Appendix A: Disease-Specific Chapters

Chapter: Botulism

Revised December 2014
Botulism

☒ Communicable
☐ Virulent

Health Protection and Promotion Act:
Ontario Regulation 558/91 – Specification of Communicable Diseases

Health Protection and Promotion Act:
Ontario Regulation 559/91 – Specification of Reportable Diseases

1.0 Aetiologic Agent
Botulism is caused by toxins produced by *Clostridium botulinum* (*C. botulinum*), which is a Gram positive, spore-forming obligate anaerobic bacillus.¹

2.0 Case Definition

2.1 Surveillance Case Definition
See Appendix B

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.

Outbreak case definitions are established to reflect the disease and circumstances of the outbreak under investigation. Confirmed outbreak cases must at a minimum meet the criteria specified for the provincial surveillance confirmed case classification. Consideration should also be given to the following when establishing outbreak case definitions:

- Clinical and/or epidemiological criteria;
- The time frame for occurrence (i.e., increase in endemic rate);
- A geographic location(s) or place(s) where cases live or became ill/exposed;
- Special attributes of case(s) (e.g., age, underlying conditions); and
- Further typing (e.g. neurotoxin subtype) as appropriate, which may be used to support linkage.

Cases may be classified by levels of probability (i.e. confirmed, probable and/or suspect).
3.0 Identification

3.1 Clinical Presentation

For information on clinical presentations in case investigations refer to the MOHLTC document Botulism – Guide for Healthcare Professionals” (Version: September, 2013).²

There are three forms of naturally occurring botulism: foodborne (classic form), wound and intestinal (infant and adult) botulism. The site of toxin production differs for each form, but all share the flaccid paralysis that results from botulinum neurotoxin.¹

Foodborne botulism is a severe intoxication resulting from ingestion of preformed toxin present in contaminated food. The usual first signs and symptoms include fatigue, weakness and vertigo, followed by blurred or double vision, dysphasia and dry mouth. Vomiting, diarrhea, constipation and abdominal swelling may occur. Acute bilateral cranial nerve impairment and descending weakness or paralysis characterize the illness. Recovery may take months; the case fatality rate in Canada is less than 5%.³

Wound botulism occurs when spores penetrate an open wound and reproduce 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 GI anatomy and microflora.¹ Clinical symptoms in infants include constipation, loss of appetite, weakness, lethargy, altered cry, and a striking loss of head control known as “floppy head”.¹

In addition to the naturally occurring forms of botulism described above, iatrogenic and inhalational botulism can rarely occur. Iatrogenic botulism is caused by accidental overdose of botulinum toxin, and inhalational botulism is the result of inhaling aerosolized pre-formed botulinum toxin. Clinical manifestations are similar to other forms of botulism.

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 MOHLTC document “Botulism – Guide for Healthcare Professionals” (Version: September 2013).²
4.0 Epidemiology

4.1 Occurrence
Botulism is a rare disease in Ontario with 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.

Please refer to the Public Health Ontario (PHO) Monthly Infectious Diseases Surveillance Reports and other infectious diseases reports for more information on disease trends in Ontario.4, 5

http://www.publichealthonotario.ca/en/DataAndAnalytics/Pages/DataReports.aspx

4.2 Reservoir
*C. botulinum* spores are ubiquitous in soil worldwide; are frequently recovered from agricultural products, including honey, and are also found in 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 canned foods (vegetables and fruits), home preserved foods and smoked and salted fish.

Wound botulism results from contamination of traumatized tissue by *C. botulinum* found in soil that grows in the wound and produces toxin.1 The majority of wound botulism occurs among injecting drug users who subcutaneously inject street drugs that may be contaminated with *C. botulinum* spores.2

Intestinal (infant and adult) botulism is typically associated with the ingestion of spores that germinate and produce toxin in-vivo that may be present in items such as foods, soil, dust, unpasteurized honey and peanut butter.

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

For wound botulism, symptoms may take up to two weeks to appear after infection, with an average of about 10 days.1

The incubation period of intestinal botulism in infants 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
People with foodborne botulism typically excrete the toxin for shorter periods.¹

4.6 Host Susceptibility and Resistance

Susceptibility is general. Adults with special bowel problems leading to unusual gastrointestinal flora (or with a flora unintentionally altered by antibiotic treatment for other purposes) may be predisposed to intestinal botulism.¹ Injecting drug users are more susceptible to wound botulism.

5.0 Reporting Requirements

5.1 To local Board of Health

Individuals who have or may have botulism shall be reported as soon as possible to the medical officer of health by persons required to do so under the Health Protection and Promotion Act, R.S.O. 1990 (HPPA).⁶

5.2 To the Ministry of Health and Long-Term Care (the ministry) or Public Health Ontario (PHO), as specified by the ministry

Report only case classifications specified in the case definition using the integrated Public Health Information System (iPHIS), or any other method specified by the ministry within one (1) business day of receipt of initial notification as per iPHIS Bulletin Number 17: Timely Entry of Cases.⁷

The minimum data elements to be reported for each case are specified in the following sources:

- Ontario Regulation 569 (Reports) under the Health Protection and Promotion Act (HPPA);⁸, 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

Preventive measures:⁹

Foodborne botulism:

- 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.¹⁰
Wound botulism:
- Avoid injection of illicit drugs
- Seek prompt medical attention for infected wounds.\textsuperscript{11}

Infant botulism:
- Do not feed honey to infants less than one year of age

6.2 Infection Prevention and Control Strategies
Routine practices are recommended for hospitalized cases.

Refer to Public Health Ontario’s website at [www.publichealthontario.ca](http://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:

6.3 Management of Cases
Investigate cases and suspected exposures in collaboration with the attending physician, PHO, 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.

