Botulism
Yukon Communicable Disease Control
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(Adapted from: BCCDC Communicable Disease Control Botulism Guideline November 2018)

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1.0 AUTHORITY

Yukon Public Health and Safety Act (2009). Available at www.gov.yk.ca/legislation/acts/puhesa.pdf

2.0 GOAL

To prevent serious medical complications associated with botulism.

This will be accomplished by:

- Rapid and coordinated communication between clinicians, public health, pharmacy and laboratory
- Rapid availability of antitoxin
- Initiation of initial antitoxin infusion and rapid transport for further diagnostics and treatment, including tertiary care
- Processes for testing of appropriate specimens
- Prompt confiscation of food(s) felt to be implicated, especially foods eaten within the last two to three days

3.0 BOTULISM FLOW CHART

The flow chart describes public health actions when notified of a case of botulism.

Case Identification

- Notification of a probable or confirmed case of botulism to be reported to Medical Officer of Health (MOH) as soon as suspected.
- Determine whether case is foodborne, wound, infant or adult colonization botulism.

Case Management

- Collect serum for identification of the specific toxin prior to administering antitoxin but do not withhold antitoxin pending results.
- Prior to administering botulism antitoxin, assess whether the client is at increased risk of an allergic reaction to equine protein.
- Arrangements for laboratory testing (serum) – specimens are to be shipped to BCCDC: YCDC/MOH contacts the **BCCDC Public Health Laboratory Medical Microbiologist 604-707-2620 (Environmental Microbiology Program Head: 604-707-2608)**. After hours, the MOH contacts the on call **Medical Microbiologist (604-661-7033)** to discuss laboratory testing.
- YCDC/MOH contacts on-call WGH Pharmacist. Regular hours call WGH pharmacy: 867-393-8737
- After hours call WGH Admission and Discharge at 867-393-8700 and ask to have on-call pharmacist paged regarding release of botulism antitoxin.

Infant botulism

Yukon does not store infant (under one year of age) botulism antitoxin (Baby BIG). If suspected, rapid transfer of the infant to an out of territory health care facility that can support further diagnostics and treatment is required.

Food Investigation (Foodborne botulism only)
Environmental Health Services (EHS) to be involved in food investigation

- YCDC to engage EHS to investigate the case's food source with particular attention to foods eaten within the three days prior to onset including:
  - Testing of implicated foods with Yukon Environmental Health Services
  - Confiscation of all suspicious foods in order to prevent other cases
  - Obtaining food specimens for laboratory testing
- Determine the health status of other persons who consumed the same sources of suspect foods, and
- Advise these individuals to seek medical attention immediately

4.0 CASE IDENTIFICATION

4.1 Confirm the diagnosis

Surveillance	Definition	Reportable to YCDC
Foodborne botulism		
Confirmed case	Laboratory confirmation of intoxication with clinical evidence [1]: • Detection of botulinum toxin in serum, stool, gastric aspirate or food **OR** • Isolation of *C. botulinum* from stool or gastric aspirate **OR** • Clinical evidence [1] and indication that the client ate the same suspect food as an individual with laboratory-confirmed botulism.	Yes
Probable case	• Clinical evidence [1] **AND** • Consumption of a suspect food item in the incubation period (12-48 hours)	Yes
Wound botulism		
Confirmed case	Laboratory confirmation of infection: • Detection of botulinum toxin in serum **OR** • Isolation of *C. botulinum* from a wound **AND** • Presence of freshly infected wound in the two weeks before symptoms and no evidence of consumption of food contaminated with *C. botulinum*	Yes
Infant botulism		
Confirmed case	Laboratory confirmation with symptoms compatible with botulism [2] in a person < one year of age: • Detection of botulinum toxin in stool or serum **OR** • Isolation of *C. botulinum* from the patient's stool, or at autopsy	Yes
Adult colonization botulism		
Confirmed case	Laboratory confirmation with symptoms compatible with botulism [1] in a patient ≥ one year with severely compromised gastrointestinal tract functioning (i.e., abnormal bowel) due to various diseases such as colitis, or intestinal bypass procedures, or in association with other conditions that may create local or widespread disruption in the normal intestinal flora: • Detection of botulinum toxin in stool or serum **OR** • Isolation of *C. botulinum* from the patient's stool, or at autopsy	Yes

[1] Clinical evidence of foodborne botulism includes: blurred vision; dry mouth and difficulty swallowing and speaking; and descending symmetric paralysis that may progress rapidly.

