From Public Health to Ministry of Health:
West Nile Virus Neuroinvasive Disease (WNND) – Within 72 hours.
West Nile Virus Non-Neuroinvasive Disease (WN Non-ND) – Not required.

Public Health Follow-up Timeline:

West Nile Virus Neuroinvasive Disease (WNND) – Within 72 hours.
West Nile Virus Non-Neuroinvasive Disease (WN Non-ND) – Not required.

Information

Case Definitions – West Nile Virus Neuroinvasive Disease (WNND) (Adapted from Council of State and Territorial Epidemiologists, 2013)

Confirmed Case –WNND	Clinical criteria **AND** at least one of the following laboratory criteria: • Isolation of virus from, or demonstration of specific viral antigen or nucleic acid in, tissue, blood, CSF, or other body fluid, **OR** • Four-fold or greater change in virus-specific quantitative antibody titers in paired sera **OR** • Virus-specific IgM antibodies in serum with confirmatory virus-specific neutralizing antibodies in the same or a later specimen **OR** • Virus specific IgM antibodies in serum with confirmatory avidity test* in the same or later specimen **OR** • Virus-specific IgM antibodies in CSF and a negative result for other IgM antibodies in CSF for arboviruses endemic to the region where exposure occurred.
Probable Case – WNND	Clinical criteria **AND** the following laboratory criteria: • Virus-specific IgM antibodies in CSF or serum but with no other testing.

Clinical Criteria – WNND	• 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** • 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.

[*] The presence of both IgM antibody and low avidity IgG in a patient's convalescent serum sample is consistent with current cases of viral-associated illness. However, test results that show the presence of IgM and high avidity IgG are indicative of exposures that have occurred in the previous season.
[†] History of exposure when and where West Nile virus transmission is present, or could be present, or history of travel to an area with confirmed WNV activity in birds, horses, other mammals, sentinel chickens, mosquitoes or humans or other plausible explanation of exposure to infected mosquitoes.
[‡] Alternative modes of transmission, identified to date, include laboratory acquired; in utero; receipt of blood components; organ/tissue transplant; and, possibly, through breast milk.

Case Definition – West Nile Virus Non-Neuroinvasive Disease (WN Non-ND) (Adapted from Council of State and Territorial Epidemiologists, 2013)

Confirmed Case – WN Non-ND	Clinical criteria **AND** at least one of the following laboratory criteria: • Isolation of virus from, or demonstration of specific viral antigen or nucleic acid in, tissue, blood, or other body fluid, excluding CSF **OR** • Four-fold or greater change in virus-specific quantitative antibody titers in paired sera **OR** • Virus-specific IgM antibodies in serum with confirmatory virus-specific neutralizing antibodies in the same or later specimen. **OR** • Virus specific IgM antibodies in serum with confirmatory avidity test* in the same or later specimen
Probable Case – WN Non-ND	Clinical criteria **AND** the following laboratory criteria: • Virus-specific IgM antibodies in serum but with no other testing.

Clinical Criteria – WN Non-ND	• 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** • fever or chills as reported by the patient or a health care provider **AND** • Absence of neuroinvasive disease **AND** • Absence of more likely clinical explanation
[*] The presence of both IgM antibody and low avidity IgG in a patient's convalescent serum sample is consistent with current cases of viral-associated illness. However, test results that show the presence of IgM and high avidity IgG are indicative of exposures that have occurred in the previous season. [†] History of exposure when and where West Nile virus transmission is present, or could be present, or history of travel to an area with confirmed WNV activity in birds, horses, other mammals, sentinel chickens, mosquitoes or humans or other plausible explanation of exposure to infected mosquitoes.. [‡] Alternative modes of transmission, identified to date, include laboratory acquired; in utero; receipt of blood components; organ/tissue transplant; and, possibly, through breast milk.	

Case Definition – Asymptomatic Blood Donors (Public Health Agency of Canada, 2008)

• Demonstration of West Nile Virus-specific nucleic acid amplification test on positive donor screen test result.
Canadian Blood Services perform a nucleic acid amplification test (NAT) on all blood donations to detect all viruses in the Japanese encephalitis (JE) serocomplex ─ WNV and 9 other viruses, most of which are not endemic to Canada. Confirmatory testing using a WNV-specific NAT is then performed on donor blood that has screened positive..

