

# Appendix A: Disease-Specific Chapters

**Chapter: West Nile Virus Illness**

Effective: February 2019

# West Nile Virus Illness

Communicable

Virulent

**Health Protection and Promotion Act:  
O. Reg. 135/18 (Designation of Diseases)**

## 1.0 Aetiologic Agent

West Nile Virus (WNV) is a ribonucleic acid (RNA) virus of the genus Flavivirus.<sup>1</sup>

## 2.0 Case Definition

### 2.1 Surveillance Case Definition

Refer to [Appendix B](#) for Case Definitions.

### 2.2 Outbreak Case Definition

Not applicable.

## 3.0 Identification

### 3.1 Clinical Presentation

There are three clinical manifestations of WNV; asymptomatic, non-neurological, and neurological. The majority of WNV cases are asymptomatic. About 20% of infected persons develop the usually less severe symptom complex known as WNV fever (non-neurological syndrome). This presents with a mild flu-like illness with fever, headache, and body aches, occasionally with a skin rash and swollen lymph nodes or other non-specific symptoms that last several days. Other symptoms may include nausea, vomiting, diarrhea, eye pain or photophobia.<sup>2,3</sup>

WNV neurological symptoms can present as meningitis, encephalitis as well as conditions similar to acute flaccid paralysis, and Parkinson's disease.<sup>1,4</sup> Less than 1% of infected people will develop neurological symptoms.<sup>1</sup>

### 3.2 Diagnosis

See [Appendix B](#) for diagnostic criteria relevant to the Case Definitions.

For further information about human diagnostic testing, contact the Public Health Ontario Laboratories or refer to the Public Health Ontario Laboratory Services webpage: <http://www.publichealthontario.ca/en/ServicesAndTools/LaboratoryServices/Pages/default.aspx>

## 4.0 Epidemiology

### 4.1 Occurrence

Every continent except Antarctica.<sup>2</sup> The virus was first isolated in 1937 in the West Nile district of Uganda. The first recorded outbreak in North America happened in New York City in 1999.<sup>3</sup>

In Canada, the virus was first confirmed in birds in 2001 and the first human case was confirmed in Ontario in 2002.<sup>5</sup> Locally acquired WNV occurs in the summer months, with the majority of cases occurring in August and September.

In Ontario, between 2006-2016, annual number of cases varied between 4 and 271.<sup>6</sup>

There are no scientific models that can accurately predict the extent of WNV activity from one year to the next; multiple factors, including weather affect mosquito growth and development as well as viral transmission.

Please refer to Public Health Ontario's (PHO) Reportable Disease Trends in Ontario reporting tool and other reports for the most up-to-date information on infectious disease trends in Ontario.

<http://www.publichealthontario.ca/en/DataAndAnalytics/Pages/DataReports.aspx>

For additional national and international epidemiological information, please refer to the Public Health Agency of Canada and the World Health Organization.

### 4.2 Reservoir

Birds are the main reservoir of WNV in North America. WNV is transmitted in an enzootic cycle between mosquitoes and amplifying vertebrate hosts, primarily birds. Birds infect feeding vector mosquitoes that then transmit the virus to humans and other mammals during subsequent feedings. The concentrations of the virus in human blood is generally too low to infect mosquitoes, making humans incidental or "dead-end" hosts.<sup>2</sup>

### 4.3 Modes of Transmission

WNV is transmitted to humans primarily through bites of infected *Culex* mosquitoes.<sup>1</sup> In Ontario, the main vectors of concern are *Culex pipiens* and *Culex restuans*.<sup>5</sup>

Person-to-person WNV transmission can occur through blood transfusion and solid organ transplantation. Intrauterine transmission and probable transmission via human milk also have been described but appear to be uncommon.<sup>1,2</sup>

### 4.4 Incubation Period

Usually 2-6 days but ranges from 2-14 days and can be as long as 21 in immunocompromised people.<sup>1,2</sup>

## 4.5 Period of Communicability

Viraemia in humans usually last fewer than 7 days in immunocompetent persons.<sup>2</sup>

## 4.6 Host Susceptibility and Resistance

Risk of WNV infection is generally determined by exposure to infected vectors and is dependent on many factors including environmental conditions, season and human activities. Once infected, older age, chronic renal disease, immune suppression, history of alcohol abuse, diabetes and hypertension have been associated with higher risk of severe disease.<sup>2</sup>

## 5.0 Reporting Requirements

As per Requirement #3 of the “Reporting of Infectious Diseases” section of the *Infectious Diseases Protocol, 2018* (or as current), the minimum data elements to be reported for each case are specified in the following:

- *Ontario Regulation 569* (Reports) under the *Health Protection and Promotion Act* (HPPA);<sup>7</sup>
- The iPHIS User Guides published by PHO; and
- Bulletins and directives issued by PHO.

## 6.0 Prevention and Control Measures

### 6.1 Personal Prevention Measures

Provide public education regarding:

- The use of insect repellent when outdoors. Consider using federally registered personal insect repellents on exposed skin, such as those containing DEET or other approved repellants. Follow the manufacturer’s label for directions on use.
- Wearing long sleeve shirts, long pants, and light coloured clothes.
- Cleaning up mosquito-friendly areas around your home regularly such as standing water.