[2] Clinical evidence of infant botulism includes: constipation; loss of appetite; altered cry; and loss of head control.

5.0 CASE MANAGEMENT

5.1 Notification

When botulism is suspected, immediately inform the Medical Officer of Health (MOH). Individuals with suspected botulism must be transferred for definitive care to an appropriate tertiary care facility, to be determined in collaboration with the MOH.

YCDC or the MOH should contact the BCCDC Public Health Laboratory Medical Microbiologist (Environmental Microbiology Program Head): 604-707-2620/ 604-707-2608. After hours, the MOH should contact the on-call Medical Microbiologist (604-661-7033) to discuss laboratory testing.

Specimens will be collected and sent to WGH Laboratory and then will be shipped to BCCDC for processing.

Release of botulism antitoxin

Regular business hours: YCDC/MOH to call the WGH Pharmacy at 867-393-8737 and request the release of botulism antitoxin. Bottles kept in stores fridge.

After hours: MOH to call WGH Admission and Discharge at 867-393-8700 to request the on-call pharmacist be paged regarding the release of botulism antitoxin.

5.2 Laboratory investigation

The MOH or YCDC should discuss testing with the BCCDC Public Health Laboratory Medical Microbiologist to ensure ordering of mice for the bioassay, as well as adequate and rapid shipment of specimens to the BCCDC PHL Environmental Microbiology Program.

Lab requisition forms can be obtained from BCCDC Laboratory Services, Diagnostics testing: Food Poisoning www.bccdc.ca/health-professionals/professional-resources/laboratory-services.

Practice Point

Below specimens are listed based in general order of priority (* = preferred). Collection of as many specimens as possible is ideal yet is not a requirement and should not delay administration of the antitoxin. *Specimen collection must occur prior to antitoxin administration.*

Collect the following specimens: ***(* = preferred specimen):***

- Foodborne botulism
  - 15 ml of serum for toxin bioassay (within three days of ingestion of suspect food)*
  - 25-50 gm of stool for culture and toxin bioassay*
  - 100 ml of vomitus or gastric aspirate for culture and toxin bioassay

  - 200 gm of suspect foods for culture and toxin bioassay

- Wound botulism
  - wound exudate for culture*
  - 15 ml serum for toxin bioassay

- Infant botulism
  - Send all available stool; 25 gm of stool or enema (without preservatives) for culture and toxin bioassay is preferred (pooled stool or enema samples are also acceptable)*
  - 200 gm of suspect food
  - At least 3mL of serum for toxin bioassay (toxin rarely found in serum in infant cases); 10-30mL of serum is preferred

- Adult colonization botulism
  - At least 25 gm of stool for culture and toxin bioassay
  - 15 mL of serum for toxin bioassay

- Fatal case
  - autopsy material (especially liver and contents of gut), at least 100gm

In some situations, other specimens may be collected and tested (e.g., food or environmental specimens in cases of infant botulism). For further information on botulism testing contact EHS and Environmental Microbiology at BCCDC.

5.3 Treatment

Collect serum for identification of specific toxin prior to administering antitoxin.

Initiate treatment with antitoxin as soon as possible. Do not wait for lab confirmation if clinical suspicion is strong.

Release of botulism antitoxin:

Regular working hours: YCDC/MOH to call the WGH Pharmacy at 867-393-8737 and request the release of botulism antitoxin.

After hours: MOH to call WGH Admission and Discharge at 867-393-8700 to request the on-call pharmacist be paged regarding the release of botulism antitoxin.

If wound botulism: debride wound, establish drainage, and give antibiotics. Antibiotics are not effective against toxins but may be used to treat secondary infections.

Antitoxin cannot reverse the effects of the disease but can prevent further paralysis.

5.3.1 Botulism Immune Globulin, IV (BIG-IV); (BabyBIG®) for treatment of infant cases of botulism due to type A or B

Human-derived botulism immune globulin (BabyBIG®) is indicated in infant botulism. Yukon *does not* have immune globulin for treatment of infant cases of botulism. Medevac must be arranged to an advanced pediatric care facility in Canada or the US that has the capability to administer BabyBIG as per the MOH.