Canadian Blood Services (CBS) reports all cases of positive blood donors to the regional MHO as per Section 32 of *The Public Health Act*. No follow-up by public health is required on these reports.

Causative Agent

The West Nile virus (WNV) is a single-stranded RNA Flavivirus.

Symptoms

The vast majority of WNV infections are asymptomatic.

Approximately 20% of persons experience an acute systemic febrile illness that often includes headache, weakness, myalgia, or arthralgia; gastrointestinal symptoms and a transient maculopapular rash also are commonly reported. This form of illness is called WNV non-neuroinvasive disease (previously West Nile non-neurological syndrome)

Less than 1% of infected persons develop WNV neuroinvasive disease (previously West Nile neurological syndrome), which typically manifests as meningitis, encephalitis, or acute flaccid paralysis. For every case of neuroinvasive disease, there are approximately 150 WNV infections.

Meningitis generally presents with fever, headache and nuchal rigidity (neck stiffness).

Encephalitis generally presents with fever and altered mental status, seizures, focal neurologic deficits, or movement disorders such as tremor or parkinsonism.

Acute flaccid paralysis due to WNV is clinically and pathologically identical to poliovirus-associated poliomyelitis. It often presents as an isolated limb paresis or paralysis and can occur with or with fever or apparent viral prodrome. It may progress to respiratory paralysis requiring mechanical ventilation.

WNV-associated Guillain-Barré syndrome and radiculopathy have also been reported.

Rarely, cardiac dysrhythmias, myocarditis, rhabdomyolysis, optic neuritis, uveitis, chorioretinitis, orchitis, pancreatitis, and hepatitis have been described in patients with WNV disease.

Complications
Most persons with WNV non-neuroinvasive disease recover completely, but fatigue, malaise, and weakness can last for weeks or months. Persons with WNV neuroinvasive disease presenting with meningitis generally recover completely but persons presenting with encephalitis or acute flaccid paralysis often have residual neurologic deficits. Among persons with WNV neuroinvasive disease, the overall case-fatality ratio is approximately 10% (U.S. Centers for Disease Control and Prevention, 2013).

Incubation Period
Typically 2 to 6 days, ranging up to 14 days but can be several weeks for immunocompromised individuals (U.S. Centers for Disease Control and Prevention, 2013).

Reservoir/Source
Wild birds are the predominant reservoir including > 300 different species found in North America. Mammals, including humans, are considered incidental or dead-end hosts because viral concentrations are not high enough to create the infection in mosquito vectors. It is unclear how West Nile virus is maintained in Saskatchewan, but is most likely re-introduced through migrating birds, present in over-wintered or hibernating *Culex* mosquitoes, or maintained in resident bird or other mammal, amphibian, or reptile populations. Squirrels have been implicated as competent reservoirs for WNV in California and other arboreal animals may contribute to maintenance and transmission ecology of WNV in North America (Platt et al. 2008).

Mode of Transmission
Enzootic cycle involving mosquitoes, primarily *Culex* sp., and birds or birds eating other birds. Mosquitoes acquire the virus after feeding on infected birds or to a lesser extent, through transovarial transmission from an infected mother. Viremia in birds tends to peak 1 to 4 days after exposure. The extrinsic incubation period (EIP) of the virus within the mosquito varies and is dependent on temperature and a number of other factors.

The minimum developmental temperature for West Nile virus incubation and replication within the mosquito is 14.3°C and 109 accumulated Degree Days above this base temperature are required to complete the EIP for the virus within the mosquito and for that mosquito to become fully infective and efficiently transmit the virus to another bird, or to a human. The female must complete at least one biting/egg-laying cycle before she can effectively transmit the virus. The EIP can be quite short during warm weather (5-7 days) and quite long (> 2-3 weeks) under cooler conditions.

