

Appendix A: Disease-Specific Chapters

Chapter: Botulism

Effective: February 2019

Botulism

Communicable

Virulent

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

1.0 Aetiologic Agent

Botulinum toxin is produced by *Clostridium botulinum* (*C. botulinum*), which is a gram-positive, spore-forming obligate anaerobic bacillus.^{1,2}

2.0 Case Definition

2.1 Surveillance Case Definition

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

2.2 Outbreak Case Definition

A single case of botulism, other than infant botulism, should be managed as if it was an outbreak (see 6.5 Management of Outbreaks). A single case of infant botulism does not need to be managed as such and should be managed as a sporadic case of botulism (see 6.3 Management of Cases). However, two or more cases of infant botulism should be managed as an outbreak.

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

For information on clinical presentations in case investigations refer to the Ministry of Health and Long-Term Care's (ministry) document Botulism – Guide for Healthcare

Professionals (2017 or as current).³

<http://www.health.gov.on.ca/en/pro/publications/disease/botulism.aspx>

There are three main forms of botulism depending on the mode of transmission: foodborne, wound, and intestinal (infant and adult) botulism. All forms cause flaccid paralysis as a result from the botulinum neurotoxin.¹

Foodborne botulism is a severe intoxication resulting from ingestion of preformed toxin present in contaminated food. Most individuals develop the following symptoms: nausea, vomiting, diarrhea, constipation, fatigue, weakness, dizziness, blurred or double vision, dysphasia, and dry mouth may occur. Acute bilateral cranial nerve impairment and descending weakness or paralysis characterize the illness. Most people recover if diagnosed and treated quickly, but recovery may take months and some have residual weakness.^{1,4}

Wound botulism occurs when spores penetrate an open wound and produce the toxin in an anaerobic environment. Symptoms are similar to food borne botulism but may take up to two weeks to appear.¹

Intestinal (infant and adult colonization) botulism occurs following spore ingestion, subsequent outgrowth and in-vivo toxin production in the intestine; it affects children under one year but can also affect adults who have altered intestinal microflora because of antimicrobial use or because of bowel abnormalities.¹ Clinical symptoms in infants include constipation, loss of appetite, poor suck, weakness, lethargy, altered cry, and a striking loss of head control known as “floppy head”.¹

Other forms of botulism include iatrogenic and inhalational. Iatrogenic botulism is caused by accidental overdose of botulinum toxin that is injected for cosmetic or other indications (e.g. neuromuscular disorders). Inhalational botulism is the result of inhaling aerosolized botulinum neurotoxin. Clinical manifestations are similar to other forms of botulism.¹

3.2 Diagnosis

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

Identification of organisms in suspected food is helpful but not diagnostic because *C. botulinum* spores are ubiquitous. The diagnosis may be accepted in a person with the clinical syndrome who had consumed food incriminated in a laboratory-confirmed case.¹

Diagnosis is made in collaboration with Health Canada’s National Botulism Reference Service in Ottawa. The Botulism Reference Service office can be reached during working hours at 613-957-0902 or after-hours at 613-296-1139.

Also refer to the ministry document Botulism – Guide for Healthcare Professionals (2017 or as current).³

4.0 Epidemiology

4.1 Occurrence

Botulism is a rare disease in Ontario with five cases reported from 2013 to 2017*.

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

C. botulinum spores are ubiquitous in soil worldwide; are frequently recovered from agricultural products, including honey and produce, and are also found in dust, soil, marine sediments, and in the intestinal tract of animals, including fish.¹

4.3 Modes of Transmission

Foodborne botulism is transmitted by the ingestion of improperly prepared, stored or cooked food containing the toxin. The foods most often implicated are lightly preserved foods (such as smoked and salted fish) and in inadequately processed, home-preserved foods (including fruits, vegetables, and herbs in oil) that are low in sugar, salt, and acid.¹

