Ministry of Health and Long-Term Care

Infectious Diseases Protocol

# Appendix A: Disease-Specific Chapters

## Chapter: Poliomyelitis, acute

Effective: February 2019

Ontario

# Poliomyelitis, acute

☒ Communicable

☐ Virulent

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

# 1.0 Aetiologic Agent

Poliomyelitis is caused by the poliovirus, a member of the genus *Enterovirus*. There are three types: poliovirus type 1, 2, and 3, and they can all cause paralysis.[1] However, the majority of polio infections (90% to 95%) do not have any symptoms.[2]

Infection can also occur rarely as a result of vaccine-associated paralytic poliomyelitis (VAPP) following immunization with the oral polio vaccine (OPV). OPV contains live attenuated virus. It is not used in Canada but is used in some parts of the world.[1,2]

# 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

Most polio infections (90% to 95%) are asymptomatic. Symptomatic polio is most often recognized by the acute onset of flaccid paralysis. However, severity can range from subclinical infection or non-specific fever in 90% to paralytic disease in less than 1% of infections.[1] Symptoms of minor illness include fever, headache, malaise, nausea and vomiting and can progress to major disease distinguished by severe muscle pain and stiffness of the neck and back with or without flaccid paralysis.[1] Aseptic meningitis occurs in approximately 1% of infected individuals.[1]

Paralysis is most often asymmetric and accompanied by fever; the maximum extent of paralysis is reached in 3 to 4 days.[1] Paralysis may improve during the convalescent period; however, paralysis that persists beyond 60 days is likely permanent.[1] Paralysis of the respiratory or swallowing muscles can be life-threatening.[1] The case-fatality ratio for paralytic polio is 2% to 5% in children and 15% to 30% for adults.[2]

## 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

Polio is endemic in three countries, Afghanistan, Nigeria and Pakistan, with other countries suspected of having re-established transmission of poliovirus.[2] Canada was certified polio-free in 1994.[2] The last indigenous case of wild poliovirus detected in Canada was in 1977.[2] Risk of polio in Canada is associated with importations of wild poliovirus and OPV use from other countries, with isolated cases of VAPP reported in Canada in 2007 and 2009.[2] Polio primarily affects infants and young children in the three countries where the disease remains endemic, with 80% to 90% of cases occurring in those less than 3 years of age.[1]

Between 2013 and 2017, no cases of polio were reported in Ontario.*

In Ontario, acute flaccid paralysis (AFP) is a reportable syndrome. For further information, refer to *Appendix A, Disease-Specific Chapter, Acute Flaccid Paralysis (AFP)*.

Surveillance for AFP is conducted by the Public Health Agency of Canada in conjunction with the Canadian Pediatric Society for children less than 15 years of age as part of ensuring Canada remains polio-free.[1]

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

Humans, most frequently in people with inapparent infections, especially children. There are no long-term carriers of wild type polio virus.[1]

* Data included in the epidemiological summary are from January 1, 2013 to December 31, 2017. Data were extracted from Query on February 7, 2018 and therefore are considered preliminary.

## 4.3 Modes of Transmission

Polio is transmitted person to person, predominantly through the fecal-oral and rarely via respiratory route.[1,2] Rarely through milk and foodstuff contaminated with stool.[1]

## 4.4 Incubation Period

Commonly 7-14 days for paralytic cases; there has been a reported range of 3 to possibly 35 days.[1]

## 4.5 Period of Communicability

Not precisely defined, however it is communicable for as long as the virus is shed in the throat and/or the stool; cases are most infectious in the days before and after onset of symptoms. Virus usually persists in the throat for 1 week and in stool for 3-6 weeks.[1]

Poliovirus is shed in throat secretions as early as 36 hours to 7 days and in the stool 72 hours to six weeks after exposure to infection in both clinical and inapparent cases.[1]

Persons who receive OPV can have poliovirus present in the throat for 1 to 2 weeks and excreted in stool for several weeks following immunization.[2]

## 4.6 Host Susceptibility and Resistance

Susceptibility is universal in those not immunized.[1] Infants born to immune mothers have transient passive immunity.[1] Unvaccinated contacts of those immunized with OPV are at increased risk of VAPP and may also benefit from bystander immunity.