The risk of transmission to humans increases when there are high numbers of infected "bridge" species (mosquitoes that bite both birds and other animals) such as *Culex tarsalis* and there are hot, humid conditions during the evening and night-time period.

Alternative modes of transmission exist although they are extremely rare. Those identified to date, include laboratory acquired; in utero; receipt of blood components; organ/tissue transplant; and, possibly, through breast milk.

Risk Groups

- Individuals who work outside or participate in outdoor activities are at higher risk of acquiring infection because of greater exposure to mosquitoes
- Individuals with chronic illnesses, such as cancer, diabetes, hypertension and kidney disease, are at higher risk of serious illness

Period of Communicability

Not applicable.

Specimen Collection and Transport

The following specimens should be submitted on persons presenting with meningitis, encephalitis, acute flaccid paralysis, or other acute signs of central or peripheral neurologic dysfunction (with or without fever) may have West Nile virus (WNV) neuroinvasive disease:

- serum sample for WNV IgM antibodies
- CSF for WNV PCR[1]

When a plasma PCR is indicated, send EDTA plasma, separated[1].

With paired sera, convalescent samples should be taken 14 days after the initial sample.

Methods of Control/Role of Investigator

Prevention and Education

Refer to the Vector-borne and Zoonotic Diseases – Introduction and General Considerations section of the manual that highlights topics for client education that should be considered as well as provides information on high-risk groups and activities. Prevention measures are where the most emphasis should be placed.

Refer to the Government of Saskatchewan website for information on West Nile Virus Awareness and Prevention.[2]

[1] If the sample can reach SDCL within four hours, send on ice packs. If it will take longer than four hours to reach the SDCL, send the sample frozen on dry ice.

[2] http://www.saskatchewan.ca/live/health-and-healthy-living/health-topics-awareness-and-prevention/seasonal-health-concerns/west-nile-virus/west-nile-virus-awareness-and-prevention

Surveillance
Various activities to determine the presence and risk of West Nile virus transmission can be undertaken including:

- avian and equine morbidity/mortality surveillance;
- larval and adult mosquito collection and testing;
- surveillance of weather and other environmental risk factors;
- surveillance of human illness locally and in neighbouring provinces/states.

Immunization

- There is no human vaccine currently available.
- Equine (horse) vaccines are available.

Communication/Education
Population health communication strategies should include a combination of risk communication and implementation of environmental and personal protective measures. This information should be disseminated prior to the emergence of mosquitoes and repeated during the summer months as the transmission risk begins to increase.

Key preventative measures include:
Environmental Prevention Measures

- Clean eaves troughs and regularly empty bird baths and other items that might collect water.
- Ensure rain barrels are covered with mosquito screening or are tightly sealed around the downspout.
- Clear yards of old tires or other items that collect water.
- Improve landscaping to prevent standing water around the home.
- Remove decaying debris such as fallen leaves, grass clippings, and dense shrubs that provide shelter for adult mosquitoes.
- Areas with shallow standing water, particularly those with high organic matter content that cannot be drained can be treated with a larvicide to kill mosquitoes in their larval stage.
- Municipal mosquito control programs that use integrated pest management (IGM) principals should be encouraged. These programs include: larval and adult mosquito surveillance, source reduction, larval and in some cases, adult mosquito control, and public education.

- Refer to Government of Saskatchewan handout "West Nile Virus and Your Property"[3].

Personal Protective Measures

- Wear loose fitting, light color clothing that covers as much exposed skin as possible.
- Reduce the amount of time spent outdoors during times when mosquito activity is the greatest (between dusk and dawn).
- Individuals who are highly active with outdoor activities or who work outdoors can be at greater risk of infection.
- Use DEET containing personal insect repellents on exposed skin. Refer to the Government of Canada website for guidelines on DEET use: http://www.hc-sc.gc.ca/hl-vs/iyh-vsv/life-vie/insect-eng.php. Repellents with Icaridin and oil of eucalyptus are also effective. See Health Canada website for more information: http://www.hc-sc.gc.ca/hl-vs/iyh-vsv/life-vie/insect-eng.php
- Maintain door and window screens so they fit tightly and are free of holes.
- Refer to Government of Saskatchewan brochure "Protect Yourself: West Nile Virus"[3]