5.3.2 BAT, Botulism Antitoxin Heptavalent (A,B,C,D,E,F,G) – (Equine) Sterile solution or injection, Emergent Biosolutions (formerly Cangene Corporation) (for individuals of all ages)

A limited supply of the heptavalent product is stored at WGH; the release of this product can be secured by contacting the MOH who will authorize the WGH pharmacist to release the product.

The heptavalent product is **equine-derived** and made from equine plasma. It is approved for use in all age groups. Prior to administering this product, assess whether the patient is at increased risk of a hypersensitivity reaction to equine protein (i.e., history of previous allergic reaction to equine protein, history of repeated use of antitoxin products). Consider skin sensitivity testing for such patients prior to administration of the treatment dose and concurrent administration of a medication to treat anaphylactic shock. However, sensitivity testing should not delay treatment when clinical suspicion is high. Increased risk of allergic reaction is not a contraindication to administration of botulism antitoxin.

The treating physician/ hospital must comply with reporting requirements on the use of the product back to WGH.

This heptavalent product is for serotypes A, B, C, D, E, F and G antitoxin. Each single- use vial, regardless of size or fill volume, contains a minimum potency of:

- 4,500 Units (U) for serotype A antitoxin
- 3,300 U for serotype B antitoxin
- 3,000 U for serotype C antitoxin
- 600 U for serotype D antitoxin
- 5,100 U for serotype E antitoxin
- 3,000 U for serotype F antitoxin
- 600 U for serotype G antitoxin

Dosage by age is recommended in the product monograph for three age groups: infants < 1 year old, 1 to 16 years of age, and 17 years and older.

Refer to the product monograph for details of dosing and administration including Pediatric Dosing Guide for BAT based on Salisbury Rule:
emergentbiosolutions.com/sites/default/files/inline-files/BAT%20Product%20Monograph%20-%20English.pdf

The product is given intravenously by slow infusion after dilution 1:10 in normal saline.

5.3.3 Antibiotics

Antibiotics are not recommended in the treatment of botulism. Lysis of C. botulinum theoretically could increase the amount of toxin available for absorption. Aminoglycoside agents potentiate the paralytic effects of the toxin and should be avoided.

6.0 OUTBREAK MANAGEMENT

In foodborne botulism, one case is considered an outbreak. Confirmation of an outbreak will occur through Yukon's MOH and YCDC in collaboration. Infant botulism outbreaks rarely occur.

Early ascertainment and notification to YCDC of the potential for more cases is needed in order to secure sufficient inventory of antitoxin. The territorial supply is sufficient only for a single case.

Environmental Health Services will be involved in the

- Search for potential food sources, collect for testing and discarding of any remaining suspect foods. See 7.0 Food Source Investigation.

YCDC will be involved in

- Active case finding for other people who may have eaten the suspect food. No isolation or quarantine of cases is necessary.

The Botulism Follow-Up Form may be used to assist with outbreak management. The form is available at BCCDC Surveillance Forms, Enteric, Food and Waterborne: www.bccdc.ca/health-professionals/professional-resources/surveillance-forms (adapt for Yukon). If used please fax to YCDC (867) 667-8349.

7.0 FOOD SOURCE INVESTIGATION (FOODBORNE BOTULISM ONLY)

Involve Environmental Health Services to assist with the food follow up; including the food history, confiscation and analysis of food for testing. They will discuss testing of implicated foods with the BCCDC Environmental Microbiology Lab Section Head or Supervisor, Food Poisoning Lab (604-707-2611/2608) as appropriate. If it is after regular working hours, contact the on call BCCDC Laboratory Medical Microbiologist (604-661-7033).

Environmental Health Services will lead the food investigation utilizing the following principles:

- Investigate the case's food source with particular attention to foods eaten within the two or three days prior to onset of symptoms
- Confiscate **all** suspicious foods in order to prevent other cases
- Home preserved food should be the prime suspect until ruled out
- Use gloves when confiscating food
- In a case of infant botulism, ingestion of honey, corn syrup or other baby foods should be ruled out as the source of illness

Yukon Communicable Disease Control will lead the assessment of the health status of other household members and other individuals who may have shared the same sources of suspected food.

Advise other contacts of the suspected food to seek medical attention immediately.