For more information on prevention measures refer to the West Nile Virus Preparedness and Prevention Plan (2018, or as current) from the Ministry of Health and Long-Term Care (ministry).<sup>8</sup>

### 6.2 Infection Prevention and Control Strategies

The board of health shall develop and utilize a local vector-borne management strategy in order to mitigate risk. This strategy shall include measures such as:

- Local risk assessments;
- Public education; and
- Source reduction when and where applicable.

For healthcare settings, implementing routine practices is sufficient.

For more information on vector-borne management strategies refer to *Ontario Regulation 199 (Control of West Nile Virus)* under the HPPA and the West Nile Virus Preparedness and Prevention Plan (2018, or as current).<sup>8,9</sup>

Refer to PHO's website at [www.publichealthontario.ca](http://www.publichealthontario.ca) to search for the most up-to-date Provincial Infectious Diseases Advisory Committee information on Infection Prevention and Control.

### 6.3 Management of Cases

In addition to the requirements set out in the Requirement #2 of the “Management of Infectious Diseases – Sporadic Cases” and “Investigation and Management of Infectious Diseases Outbreaks” sections of the *Infectious Diseases Protocol, 2018* (or as current), the board of health shall investigate cases to determine the source of infection. Refer to Section 5: Reporting Requirements above for relevant data to be collected during case investigation.

As per the *Infectious Diseases Protocol, 2018* (or as current), notify Trillium Gift-of-Life of any positive human WNV results with organ donation histories.

### 6.4 Management of Contacts

Not applicable.

### 6.5 Management of Outbreaks

Please see the *Infectious Diseases Protocol, 2018* (or as current) as well as the ministry's West Nile Virus Preparedness and Prevention Plan (2018, or as current) for the public health management of outbreaks or clusters in order to identify the source of illness, manage the outbreak and limit secondary spread.<sup>8</sup>

## 7.0 References

1. Committee on Infectious Diseases, American Academy of Pediatrics. Section 3: Summaries of Infectious Diseases: West Nile Virus. In: Kimberlin DW, Brady MT, Jackson MA, Long SS, editors. Red Book: 2018 Report of the Committee on Infectious Diseases. 31 ed. Itasca, IL: American Academy of Pediatrics; 2018.
2. Heymann DL, editor. Control of Communicable Diseases Manual. 20 ed. Washington, D.C: American Public Health Association; 2015.
3. Government of Canada. Pathogen Safety Data Sheets: Infectious Substances – West Nile virus (WNV) [Internet]. Ottawa, ON: Her Majesty the Queen in Right of Canada; 2018 [updated June 13, 2018; cited August 20, 2018]. Available from: <https://www.canada.ca/en/public-health/services/laboratory-biosafety-biosecurity/pathogen-safety-data-sheets-risk-assessment/west-nile-virus.html>

4. Mackenzie JS, Gubler DJ, Petersen LR. Emerging flaviviruses: the spread and resurgence of Japanese encephalitis, West Nile and dengue viruses. *Nature Medicine*. 2004;10(12S):S98-S109.
5. Ontario Agency for Health Protection and Promotion (Public Health Ontario). Vector-borne diseases: 2016 summary report. Toronto, ON: Queen's Printer for Ontario; 2017. Available from: <https://www.publichealthontario.ca/en/diseases-and-conditions/infectious-diseases/vector-borne-zoonotic-diseases/west-nile-virus>
6. Ontario Agency for Health Protection and Promotion (Public Health Ontario). Reportable Disease Trends in Ontario: West Nile virus illness [Internet]. Toronto, ON: Queen's Printer for Ontario; 2018 [updated March 29, 2018; cited August 20, 2018]. Available from: <https://www.publichealthontario.ca/en/DataAndAnalytics/pages/rdto.aspx>
7. Health Protection and Promotion Act, R.S.O. 1990, Reg. 569, Reports, (2018). Available from: <https://www.ontario.ca/laws/regulation/900569>
8. Ontario, Ministry of Health and Long-Term Care. West Nile Virus Preparedness and Prevention Plan. Toronto, ON: Queen's Printer for Ontario; 2018. Available from: [http://www.health.gov.on.ca/en/pro/programs/publichealth/oph\\_standards/reference.aspx](http://www.health.gov.on.ca/en/pro/programs/publichealth/oph_standards/reference.aspx)
9. Control of West Nile Virus, O. Reg. 199/03. Available from: <https://www.ontario.ca/laws/regulation/030199>

## 8.0 Document History

**Table 1: History of Revisions**

Revision Date	Document Section	Description of Revisions
March 2017	General	New Template
March 2017	6.3 Management of Cases	Removal of "...Canadian Blood Services (CBS) and..."
March 2017	Document History	Updated

<b>Revision Date</b>	<b>Document Section</b>	<b>Description of Revisions</b>
February 2019	General	Minor revisions were made to support the regulation change to Diseases of Public Health Significance, West Nile Virus Illness is designated a disease of public health significance and is no longer classified as communicable. Common text included in all Disease Specific chapters: Surveillance Case Definition, Diagnosis, Reporting Requirements, Management of Cases, and Management of Outbreaks. The epidemiology section and references were updated and Section 8.0 Additional Resources was deleted.
February 2019	4.2 Reservoir	Entire section revised.
February 2019	4.3 Modes of Transmission	Entire section revised.
February 2019	4.4 Incubation Period	Entire section revised.
February 2019	4.5 Period of Communicability	Entire section revised.
February 2019	4.6 Host Susceptibility and Resistance	Entire section revised.
February 2019	6.3 Management of Cases	Second paragraph, removed notification for blood donation histories.