Management

I. Case

History

Physicians are required to report to Public Health if:

- the patient is a donor or recipient of blood or blood products or is a tissue recipient
- the patient has clinical presentation of neuroinvasive disease

Human case investigation will be performed by the attending physician and Public Health. Information collected includes:

- clinical manifestation;
- clinical information (onset dates, hospitalization, outcome of illness, etc.);
- travel history;
- history of suspected exposures/mode of transmission;
- blood/plasma donor or recipient or tissue recipient information.

[3] http://www.saskatchewan.ca/live/health-and-healthy-living/health-topics-awareness-and-prevention/seasonal-health-concerns/west-nile-virus/west-nile-virus-awareness-and-prevention

See Attachments:

- Physician Reporting Form for West Nile Virus;
- West Nile Virus Case Investigation Form;
- Decision-Making Algorithm for Notification.

Treatment/Supportive Therapy

Supportive therapies only. Clinical trials to evaluate proposed treatments are ongoing.

Immunization

Not applicable.

Exclusion

There is a deferral period for donating blood or blood products to Canadian Blood Services (CBS). CBS should be contacted directly for detailed information.

Referrals

CBS is to be notified when a case has identified any history of receiving or donating blood or blood products. See Appendix K – Notification to Canadian Blood Services for the template form for making these referrals.

The Saskatchewan Transplant Program is to be notified when a case has identified receiving a tissue transplant in the 8 weeks prior to onset of symptoms. See Appendix M – Notification to Saskatchewan Transplant Program for the template form for making these referrals.

II. Contacts/Contact Investigation

Contact Definition

Not applicable.

III. Environment

See Environmental Prevention Measures above. Refer to the Government of Saskatchewan website for information on mosquito control.[4]

[4] http://www.saskatchewan.ca/live/health-and-healthy-living/health-topics-awareness-and-prevention/seasonal-health-concerns/west-nile-virus/west-nile-virus.

The risk of human disease is calculated weekly according to an empirical risk assessment framework using numbers of vector mosquitoes, infection rates, age structure of the mosquito population, human population at risk, and other surveillance indicators (bird, horse, human, and environmental risk factors such as degree day accumulations, night-time temperatures, amount of mosquito habitat, etc.). The risk assessments help guide the WNV response in terms of risk communication, mosquito control, and other prevention activities.

Dead birds are a potential source of transmission however the risk is minimal. Special handling considerations are required for all dead animals regardless of suspected WNV infection. The following procedure should be used:

- Do not handle the bird, its blood, or secretions with bare hands.
- If possible, use a shovel to handle the carcass and bury it if a location is convenient.
- Use durable plastic gloves or, at minimum, several plastic bags. Bags should be inverted prior to grabbing the animal. Fold the bag back around the carcass so it ends up inside.
- Take care not to grab the claws or beak or allow these parts to puncture the bag or gloves.
- Double bag the carcass and tie it off tightly. The animal can be disposed of with municipal waste.
- Once disposed of, wash hands thoroughly.

Larval Mosquito Control

Larviciding is the application of chemical/biological agents to areas where mosquito larvae are present. Thorough identification of larval development sites is critical to a successful larviciding program.

Adult Mosquito Control

During periods of high transmission risk determined from thorough analysis of the surveillance and environmental risk factors, targeted adult mosquito control may be considered as part of the WNV response program. This is used to quickly reduce the number of infected mosquitoes in an area and to break the transmission cycle.

Reduction of Occupational Exposures

- Steps to limit occupational exposure to the West Nile virus can be taken by applying the general prevention strategies to worksites and workplaces.

- Refer to "Protecting Outdoor Workers from West Nile Virus" available at http://www.lrws.gov.sk.ca/ohs-booklets-brochures-guides.

Child Care Centre Control Measures

- Considerations to minimize exposure to mosquitoes should be given to children playing outside or taken on field trips.
- Openable windows in child care centres should have tight fitting screens to prevent insect entry.
- See Prevention and Education above.