Refer to the MOHLTC document [Botulism – Guide for Healthcare Professionals” (Version: September 2013)](http://www.publichealthontario.ca/en/BrowseByTopic/InfectiousDiseases/PIDAC/Pages/PIDAC_Documents.aspx)\textsuperscript{2} for steps to be taken in case investigations including:
- Symptoms and date of symptom onset
- History of out-of-province or international travel
- 2-3 day food history and history of other risk behaviours or exposures
- Earliest and latest exposure dates
- Look for other cases related to the suspect case (i.e. family members or others who may have shared the same meals)

Exposure investigation should include but not be limited to:
- The collection of food histories 2-3 days prior to symptom onset
- 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

**Treatment:**
Immediate medical treatment is required; do not await laboratory confirmation. Botulinum Antitoxin (BAT) can be accessed through the Public Health Division - Ministry of Health and Long-Term Care (MOHLTC).
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 MOHLTC document *Botulism – Guide for Healthcare Professionals” (Version: September 2013).*

6.4 Management of Contacts

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. Treatment may include purging with cathartics, gastric lavage and high enemas.

6.5 Management of Outbreaks

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 (ON-FIORP) [http://www.health.gov.on.ca/en/pro/programs/publichealth/enviro/docs/fiorp_protocol.pdf](http://www.health.gov.on.ca/en/pro/programs/publichealth/enviro/docs/fiorp_protocol.pdf) and will include the BRS and the attending physician(s) in order to handle the unique laboratory testing needs and urgency of a botulism outbreak.

The local public health unit should consider the following minimum outbreak control measures:

- Active finding of cases and persons exposed to the same source(s) of infection
- Alerts for medical community and hospitals
- Public information and communication plans
- Recall of the suspect food

In addition, as per this Protocol, outbreak management shall be comprised of but not limited to, the following general steps:

- Confirm diagnosis and verify the outbreak
- Establish an outbreak team
- Develop an outbreak case definition. 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
- Implement prevention and control measures
- Implement and tailor communication and notification plans depending on the scope of the outbreak
- Conduct epidemiological analysis on data collected
- Conduct environmental inspections of implicated premise where applicable
- 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
- Identify the origin of suspect food, along with the transportation, storage and preparation processes
- Prepare a written report
- Declare the outbreak over in collaboration with the outbreak team

7.0 References


8.0 Additional Resources


9.0 Document History

Table 1: History of Revisions

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<tr>
<th>Revision Date</th>
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<tr>
<td>December 2014</td>
<td>General</td>
<td>New template.</td>
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<td></td>
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<td>Title of Section 4.6 changed from “Susceptibility and Resistance” to “Host Susceptibility and Resistance”.</td>
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<td>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”.</td>
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<td>Section 9.0 Document History added.</td>
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<tr>
<td>December 2014</td>
<td>2.2 Outbreak Case Definition</td>
<td>Entire section revised.</td>
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| December 2014 | 3.1 Clinical Presentation | In second paragraph, addition of “…naturally occurring…”  
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%.”  
Fifth paragraph: change from “Intestinal (infant and adult) botulism is rare; it occurs…” to “Intestinal (infant and adult colonization) botulism occurs…”  
Fifth paragraph: change from “…but can rarely affect adults…” to “…but can also affect adults…”  
Addition of a new (last) paragraph: “In addition to the naturally occurring forms of botulism described above…” |
| December 2014 | 3.2 Diagnosis | Addition to end of first paragraph: “…for diagnostic criteria relevant to the case definition.”  
Removal of paragraph: “Diagnosis of food borne botulism is made by demonstration of botulinum toxin in serum, stool, gastric aspirate or incriminated food; or through culture of C. botulism from gastric aspirate or stool in a clinical case.”  
Second paragraph: change from “…botulism spores…” to “…C. botulinum spores…”  
Third paragraph: addition of “…Health Canada’s…” |
| December 2014 | 4.1 Occurrence | 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.”  
Addition of direction to refer to PHO’s Monthly Infectious Diseases Surveillance Reports. |
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<tr>
<td>December 2014</td>
<td>4.2 Reservoir</td>
<td>At beginning of paragraph change from &quot;Botulinum...&quot; to &quot;C. botulinum...&quot;</td>
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| December 2014 | 4.3 Modes of Transmission | 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.”  
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 C. botulinum spores.” |
| December 2014 | 4.6 Host Susceptibility and Resistance | Changed from “…may be susceptible to intestinal botulism” to “…may be predisposed to intestinal botulism.”  
At end of paragraph, addition of “Injecting drug users are more susceptible to wound botulism.” |
| 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 | Removal of “The board of health shall notify the PHD immediately by phone upon receiving a report of a confirmed, probable or suspect case.”  
The following removed from the end of the first sentence: “to PHD”.  
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”.  
Under the second paragraph the end of the last bullet changed from: “the Ministry” to “PHO”. |
| December 2014 | 6.1 Personal Prevention Measures | Entire section revised. |
| December 2014 | 6.3 Management of Cases | Entire first paragraph revised.  
Under second paragraph new bullet (last): “Look for other cases related to the suspect case….”  
Last bullet under third paragraph change from “infection” to “intoxication”. |
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<td>December 2014</td>
<td>6.5 Management of</td>
<td>Entire first paragraph revised. Third paragraph change from “shall comprise” to “shall be comprised of”. Third bullet under third paragraph, addition of “These definitions should be....” 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”. Insertion of new bullet under third paragraph: “Identify the origin of suspect food, along with the transportation, storage and preparation processes.”</td>
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