

Appendix A: Disease-Specific Chapters

Chapter: Cholera

Effective: February 2019

Cholera

Communicable

Virulent

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

1.0 Aetiologic Agent

Cholera is caused by toxigenic strains of *Vibrio cholerae* (*V.cholerae*), which is a gram-negative, curved rod that is motile and has many serogroups.¹ Only the toxin producing serogroups O1, O139 cause epidemics.² However, non-toxigenic serotypes such as O141 can cause sporadic illness.¹

2.0 Case Definition

2.1 Surveillance Case Definition

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

2.2 Outbreak Case Definition

The outbreak case definition varies with the outbreak under investigation. Please refer to the *Infectious Diseases Protocol, 2018* (or as current) for guidance in developing an outbreak case definition as needed.

The outbreak case definitions are established to reflect the disease and circumstances of the outbreak under investigation. The outbreak case definitions should be developed for each individual outbreak based on its characteristics, reviewed during the course of the outbreak, and modified if necessary, to ensure that the majority of cases are captured by the definition. The case definitions should be created in consideration of the outbreak definitions.

Outbreak cases may be classified by levels of probability (*i.e.* confirmed and/or probable).

3.0 Identification

3.1 Clinical Presentation

Most persons infected with *V.cholerae* are asymptomatic although the bacterium can be shed in their feces for 7-14 days.² When illness does occur, infection causes only mild or moderate diarrhea in roughly 90% of individuals. In 5-10% of cases, infected individuals develop severe, watery diarrhea and vomiting.³ Stools are typically white-tinged with flecks of mucous referred to as “rice water” diarrhea.¹ The resulting loss of

fluids in an infected individual can rapidly lead to severe dehydration. If not treated, death can occur within hours.⁴

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

Cholera is not endemic to Canada and cases in Ontario are directly or indirectly associated with travel to endemic regions of the world. In recent years, outbreaks have been reported in areas of the Caribbean including Cuba, Dominican Republic, and Haiti.⁵ Seven cases were reported in Ontario from 2013 to 2017, for an average of one case per year (range zero to five cases).*

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 are the only documented natural hosts, but living *V. cholerae* organisms can exist in contaminated aquatic environments.¹ The bacterium has been found to exist in environmental reservoirs such as small crustaceans.

4.3 Modes of Transmission

Cholera is one of the oldest and best understood epidemic diseases. Epidemics and pandemics are strongly linked to the consumption of fecally contaminated water.²

Transmission occurs through the ingestion of food or water contaminated with feces or vomitus of cases or carriers; consumption of raw or improperly cooked seafood, and other foods harvested from estuarine water or seawater.²

* 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.

4.4 Incubation Period

From a few hours to 5 days, usually 2-3 days.²

4.5 Period of Communicability

For the duration of the stool-positive stage, usually until 2-3 days after recovery for symptomatic individuals, however, carrier state may persist for months. Asymptomatic individuals can shed the bacterium in their feces for 7-14 days. Appropriate antibiotics can shorten the period of communicability, but are not recommended for treatment.²

4.6 Host Susceptibility and Resistance

Susceptibility is variable; gastric achlorhydria and the lack of immunity seen in small children may increase the risk of illness. Breastfed infants are at reduced risk of cholera. Cholera occurs more often in persons with blood type O.²

In endemic areas, most people acquire antibodies by early adulthood. Infection with O1 serotype affords no protection against serotype O139 infection and vice versa. Previous exposure does not confer immunity against future infection.²

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);⁶
- 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

Traveler education:

- Consult with a travel clinic regarding occurrence of cholera and vaccination recommendations. A number of safe and effective vaccines for cholera are available.
- Stress food and water precautions while travelling in endemic areas.
- Avoid eating raw oysters and undercooked shellfish and fish.
- Disseminate general public health education messages about hand hygiene and food safety.

6.2 Infection Prevention and Control Strategies

Preventative strategies:

- Use routine practices and additional precautions for hospitalized cases, including contact precautions for diapered or incontinent persons for the duration of illness.¹
- When possible, hospitalized individuals with diarrhea possibly due to cholera should not share toilet facilities with other patients.
- 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

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:

- Inquire about cholera vaccination history.

Provide education about the illness and how to prevent the spread of infection as above.

Exclude symptomatic food handlers, healthcare providers,[†] and day care staff and attendees until symptom free for 24 hours, or 48 hours after completion of antibiotic or anti-diarrheal medications.

Note: Treatment is under the direction of the attending health care provider.

6.4 Management of Contacts

Meal companions in the five days before onset should be assessed for symptoms and advised to seek medical care if indicated.²

Chemoprophylaxis of contacts currently is not recommended by the WHO, except in special circumstances in which the probability of fecal exposure is high and medication can be delivered rapidly.¹

Management of symptomatic contacts is the same as for cases.

[†] If the healthcare setting is a hospital, use the “Enteric Diseases Surveillance Protocol for Ontario Hospitals” (OHA and OMA Joint Communicable Diseases Surveillance Protocols Committee [2017, or as current]) for exclusion criteria: <https://www.oha.com/labour-relations-and-human-resources/health-and-safety/communicable-diseases-surveillance-protocols>.

6.5 Management of Outbreaks

Please see the *Infectious Diseases Protocol, 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.

Two or more non-travel cases linked by time, common exposure, and/or place is suggestive of an outbreak.