Type-specific immunity is felt to be life-long for both clinically recognizable and inapparent infections.[1]

# 5.0 Reporting Requirements

Canada is certified as being polio-free. In any country that has previously interrupted transmission of wild polio virus, a single case is considered a public health emergency.

Please note that this disease requires immediate notification to the Population and Public Health Division of the Ministry of Health and Long-Term Care (ministry). The reporting of this event will be notified to PHAC and the World Health Organization under the International Health Regulations. Reporting of this disease is by phone through the ministry during business hours by calling 416-327-7392. After-hours and on weekends and holidays please call the ministry's Health Care Provider Hotline at 1-866-212-2272.

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);[3]
- The iPHIS User Guides published by PHO; and
- Bulletins and directives issued by PHO.

Individuals with VAPP should be reported as a polio case, as well as an adverse event following OPV.

# 6.0 Prevention and Control Measures

In the event that publicly funded vaccine doses are needed for case and contact management, the board of health should contact the ministry immunization program at vaccine.program@ontario.ca as soon as possible.

## 6.1 Personal Prevention Measures

Immunize as per the current *Publicly Funded Immunization Schedules for Ontario*.[4]

In Ontario, the *Immunization of School Pupils Act* (ISPA) is the legislation that governs the immunization of school pupils for the designated diseases included in the Act. All students without a valid exemption must have documented receipt of polio containing vaccine according to the specified schedule.[5]

In Ontario, the *Child Care and Early Years Act, 2014* (CCEYA) is the legislation that governs licensed child care settings. Pursuant to *Ontario Regulation 137/15* under the CCEYA, children who are not in school and who are attending licensed child care settings must be immunized as recommended by the local medical officer of health prior to being admitted. Under the CCEYA parents can provide a medical reason as to why the child should not be immunized or object to immunization on religious/conscience grounds.[6]

Inactivated polio virus (IPV) containing vaccines produce immunity to all three types of poliovirus in over 95% of vaccinees following three doses of vaccine, and in close to 100% following a booster dose.[2] In addition, proper hand hygiene should be maintained.

## 6.2 Infection Prevention and Control Strategies

- In addition to routine practices, contact precautions are recommended for hospitalized cases for the duration of hospitalization.[1]
- Suspected cases and their families should telephone the local board of health to arrange for medical assessment to limit exposures in health care settings.
- Isolation in the household is of minimal value as the virus has often infected susceptible close contacts by the time poliomyelitis is recognized.[1]

Refer to PHO's website at www.publichealthontario.ca to search for the most up-to-date information on Infection Prevention and Control.

## 6.3 Management of Cases

Thorough investigation of any case is essential to maintain the Polio Elimination Status in Canada, and to determine the source of infection.

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. The following disease-specific information should also be obtained during case management:

- Relevant medical history including immunocompromised status or abnormal neurological history;
- Travel to or residing in another country within 30 days prior to the onset of this illness, particularly polio-endemic or infected countries, or recent (seven to 60 days) presence in an area where OPV is used;
- Household members or other close contacts who have traveled to or resided in another country within 30 days prior to the onset of the case's illness, or receipt of OPV seven to 60 days prior to the onset of this case's illness;
- Polio immunization status: total number of doses of IPV or OPV as well as dates, particularly receipt of OPV seven to 30 days prior to the onset of current illness;

Exclude cases that are food handlers until proof of immunity is demonstrated or negative stool sample is obtained.

No specific treatment is available; however attention should be given during acute illness to complications of paralysis.

## 6.4 Management of Contacts

Contacts are:

- Persons living in the same household or having close contact with the case (e.g., sharing sleeping arrangements or playing together for > four hours) within 30 days before the case's onset of illness;
- Children attending the same child care setting as the case; and
- Persons having contact with stool or fecal matter of the case within 30 days before the case's onset of illness, without using infection control precautions.[7]

Even though contacts may already be infected, they should be assessed for immunization status and if not fully immunized receive updated doses as per the current *Publicly Funded Immunization Schedules for Ontario*.[4]

Quarantine measures have not been found to be of value in the community.[1] Consider exclusion of contacts from food handling until proof of immunity is provided. Further quarantine measures could be considered in consultation with PHO.