Wound botulism results from contamination of traumatized tissue by *C. botulinum* spores that germinate and produce toxin inside the wound; spores may originate in soil.¹ The majority of wound botulism occurs among injection drug users who subcutaneously inject illicit drugs that may be contaminated with *C. botulinum* spores.⁵

Intestinal (infant and adult) botulism is typically associated with the ingestion of spores that germinate and produce toxin in the colon that may be present in sources including: soil, dust, unpasteurized honey, and peanut butter.¹

4.4 Incubation Period

In foodborne botulism neurological symptoms usually appear within 12 to 36 hours after ingestion of contaminated food, or up to several days after eating contaminated food. The shorter the incubation period, the more severe the disease and the higher the case-fatality rate.^{1,4}

For wound botulism, the incubation period is generally 4 to 14 days.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.

The incubation period of intestinal botulism in infants is estimated to be up to 30 days, but for adults is unknown since the precise time of spore ingestion often cannot be determined.¹

4.5 Period of Communicability

No instance of secondary person-to-person transmission has been documented despite excretion of *C. botulinum* toxin and organisms in the feces of intestinal (infant) and foodborne botulism cases.¹

4.6 Host Susceptibility and Resistance

Susceptibility is general. Adults with anatomical or functional bowel abnormalities leading to altered intestinal flora (unintentionally altered by antibiotic treatment for other purposes) may be predisposed to intestinal botulism.¹ Injection drug users are more susceptible to wound botulism.⁵

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

Foodborne botulism:

- Practice safe food preparation and canning processes. For more information on safe home canning practices, please see Health Canada’s website ‘Food Safety Tips for Home Canning’ <http://healthycanadians.gc.ca/eating-nutrition/safety-salubrite/food-canning-conserve-aliment-eng.php#a3>.
- Refrigerate foods stored in oil (e.g. oils infused with garlic, herbs, and vegetables).
- Follow storage and shelf-life recommendations on food labels.
- Avoid consumption of canned or bottled foods that are dented, leaking or have bulging ends, or it is suspected they have been tampered with.⁷

Wound botulism:

- Avoid injection of illicit drugs; and
- Seek prompt medical attention for infected wounds.⁵

Infant botulism:

- Do not feed honey to infants less than one year of age.

6.2 Infection Prevention and Control Strategies

Refer to PHO's website at www.publichealthontario.ca to search for the most up-to-date best practices 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 and suspected exposures in collaboration with the attending physician, PHO, the Botulism Reference Service (BRS) in Ottawa, as well as with the Public Health Agency of Canada (PHAC). If required, notification of the Canadian Food Inspection Agency (CFIA) will be made in collaboration with the PHO and PHAC, as well as decisions for any other communication and or notification that are required.

Additional case follow-up may include:

- The collection of food histories 2-3 days prior to symptom onset (including: when consumed, where obtained);
- History of other risk behaviours or exposures (e.g. site and date of injury, illicit drug use);
- The collection of food samples of suspected sources of intoxication for laboratory analysis using appropriate media, sampling techniques and routine practices for the handling of suspect food; and
- Coordinate food and clinical specimen collection (as appropriate), and communicate with the Botulism Reference Service in Ottawa at tel. # 613-957-0902 or after hours at 613-296-1139.

Treatment:

Immediate medical treatment is required; do not await laboratory confirmation. Botulinum Antitoxin (BAT) can be accessed through the Office of the Chief Medical Officer of Health, Public Health 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.

Treatment of infant botulism requires Botulism Immune Globulin, Intravenous (BIG-IV) or BabyBIG®. This can only be obtained through Health Canada's Special Access Program (SAP).

For more information on placing a request for BAT or BabyBIG® refer to the ministry document Botulism – Guide for Healthcare Professionals (2017 or as current).³

6.4 Management of Contacts (foodborne botulism only)

Contacts are managed as part of the outbreak as per the *Infectious Diseases Protocol, 2018* (or as current). People who are known to have eaten contaminated food or who have shared a likely exposure should be advised to consult with their health care provider for assessment and/or treatment.

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.