Institutional Control Measures

- Staff within institutional settings should be aware of the signs and symptoms of West Nile virus infection so residents, particularly those with compromised immune systems can be assessed medically without delay.
- Openable windows should have tight fitting screens to prevent insect entry.
- See Prevention and Education above.

Epidemic Measures

- Public education regarding prevention activities is essential.
- Chemical/biological control of mosquitoes in larval and adult stages should be maintained or increased during epidemic periods.
- Immunize livestock.
- Refer to Government of Saskatchewan website for information on WNV risk.[5]

[5] http://www.saskatchewan.ca/live/health-and-healthy-living/health-topics-awareness-and-prevention/seasonal-health-concerns/west-nile-virus/west-nile-virus

References

American Academy of Pediatrics. (2012). *Red book: 2012 Report of the Committee on Infectious Diseases* (29th ed.). Elk Grove Village, IL: Author.

Council of State and Territorial Epidemiologists (2013). Update to Arboviral neuroinvasive diseases case definition. Retrieved June 2014 from http://c.ymcdn.com/sites/www.cste.org/resource/resmgr/PS/13-ID-13.pdf

Heymann, D. L. (Ed.). (2008). *Control of communicable diseases manual* (19th ed.). Washington, DC: American Public Health Association.

Lefrère, J., Main, J., Prati, D., Sauleda, S., Reesink, H. (2003). West Nile virus and blood donors. *The Lancet. Vol. 361(9374) Jun 14, 2003*. Retrieved June, 2014 from http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(03)13658-6/fulltext.

Platt, K. B., Tucker, B. J., Halbur, P. G., Blitvich, J., Fabiosa, F. G., Mullin, K. et al. (2008). Fox squirrels (*Sciurus niger*) develop West Nile virus viremias sufficient for infecting select mosquito species. *Vector-Borne and Zoonotic Diseases. Vol. 8(2) May 1, 2008.*

Public Health Agency of Canada. (2008). Case definitions for communicable diseases under national surveillance. *Canada Communicable Disease Report (CCDR), 35S2, November 2009*. Retrieved June, 2014 from http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/09vol35/35s2/V_Nile_Nil-eng.php.

U.S. Centers for Disease Control and Prevention. (2006). *West Nile Virus (WNV) Infection: Information for Clinicians* [Fact Sheet]. Retrieved June, 2014 from http://www.cdc.gov/ncidod/dvbid/westnile/resources/fact_sheet_clinician.htm.

West Nile Virus
Attachment – Physician Reporting Form for West Nile Virus

Please see the following pages for the Physician Reporting Form for West Nile Virus.

The following form must be completed within 48 hours of receiving positive laboratory reports (eg. IgM, PCR) for WNV for either:

- Individuals with a history of:
  - Donation of blood or blood products to Canadian Blood Services in the 2 weeks prior to onset of symptoms;
  - Receipt of blood or blood products within the 8 weeks before onset of symptoms;
  - Receipt of tissue within the 8 weeks before onset of symptoms

OR

- Individuals with neuroinvasive disease and the absence of a more likely explanation

Physician Reporting Form for West Nile Virus

Report to public health within 48 hours if the criteria in Section C or D apply.

SECTION A. PATIENT INFORMATION

Health card number (PHN): __ __ __ __ __ __ ___ __ __

Last name: _____ First name: _____

DOB: _____/____/____ (yyyy/mm/dd) Phone: (_____) _____

Address: _____

SECTION B. EVIDENCE OF INFECTION

Laboratory evidence of West Nile Virus infection? ☐ No ☐Yes

Indicate onset date for first sign/symptom: _____/____/____ (yyyy/mm/dd)

Symptoms: _____

SECTION C. BLOOD/TISSUE DONOR OR RECIPIENT

Has this individual received a blood transfusion/blood product in the 8 weeks prior to onset of symptoms? ☐ No ☐ Yes

Has this individual donated blood in the 2 weeks prior to the onset of their symptoms?
☐ No ☐ Yes

Has this individual received a tissue in the 8 weeks prior to the onset of their symptoms?
☐ No ☐ Yes