## 6.5 Management of Outbreaks

Not applicable

# 7.0 References

1. Heymann DL, editor. Control of Communicable Diseases Manual. 20 ed. Washington, D.C: American Public Health Association; 2015.

2. National Advisory Committee on Immunization, Public Health Agency of Canada. Part 4- Active Vaccines: Poliomyelitis Vaccine. 2015. In: Canadian Immunization Guide [Internet]. Evergreen ed. Ottawa, ON: Her Majesty the Queen in Right of Canada, [cited May 2, 2018]. Available from: https://www.canada.ca/en/public-health/services/publications/healthy-living/canadian-immunization-guide-part-4-active-vaccines.html
3. Health Protection and Promotion Act, R.S.O. 1990, Reg. 569, Reports, (2018). Available from: https://www.ontario.ca/laws/regulation/900569
4. Ontario, Ministry of Health and Long-Term Care. Publicly Funded Immunization Schedules for Ontario: December 2016. Toronto, ON: Queen's Printer for Ontario; 2016. Available from: http://www.health.gov.on.ca/en/pro/programs/immunization/schedule.aspx
5. Immunization of School Pupils Act, R.S.O. 1990, c.I.1, (2018). Available from: https://www.ontario.ca/laws/statute/90i01
6. Child Care and Early Years Act, 2014, S.O. 2014, c. 11, Sched. 1, (2018). Available from: https://www.ontario.ca/laws/statute/14c11
7. Working Group on Polio Eradication, Bentsi-Enchill A. Protocol for the investigation of acute flaccid paralysis and suspected paralytic poliomyelitis. Paediatrics & Child Health. 1997;2(6):409-12.

# 8.0 Document History

### Table 1: History of Revisions

| Revision Date | Document Section | Description of Revisions |
|---|---|---|
| December 2014 | General | New template.<br><br>Title of Section 5.2 changed from “To Public Health Division (PHD)” to “To the Ministry of Health and Long-Term Care (the ministry) or Public Health Ontario (PHO), as specified by the ministry”.<br><br>Section 9.0 Document History added. |

| Revision Date | Document Section | Description of Revisions |
|---|---|---|
| December 2014 | 1.0 Aetiologic Agent | Addition of “However the majority of polio infections (90% to 95%) do not have any symptoms.”<br><br>Addition of a second paragraph “Infection can also occur rarely as a result of vaccine-associated paralytic poliomyelitis (VAPP) following immunization with the oral polio vaccine (OPV). OPV is a vaccine not used in Canada but in use in some parts of the world, that contains live attenuated virus.” |
| December 2014 | 2.1 Surveillance Case Definition | New paragraph added “Canada is certified as being polio-free. In any country that has previously interrupted transmission of wild polio virus, a single case is considered a public health emergency. Public health units should notify Public Health Ontario (PHO), as specified by the ministry, via telephone immediately when a case is suspected.” |
| December 2014 | 2.2 Outbreak Case Definition | Section removed. |
| December 2014 | 3.1 Clinical Presentation | Entire section revised. |
| December 2014 | 3.2 Diagnosis | First paragraph, addition of “for diagnostic criteria relevant to the Case Definitions.”<br><br>Addition of a second paragraph “For further information about human diagnostic testing, contact the Public Health Ontario Laboratories or refer to the Public Health Ontario Laboratory Services webpage…” |
| December 2014 | 4.1 Occurrence | Entire section revised. |
| December 2014 | 4.2 Reservoir | Second sentence added “There are no long-term carriers of wild type polio virus.” |