Given the severity and rarity of botulism, one case of botulism (or two or more cases of infant botulism) should be treated as if it was an outbreak and should be **managed with great urgency** (with the exception of a single case of infant botulism, which should be managed as a sporadic case of botulism). Foodborne botulism outbreaks should be managed according to the Ontario's Foodborne Illness Outbreak Response Protocol, 2013 (ON-FIORP) (or as current):

<http://www.health.gov.on.ca/en/pro/programs/publichealth/enviro/> and will include the Botulism Reference Service and the attending physician(s) in order to handle the unique laboratory testing needs and urgency of a botulism outbreak.

7.0 References

1. Heymann DL, editor. *Control of Communicable Diseases Manual*. 20 ed. Washington, D.C: American Public Health Association; 2015.
2. Government of Canada. Pathogen Safety Data Sheets: Infectious Substances – *Clostridium botulinum* [Internet]. Ottawa, ON: Her Majesty the Queen in Right of Canada; 2010 [updated April 19, 2011; cited September 5, 2018]. Available from: <https://www.canada.ca/en/public-health/services/laboratory-biosafety-biosecurity/pathogen-safety-data-sheets-risk-assessment/clostridium-botulinum.html>
3. Ontario, Ministry of Health and Long-Term Care. *Botulism Guide for Health Care Professionals*. Toronto: Queen's Printer for Ontario; 2017. Available from: <http://www.health.gov.on.ca/en/pro/publications/disease/botulism.aspx>
4. Government of Canada. *Botulism (Clostridium botulinum)* [Internet]. Ottawa, ON: Her Majesty the Queen in Right of Canada; 2013 [updated April 5, 2013; cited February 14, 2018]. Available from: <https://www.canada.ca/en/public-health/services/food-poisoning/botulism-clostridium-botulinum.html>
5. Centers for Disease Control and Prevention. *Botulism* [Internet]. Atlanta, GA: U.S. Department of Health and Human Services; 2017 [updated October 25, 2017; cited February 14, 2018]. Available from: <https://www.cdc.gov/botulism/index.html>
6. Health Protection and Promotion Act, R.S.O. 1990, Reg. 569, Reports, (2018). Available from: <https://www.ontario.ca/laws/regulation/900569>

7. Government of Canada. Home Canning Safety [Internet]. Ottawa, ON: Her Majesty the Queen in Right of Canada; 2013 [updated February 8, 2013; cited February 14, 2018]. Available from: <https://www.canada.ca/en/health-canada/services/general-food-safety-tips/home-canning-safety.html#a3>

8.0 Document History

Table 1: History of Revisions

Revision Date	Document Section	Description of Revisions
December 2014	General	<p>New template.</p> <p>Title of Section 4.6 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> <p>Section 9.0 Document History added.</p>
December 2014	2.2 Outbreak Case Definition	Entire section revised.
December 2014	3.1 Clinical Presentation	<p>In second paragraph, addition of “...naturally occurring...”</p> <p>End of third paragraph: removal of “...case fatality rate in USA is 5% to 10%” and addition of “...case fatality rate in Canada is less than 5%.”</p> <p>Fifth paragraph: change from “Intestinal (infant and adult) botulism is rare; it occurs...” to “Intestinal (infant and adult colonization) botulism occurs...”</p> <p>Fifth paragraph: change from “...but can rarely affect adults...” to “...but can also affect adults...”</p> <p>Addition of a new (last) paragraph: “In addition to the naturally occurring forms of botulism described above....”</p>