For more information regarding specimen collection and testing, please see the Public Health Inspector's Guide to Environmental Microbiology Laboratory Testing, 5th Edition (or as current).⁷

Refer to Ontario's Foodborne Illness Outbreak Response Protocol (ON-FIORP) 2013 for multi-jurisdictional foodborne outbreaks which require the response of more than two Parties (as defined in ON-FIORP) to carry out an investigation.

7.0 References

1. Committee on Infectious Diseases, American Academy of Pediatrics. Section 3: Summaries of Infectious Diseases: Vibrio Infections, Cholera. 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. Centers for Disease Control and Prevention. Cholera - Vibrio cholerae infection: Illness & Symptoms [Internet]. Atlanta, GA: U.S. Department of Health & Human Services 2014 [updated October 3, 2014; cited June 14, 2018]. Available from: <https://www.cdc.gov/cholera/illness.html>
4. Government of Canada. Cholera [Internet]. Ottawa, ON: Her Majesty the Queen in Right of Canada; 2017 [updated August 17, 2017; cited June 5, 2018]. Available from: <https://travel.gc.ca/travelling/health-safety/diseases/cholera>
5. World Health Organization. Cholera, annual report 2015. Weekly Epidemiological Record. 2016;91(38).
6. Health Protection and Promotion Act, R.S.O. 1990, Reg. 569, Reports, (2018). Available from: <https://www.ontario.ca/laws/regulation/900569>
7. Ontario Agency for Health Protection and Promotion (Public Health Ontario). Public Health Inspector's Guide to Environmental Microbiology Laboratory Testing. 5th ed. Toronto, ON: Queen's Printer for Ontario; 2017. Available from: <https://www.publichealthontario.ca/en/ServicesAndTools/LaboratoryServices/Pages/PHIGuide.aspx>

8.0 Document History

Table 1: History of Revisions

Revision Date	Document Section	Description of Revisions
January 2014	General	<p>New template.</p> <p>Section 9.0 Document History Added.</p> <p>Title of Section 4.5 changed from “Susceptibility and Resistance” to “Host Susceptibility and Resistance”</p> <p>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”</p>
January 2014	1.0 Aetiologic Agent	<p>Changed from “Cholera is caused by toxigenic strains of <i>Vibrio cholerae</i>, which is a gram-negative, curved, motile bacillus with many serogroups. Only serogroups O1, O139 and O141 cause clinical cholera associated with enterotoxin” to “Cholera is caused by toxigenic strains of <i>Vibrio cholerae</i>, which is a gram-negative, curved rod that is motile and has many serogroups. Only the toxin producing serogroups O1, O139 cause epidemics. However, non-toxigenic serotypes such as O141 can cause sporadic illness”.</p>
January 2014	2.2 Outbreak Case Definition	<p>Addition of fifth bullet point: “Further strain typing (e.g. serotype) as appropriate which may be used to support linkage”</p>
January 2014	3.2 Diagnosis	<p>The following was deleted: “Diagnosis is confirmed by laboratory isolation of <i>Vibrio cholerae</i>, serogroups O1 and O139 from feces or vomitus, or by serology for evidence of recent infection”.</p> <p>Addition of direction to contact Public Health Ontario Laboratories or PHO website for additional information on human diagnostic testing.</p>
January 2014	4.1 Occurrence	<p>Entire section revised.</p>

Revision Date	Document Section	Description of Revisions
January 2014	4.2 Reservoir	Second sentence added: "The bacterium has been found to exist in environmental reservoirs such as small crustaceans".
January 2014	4.3 Modes of Transmission	Addition of the first paragraph: "Cholera is one of the oldest and best understood..." Addition of final sentence to second paragraph: "However, one study suggests that secondary transmission may occur..."
January 2014	4.6 Host Susceptibility and Resistance	Addition of final sentence: "Previous exposure does not confer immunity against future infection."
January 2014	6.1 Personal Prevention Measures	The following was deleted: "Educate the general public and especially food handlers about careful hand washing after defecation, sexual contact and before preparing or eating food".
January 2014	6.2 Infection Prevention and Control Strategies	Addition of second bullet point: "When possible, hospitalized individuals with diarrhea possibly due to cholera should not share toilet facilities with other patients". Addition of reference to PIDAC IPAC best practices documents.
January 2014	6.3 Management of Cases	The requirement to obtain the following information deleted: "Symptoms and date of symptom onset, History of travel, Food history for last 5 days, History of exposure or risk behaviours, Earliest and latest exposure dates, Residency/attendance/occupation at a facility or institution". The requirement to "Inquire about cholera vaccination history" added. Reference to the OHA and OMA Enteric Diseases Surveillance Protocol for Ontario Hospitals added.
January 2014	6.4 Management of Contacts	Addition of final sentence "Management of symptomatic contacts is the same as for cases".

Revision Date	Document Section	Description of Revisions
January 2014	6.5 Management of Outbreaks	<p>Addition of the following to the third bullet point: “These definitions should be reviewed during the course of the outbreak, and modified if necessary, to ensure that the majority of cases are captured by the definitions”.</p> <p>Addition of the eighth bullet point: “If a food item is suspected to be the cause of the outbreak, identify the origin, along with the transportation, storage and preparation processes”.</p> <p>Addition of final two paragraphs.</p>
January 2014	7.0 References	Updated.
January 2014	8.0 Additional Resources	Updated.
February 2019	General	<p>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.</p>
February 2019	4.3 Modes of Transmission	<p>Second paragraph updated. Removed person-to-person transmission has not been documented and secondary transmission may occur.</p>
February 2019	4.5 Period of Communicability	Entire section updated.
February 2019	6.4 Management of Contacts	Updated information about chemoprophylaxis of contacts.