8.0 INFANT BOTULISM

Infant botulism occurs in infants with immature digestive tracts exposed to C. botulinum spores which sporulate in the gut. Sources of spores include contaminated soil or dust and solid foods or formula. The only food which has been implicated in several infant botulism cases is honey.

Most infants are exposed to botulism spores on a regular basis but only a few develop illness. In the majority of cases, it will be difficult to implicate a specific source and laboratory testing is rarely successful.

If a case if infant botulism is suspected, immediate arrangements should be made for transport to the most appropriate advanced pediatric care facility in Canada or the US.

9.0 MANAGEMENT OF CONTACTS AND PERSONS WHO CONSUMED THE SAME SUSPECT FOODS

People who are known to have eaten from incriminated food should be purged with cathartics, given gastric lavage and high enema. **Note:** *These measures should not be used for infant botulism.*

Ensure these people are kept under close medical supervision.

Educate regarding safe practices in food preparation and home canning methods.

Despite excretion of *C. botulinum* toxin and organisms at high levels in the feces of infant and adult colonization botulism patients for weeks to months after onset of illness, no instance of secondary person to person transmission has been documented. Hence, isolation is not required.

9.1 Management of other persons who consumed the same sources of suspect foods

Immunoprophylaxis for asymptomatic people who have consumed the same food as an individual with botulism or food with probable or confirmed botulism toxin contamination is not recommended; the available products have not been licensed for this use and there is risk of serum sickness and hypersensitivity reactions associated with equine serum antitoxin administration (AAP 2018).

Attempts may be made to remove contaminated food still in the gut by inducing vomiting or by use of enemas.

Symptom watch and rapid management of symptomatic exposed people are recommended.

10.0 REPORTING

Report the case to MOH as soon as suspected, to arrange the provision of antitoxin.

Complete the BC Botulism Follow Up Form available at www.bccdc.ca/health-professionals/professional-resources/surveillance-forms (adapt for Yukon). If used, please fax to YCDC (867) 667-8349.

11.0 CLINICAL DESCRIPTION

Botulism is a severe neuroparalytic disorder caused by toxins A though F produced by Clostridium botulinum. Types A, B, E, and rarely F cause human botulism. There are four clinical forms of botulism: foodborne, wound, infant, and adult colonization. The site of toxin production is different for each of the forms but all share the symmetrical descending flaccid paralysis that results from botulinum neurotoxin. No immunity develops even following severe disease.

Foodborne botulism: This is a severe intoxication resulting from ingestion of preformed toxin present in contaminated food. Acute bilateral cranial nerve impairment and descending weakness or paralysis characterizes the illness. Visual difficulty (blurred or double vision), dysphagia and dry mouth are often the first complaints. These symptoms may extend to a symmetrical flaccid paralysis in a paradoxically alert person. Vomiting and constipation or diarrhea may be present initially. Fever is absent unless a complicating infection occurs. The case-fatality rate is five to 10 per cent. Recovery may take months.

Wound botulism: This form occurs when botulism spores get into an open wound and reproduce in an anaerobic environment. Symptoms are similar to the foodborne form but may take up to two weeks to appear. Clinical illness is characterized by double or blurred vision and bulbar weakness. Symmetric paralysis may progress rapidly.

Infant botulism: This form occurs when botulism spores are ingested and produce bacteria that reproduce in the gut and release toxin. It affects infants younger than one year of age. It is preceded by or begins with constipation and is manifested as lethargy, poor feeding, weak cry, diminished gag reflex, ptosis and ocular palsies, and progressive descending generalized weakness and hypotonia. Respiratory arrest and death can occur. It is nearly always caused by botulism toxin type A or B. For more information about infant botulism, refer to www.infantbotulism.org.

Adult colonization botulism: This form affects older children and adults who have altered GI anatomy or function and microflora which allows the germination of ingested C. botulinum spores. It is very rarely encountered. Clinical presentation is similar to foodborne botulism. Recurring symptoms and relapse during antitoxin treatment may be observed due to ongoing intraluminal production of toxin.

11.1 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 food (vegetables and fruits), home preserved foods, smoked fish, fermented fish eggs and seal meat.