Revision Date	Document Section	Description of Revisions
December 2014	3.2 Diagnosis	<p>Addition to end of first paragraph: "...for diagnostic criteria relevant to the case definition."</p> <p>Removal of paragraph: "Diagnosis of food borne botulism is made by demonstration of <i>botulinum</i> toxin in serum, stool, gastric aspirate or incriminated food; or through culture of <i>C. botulism</i> from gastric aspirate or stool in a clinical case."</p> <p>Second paragraph: change from "...botulism spores..." to "...<i>C. botulinum</i> spores..."</p> <p>Third paragraph: addition of "...Health Canada's..."</p>
December 2014	4.1 Occurrence	<p>First paragraph: removal of "...less than twenty cases reported over the last five years" and addition of "...fifteen cases reported from 2007 to 2011. In 2012, an outbreak of foodborne botulism occurred in Ontario with three cases linked to the consumption of fesikh, a traditionally prepared salted fish."</p> <p>Addition of direction to refer to PHO's Monthly Infectious Diseases Surveillance Reports.</p>
December 2014	4.2 Reservoir	<p>At beginning of paragraph change from "<i>Botulinum</i>..." to "<i>C. botulinum</i>..."</p>
December 2014	4.3 Modes of Transmission	<p>End of first paragraph: removal of "...smoked fish, seal meat and other arctic marine mammals such as whale meat" and addition of "...and smoked and salted fish."</p> <p>End of second paragraph: addition of "The majority of wound botulism occurs among injecting drug users who subcutaneously inject street drugs that may be contaminated with <i>C. botulinum</i> spores."</p>
December 2014	4.6 Host Susceptibility and Resistance	<p>Changed from "...may be susceptible to intestinal botulism" to "...may be predisposed to intestinal botulism."</p> <p>At end of paragraph, addition of "Injecting drug users are more susceptible to wound botulism."</p>

Revision Date	Document Section	Description of Revisions
December 2014	5.1 To Local Board of Health	Entire section revised.
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	<p>Removal of “The board of health shall notify the PHD immediately by phone upon receiving a report of a confirmed, probable or suspect case.”</p> <p>The following removed from the end of the first sentence: “to PHD”.</p> <p>Under the second paragraph the second bullet changed from: “The disease-specific User Guides published by the Ministry” to “The iPHIS User Guides published by PHO”.</p> <p>Under the second paragraph the end of the last bullet changed from: “the Ministry” to “PHO”.</p>
December 2014	6.1 Personal Prevention Measures	Entire section revised.
December 2014	6.2 Infection Prevention and Control Strategies	Addition of reference to PHO’s website for PIDAC best practices.
December 2014	6.3 Management of Cases	<p>Entire first paragraph revised.</p> <p>Under second paragraph new bullet (last): “Look for other cases related to the suspect case....”</p> <p>Last bullet under third paragraph change from “infection” to “intoxication”.</p> <p>Identification of the Public Health Division as the area of the ministry where botulism antitoxin can be accessed.</p> <p>Addition of “Treatment of infant botulism requires Botulism Immune Globulin, Intravenous (BIG-IV) or BabyBIG ®. This can only be obtained through Health Canada’s Special Access Program (SAP).”</p> <p>Last paragraph, addition of “For more information on placing a request for BAT or BabyBIG ®” at the beginning of the sentence.</p>

Revision Date	Document Section	Description of Revisions
December 2014	6.5 Management of Outbreaks	<p>Entire first paragraph revised.</p> <p>Third paragraph change from “shall comprise” to “shall be comprised of”.</p> <p>Third bullet under third paragraph, addition of “These definitions should be...”</p> <p>Eighth bullet under third paragraph changed from “Coordinate and collect appropriate clinical specimens where applicable” to “Coordinate food and clinical specimen collection (as appropriate), and communicate with the Botulism Reference Service in Ottawa at tel. # 613-957-0902 or after hours at 613-296-1139”.</p> <p>Insertion of new bullet under third paragraph: “Identify the origin of suspect food, along with the transportation, storage and preparation processes.”</p>
December 2014	7.0 References	Updated.
December 2014	8.0 Additional Resources	Updated.
April 2018	General	Minor revisions were made to support the regulation change to Diseases of Public Health Significance, the epidemiology section and references were updated and Section 8.0 Additional Resources was deleted. Further details regarding ordering antitoxin were included in the treatment section.
February 2019	General	Common text included in all Disease Specific chapters: Surveillance Case Definition, Diagnosis, Reporting Requirements, Management of Cases and Management of Outbreaks.