SECTION D. NEUROINVASIVE DISEASE

Check the appropriate manifestation of West Nile Neuroinvasive Disease:

☐ Meningitis ☐ Encephalitis ☐ Acute Flaccid paralysis

☐ Other acute signs of central or peripheral neurologic dysfunction

Hospitalized? ☐ No ☐Yes Where:_____

Deceased? ☐ No ☐ Yes Date of Death: _____/____/____ (yyyy/mm/dd)

Has a more likely explanation of illness has been ruled out (i.e. stroke)? ☐ No ☐Yes

Physician (Please print or stamp)	Phone number	Date (yyyy/mm/dd)

Fax the completed form back to <*health region confidential fax number goes here*>
An electronic version of the form can be obtained http://www.ehealthsask.ca/services/manuals/Documents/4-150-WNV-Physician-Reporting-Form.doc

Revised 2014

West Nile Virus
Attachment – WNV Case Investigation Form

Please see the following pages for the West Nile Virus Case Investigation Form.

West Nile Virus Case Investigation Form

Data should be entered and updated in iPHIS immediately. Saskatchewan Ministry of Health will take the information from iPHIS.

The bolded data fields with asterisks are mandatory for surveillance. The shaded, bolded and bracketed information indicates where the data is entered in iPHIS. Please use yyyy/mm/dd for all dates.

SECTION A. PATIENT INFORMATION (*Demographics Module*):

1. *Health card number (PHN): ___ ___ ___ ___ ___ ___ ___ ___ ___

2. *Last name: _____

3. *First name: _____ **Middle name:** _____

4. *Date of birth: _____/____/____ (yyyy/mm/dd) **5. *Age:** _____ **6. *Sex**: ☐ Male ☐ Female

7. *Street Address OR **Legal Land Description:** _____

Apartment number: _____

8. *City/town: _____ **9. *Postal code:** |__|__|__| |__|__|__|

10. Telephone number: Home (____) ____-_____ **11.** Work (____) ____-_____

12. *If the primary residence is on a First Nations reserve enter in First Nations section ☐**Yes** ☐**No**
***(First Nations, Status*)**

13. Attending physician: _____ **14.** Physician phone number: (____) ____-_____

SECTION B. CASE MANIFESTATION:
(Please consult the Case Definitions for West Nile virus (WNV) in the Vector-borne and Zoonotic Diseases – West Nile Virus section of the Saskatchewan Communicable Disease Control Manual for explanation of these categories), *The Case Status or Manifestation in iPHIS should be updated if further available information warrants.*

15. Identify case manifestation in table below. (***CD Module/Case tab/Subtype field***)

***Manifestation – as per the attending physician**	
West Nile Virus Neurological Disease (to be used for reporting **West Nile Virus Neuroinvasive Disease(WNND)**)	☐
West Nile Virus Non-Neurological Syndrome (to be used for reporting **West Nile Virus Non-Neuroinvasive Disease (WN Non-ND)**)	☐
Asymptomatic **(**to be used for documenting **Asymptomatic Blood Donors)**	☐

16. *Date lab specimen was collected: _____/____/____ (yyyy/mm/dd) (***Lab Module***)

SECTION C. CLINICAL INFORMATION:
17. *Onset date of signs and symptoms_____/____/____ (yyyy/mm/dd) **confirmed by the attending physician (*CD Module/Signs&Symp*)**

Signs and Symptoms must be documented when WNND is reported. These symptoms MUST be related to WNV infection or have worsened in a case with a previous underlying neurological condition.