Wound botulism results from contamination of traumatized tissue by *C. botulinum* that grows in the wound and produces toxin locally. It occurs almost exclusively among injection drug users, particularly users of black tar heroin through "skin-popping" (i.e., injection of the black tar heroin into tissues, as opposed to veins).

Infant and adult colonization botulism results from ingestion of spores that germinate and produce toxin in the gut. Ingestion of honey is a known risk factor for infant botulism but probably only accounts for a proportion of cases. Other foods like herbal tea and ingestion of contaminated soil or dust in an environment where soil/dust is being disturbed may also be sources.

Inhalational (through intentional or accidental release) and iatrogenic (through therapeutic uses) botulism can also occur, but extremely rarely.

11.2 Incubation periods

Foodborne botulism: neurologic symptoms usually appear within 12 to 36 hours, but may range from six hours to eight days. The shorter the incubation period, the more severe the disease and the higher the case-fatality rate.

Wound botulism: onset of symptoms usually occurs four to 14 days after injury.

Infant botulism: cannot be determined for most cases but believed to be three to 30 days from the time of exposure to the spore-containing material.

Adult colonization botulism: unknown since the precise time of spore ingestion is often unknown.

12.0 EPIDEMIOLOGY

From 2000 to 2018, Yukon has had one case of botulism occurring in 2001. Between 1985 and 2005, a total of 91 lab confirmed outbreaks were reported in Canada. Of these outbreaks, the majority were type E botulism which originated in the northern areas of Quebec, British Columbia, Nunavut and the Northwest Territories. Among these outbreaks, primary causes were linked to the ingestion of marine animals such as beluga, whales, seals and walruses. Aged fish products (such as fermented salmon eggs) have been the primary source of botulism in 89% of British Columbia costal communities during this time period. Although there are other sources of foodbourne botulism, higher risk traditional foods should be identified in any suspect case (Emerging Infectious Disease, 2013).

13.0 REFERENCES

American Academy of Pediatrics. Botulism and infant botulism. In: Pickering LK, Baker CJ, Long SS, McMillan JA, eds. Red book: Report of the Committee on Infectious Diseases. 27th ed. Elk Grove Village, IL: AAP; 2006:257-60.

American Public Health Association. Control of Communicable Diseases Manual. 18th ed. Heymann D, ed. Washington DC: APHA; 2004: 69-74.

Anti-botulinum Serum, Type AB. INSTITUTO BUTANTAN. Brazil. Reviewed on January 25, 2010.

BCCDC Annual Summary of Reportable Diseases. Available at www.bccdc.ca/util/about/annreport/default.htm. Accessed on January 25, 2010.

BCCDC Laboratory Services Manual of Services. Available from: www.bccdc.ca/PHSALaboratories. Accessed on January 25, 2010.

Botulinum Antitoxin, Type E. Product Monograph. INSTITUTO BUTANTAN. Brazil. Reviewed on January 25, 2010.

California Department of Health Services. Infant Botulism Treatment and Prevention Program. Available at: www.infantbotulism.org. Accessed on January 25, 2010.

California Department of Health Services. Package Insert for BabyBIG®. Available at www.infantbotulism.org/babybig_package_insert.pdf. Accessed on January 25, 2010.

Cohen J, Powderly WG, eds. Infectious Diseases (2nd ed.). Edinburgh, Scotland: Mosby. 2004.

Novartis Vaccines. Botulism Antitoxin Behring. 2006, September. Reviewed on January 25, 2010.

Emerging Infectious Disease (2013). Foodbourne botulism in Canada, 1985-2005, 19(6): 961-968. Retrieved from www.ncbi.nlm.nih.gov/pmc/articles/PMC3713816/

Public Health Agency of Canada (2004). Emergency Preparedness: Botulism. Available at www.phac-aspc.gc.ca/ep-mu/botulism-eng.php .

Public Health Agency of Canada, (2009). Case Definitions for Communicable Diseases under National Surveillance - 2009. Retrieved from www.phac-aspc.gc.ca/publicat/ccdr-rmtc/09vol35/35s2/index-eng.php

Public Health Agency of Canada (2018). Reported cases from 1991-2016 in Canada- Notifiable disease online Retrieved from diseases.canada.ca/notifiable/charts?c=yl

Sobel J. Botulism. Clin Infect Dis. 2005:41;1167-73.

14.0 CONTACT INFORMATION

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