| Revision Date | Document Section | Description of Revisions |
|---|---|---|
| December 2014 | 4.3 Modes of Transmission | Paragraph changed from “Polio is transmitted through the fecal-oral route or respiratory route” to “Polio is transmitted person to person, predominantly through the fecal-oral and rarely via respiratory route. Rarely, through milk and foodstuff contaminated with stool.” |
| December 2014 | 4.5 Period of Communicability | First paragraph, first sentence “and” changed to “and/or”.<br><br>First paragraph, “…the virus can be most infective 7-10 days before and after onset of symptoms” changed to “…cases are most infectious in the days before and after onset of symptoms. Virus usually persists in the throat for 1 week and in stool for 3-6 weeks.”<br><br>Second paragraph, “…36 hours to 12 days after exposure and in the stool 72 hours to six weeks after exposure. Cases are most infectious during the days before and after onset of symptoms” changed to “36 hours to 7 days and in the stool 72 hours to six weeks after exposure to infection in both clinical and inapparent cases.”<br><br>Addition of a third paragraph “Persons who receive OPV can have poliovirus present in the throat for 1 to 2 weeks and excreted in stool for several weeks following immunization.” |
| December 2014 | 4.6 Susceptibility and Resistance | First paragraph, addition of second sentence “Infants born to immune mothers have transient passive immunity. Unvaccinated contacts of those immunized with OPV are at increased risk of VAPP and may also benefit from bystander immunity.”<br><br>Addition of a second paragraph “Type-specific immunity is felt to be life-long for both clinically recognizable and inapparent infections.” |

| Revision Date | Document Section | Description of Revisions |
|---|---|---|
| December 2014 | 5.1 To local Board of Health | First sentence “Confirmed and suspected cases shall…” changed to “Individuals who have or may have polio shall…” |
| December 2014 | 5.2 To the Ministry of Health and Long-Term Care (the ministry) or Public Health Ontario (PHO), as specified by the ministry | First paragraph changed from “The board of health shall notify the PHD of the MOHLTC…” to “The board of health shall notify PHO, as specified by the ministry…”<br>Second paragraph, removal of “to PHD”.<br>Fourth paragraph, second bullet changed from “…published by the Ministry” to “…published by PHO”.<br>Fourth paragraph, third bullet changed from “…issued by Ministry” to “…issued by PHO.” |
| December 2014 | 6.1 Personal Prevention Measures | Entire section changed. |
| December 2014 | 6.2 Infection Prevention and Control Strategies | First bullet, changed from “For hospitalized cases, in addition to routine practices, contact precautions are indicated, especially for infants and young children for the duration of hospitalization” to “In addition to routine practices, contact precautions are recommended for hospitalized cases for the duration of hospitalization”.<br>Second and third bullets added.<br>Paragraph added “Refer to Public Health Ontario’s website at www.publichealthontario.ca to search for the most up-to-date Provincial Infectious Diseases Advisory Committee (PIDAC) best practices on Infection Prevention and Control (IPAC). PIDAC best practice documents can be found at …” |

| Revision Date | Document Section | Description of Revisions |
|---|---|---|
| December 2014 | 6.3 Management of Cases | First paragraph changed from “Investigate the case to determine the source of infection. Refer to *Regulation 569* under the HPPA for relevant data to collect including the following…” to “Thorough investigation of any case is essential to maintain the Polio Elimination Status in Canada, and to determine the source of infection. Refer to *Regulation 569* under the HPPA for relevant data to collect including the following”.<br><br>All bullets updated. |
| December 2014 | 6.4 Management of Contacts | Second paragraph, addition of “as per the current *Publicly Funded Immunization Schedules for Ontario*.”<br><br>Addition of third paragraph “For a case of polio in a school, susceptible students can be excluded under Section 12 of the *Immunization of School Pupils Act*.”<br><br>Fourth paragraph, third sentence changed from “Quarantine measures have not been found to be of value in the community” to “Further quarantine measures could be considered in consultation with Public Health Ontario.” |
| December 2014 | 6.5 Management of Outbreaks | Section removed. |
| December 2014 | 7.0 References | Updated. |
| December 2014 | 8.0 Additional References | Updated. |
| February 2019 | General | Minor revisions were made to support the regulation change to Diseases of Public Health Significance. Common text included in all Disease Specific chapters: Surveillance Case Definition, Outbreak 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. |

| Revision Date | Document Section | Description of Revisions |
|---|---|---|
| February 2019 | 6.0 Prevention and Control Measures | Updates regarding the ordering of publicly funded vaccines for case and contact management. |
| February 2019 | 6.1 Personal Prevention Measures | Updates to information on *Immunization of School Pupils Act* and *Child Care and Early Years Act, 2014*. |


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