☐Fever ($\geq 38^{o}$C or 100^{o}F)
☐Acute demyelinating encephalomyelitis
☐Acute Flaccid Paralysis
☐Arthralgia
☐Encephalitis
☐Facial paralysis
☐Fatigue
☐Headache
☐Lymphadenopathy
☐Maculopapular rash
☐Meningitis
☐Movement disorders
☐Mylagia
☐Optic neuritis
☐Parkinson–like symptoms
☐Peripheral neuropathy
☐Polyradiculopathy

18. If the patient is of childbearing age, is she **pregnant**? ☐ Yes ☐ No ☐ Not asked (***CD Module/Risks – Medical Risk***)

19. *Hospitalized: ☐ Yes ☐ No (***CD Module/Outcome***) Hospital name: _____

20. Date of admission: _____/____/____ (yyyy/mm/dd) **21.** Date of discharge: _____/____/____ (yyyy/mm/dd)

22. *Outcome of illness (at time of interview): (***CD Module /Outcome***)

☐ Alive
☐ Deteriorating
☐ Fatal ***Date of death** _____/____/____ (yyyy/mm/dd)
☐ Recovered
☐ Recovering
☐ Stable

23. ***If Died, how did West Nile Virus relate to the <u>cause of death</u>:** (***CD Module /Outcome***)

☐ Underlying cause of death
☐ West Nile Virus contributed to the death, but was not the underlying cause
☐ West Nile Virus did not contribute to the death, and was an incidental finding
☐ Unknown

SECTION D. TRAVEL HISTORY: (*CD Module/Exposure*)

24. ***Ask this question for ALL cases with onset of symptoms prior to July 31. If the onset of symptoms is on July 31 or later, ask only for cases with an out-of-province travel history.**

In the 10 days before onset of symptoms, was there travel to an area in Canada or the USA where WNV is currently active, or to the tropics where other flavivirus diseases exist (e.g., Dengue)?

☐ No ☐ Yes If yes, where _____

Exposure Category	Case Event/Location	Comments
☐ Travel inside province	Location by health region:	Further details if available:
☐ Travel outside province/country	Type province/state/country:	Further details if available

25. For health regions wishing to evaluate the effect of larvaciding in their jurisdiction, ask this question:

In the 10 days before onset of symptoms, name the places where you spent your early mornings or evenings out of doors (e.g., name of lake, golf course, park, sports field)?

_____
_____
_____

***SECTION E.** 23**. Likely mode of transmission (*CD Module/Exposure*)**	Check those that apply
Mosquito bite	☐
Non-Mosquito transmission, including:	☐
Blood transfusion recipient (After 1985) NOTE - use this category for tissue recipients as well)	☐
Blood product recipient (After 1985)	☐
Breastfed Infant	☐
Infant born to case	☐
Laboratory-acquired infection	☐
Occupational Exposure (Medical) or Occupational Exposure (Non-Medical) If Yes, please specify:	☐

*SECTION E. 23. Likely mode of transmission (*CD Module/Exposure*)	Check those that apply
Exposure to birds 10 days prior to symptom onset If Yes, please specify:	☐
Other, please specify:	☐

SECTION F. BLOOD/PLASMA DONORS AND RECIPIENTS

If patient/client was a *donor* and/or *recipient* of blood/plasma/blood components, **local public health will notify the Canadian Blood Services using the referral form in the CDC Manual - http://www.health.gov.sk.ca/cdc-appendixK.**

Blood, plasma or blood components	***Donated*** in past 2 weeks? ☐ No ☐ Yes ☐ Unknown	***Received*** in past 8 weeks? ☐ No ☐ Yes ☐ Unknown	Date: _____/____/____ (yyyy/mm/dd City: _____ Prov/Territory: _____

SECTION G. TISSUE RECIPIENTS

If patient/client was a *recipient* of a tissue as defined below, **local public health will notify the Saskatchewan Transplant Program using the referral form in the CDC Manual - http://www.health.gov.sk.ca/cdc-appendixM**

Tissues	**Indicate the tissue the client received below:** ☐ bone ☐skin ☐ tendon ☐cornea ☐ heart valve ☐sclera	***Received*** in past 8 weeks? ☐ No ☐ Yes ☐ Unknown	Date: _____/____/____ (yyyy/mm/dd City: _____ Prov/Territory: _____

Investigator's signature: _____

Date of interview: _____/____/____ (yyyy/mm/dd)

Date entered to iPHIS: ____/____/_____ (yyyy/mm/dd)

West Nile Virus
Attachment – Decision Making Algorithm for Notification