

## Botulism, Foodborne

**Organism:** *Clostridium botulinum*, a spore forming obligate anaerobic bacillus that produces a neurotoxin.

**Incubation period:** 12-36 hours is the usual range. The shortest time may be 6 hours and the longest may be 10 days. Generally, the shorter the incubation period, the more severe will be the disease.

**Infectious period:** Person-to-person transmission has not been documented.

**Transmission route:** Oral ingestion. Foodborne. In Alaska, all documented cases have been associated with Alaska Native aged, “fermented” foods.

For a discussion of infant and wound botulism (rare events), see Control of Communicable Diseases Manual and California Infant Botulism Treatment and Prevention Program (<http://www.infantbotulism.org/>).

**Treatment:** Close observation and monitoring of respiratory Forced Vital Capacity (FVC) should be done. Supportive medical and nursing care with the capability to intubate and place on a ventilator needs to be present. In March 2013, FDA licensed the use of BAT<sup>®</sup> for use in managing cases of suspected botulism. BAT<sup>®</sup> contains antitoxins to treat botulism types A-G, including E, which is the most common type in Alaska. One vial of BAT<sup>®</sup> is supplied in the SOE botulinum antitoxin kit stored in pharmacies at major hub hospitals and in the SOE Drug Room in Anchorage. Antitoxin cannot reverse the neurotoxin but can prevent further toxin from attaching to the neurons. Antimicrobial agents, especially aminoglycosides, should be avoided as they could increase the amount of toxin available for absorption. See BAT<sup>®</sup> kit for details on administration: <http://dhss.alaska.gov/dph/Epi/id/SiteAssets/Pages/Botulism/BATPacket.pdf>

**Note: CDC Botulism Duty Officer may be consulted through the CDC/EOC 770-488-7100.**

Botulism is a public health emergency; there are several agencies that play various roles in managing the response. Below is a Table that describes some of the differences in roles as well as the data gathered.

Agency	Goal/Role	Data Tracked
DPH	<ul style="list-style-type: none"> <li>• Assist providers in clinical management of patient (i.e., facilitate access to antitoxin)</li> <li>• Provide lab testing in-state</li> <li>• Mitigate outbreaks by investigating common sources</li> <li>• Educate health care providers to promote early recognition of possible cases</li> </ul>	<ul style="list-style-type: none"> <li>• Individual case information               <ul style="list-style-type: none"> <li>○ AK Case Investigation/Interview Form</li> <li>○ AK STARS</li> <li>○ FTR reports</li> </ul> </li> </ul>

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	<ul style="list-style-type: none"> <li>Educate consumers to reduce the likelihood of being exposed to botulinum toxin</li> </ul>	<ul style="list-style-type: none"> <li>Summary data on Alaska outbreaks               <ul style="list-style-type: none"> <li>Foodborne linelist</li> <li>NORS</li> </ul> </li> </ul>
CDC	<ul style="list-style-type: none"> <li>Support public health and outbreak surveillance, including preparedness (bioterror threats)</li> <li>Facilitate access to antitoxin from manufacturer (Cangene dba EBSI)</li> <li>Coordinate review panels to develop clinical management guidelines</li> </ul>	<ul style="list-style-type: none"> <li>National aggregation of non-identified surveillance data               <ul style="list-style-type: none"> <li>Case report and outcome forms</li> <li>BAT<sup>®</sup> administration</li> </ul> </li> <li>National summary of outbreaks               <ul style="list-style-type: none"> <li>NORS</li> </ul> </li> </ul>
<i>Cangene (dba EBSI)</i>	<i>Prior to July 2017, Cangene required notification of product release for post-marketing surveillance.</i>	<i>None</i>

### Information Needed for the Investigation

#### Verify the Diagnosis

- Section of Epidemiology (SOE) staff should initially start filling out the Alaska Botulism Investigation Form (CDC surveillance forms come later). SOE form is available at: <http://dhss.alaska.gov/dph/Epi/id/SiteAssets/Pages/Botulism/resources/BotulismInvestigationForm.pdf>
- Is there a history of eating Native aged (“fermented”) foods or home-canned vegetables?
- Are three of the following five symptoms present—nausea or vomiting, dysphagia, diplopia, dilated fixed pupils, or dry mouth or throat?
- Is there evidence of cranial nerve involvement such as fixed dilated pupils, facial paralysis, ptosis, hoarseness or difficulty swallowing?
- A 1-pager checklist is also available for SOE staff: <http://dhss.alaska.gov/dph/Epi/id/SiteAssets/Pages/Botulism/BotulismChecklistSOE.pdf>
- A 1-pager checklist is available for health care providers working up a patient with suspected botulism: <http://dhss.alaska.gov/dph/Epi/id/SiteAssets/Pages/Botulism/BotulismChecklistHCP.pdf>

#### Determine the Extent of Illness:

- Determine if household or other contacts are ill or are at risk for disease (consumption of suspected contaminated food). Contact a local health care provider, public health nurse (PHN), patient or family member.
- A 1-pager investigation checklist is available for PHNs at: <http://dhss.alaska.gov/dph/Epi/id/SiteAssets/Pages/Botulism/BotulismChecklistPHN.pdf>
- A 10-day monitoring log for asymptomatic people who shared the same food is available at: <http://dhss.alaska.gov/dph/Epi/id/SiteAssets/Pages/Botulism/BotulismMonitoringLog.pdf>
- Try to obtain a recent food history from the patient or from someone who knows what he/she may have eaten.

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- Identify suspected food sources. While “fermented” foods have traditionally been thought of as the major culprit, it is important to consider all possible food sources. In addition to Alaska Native aged foods, recent botulism cases in other states have been traced to baked potatoes wrapped in foil, frozen potpies, grilled onions and garlic stored in oil.
- Retrieve and refrigerate suspect foods and their containers. If the food is a commercial product, obtain the brand name, lot number and distributor and notify DEC.

### **Laboratory Specimens:**

- Detailed collection information is available in the ASPHL Laboratory Testing Directory: <http://dhss.alaska.gov/dph/Labs/Documents/LaboratoryTests.pdf> (see pages 16 and 68).
- From the patient, collect approximately 20 mls of whole blood to obtain ~10 mls of serum BEFORE administration of the anti-toxin.
- Collect 10-50 gm of stool.
- Collect any emesis or gastric aspirate.
- Collect suspected food samples and bag separately. DEC or OEH can sometimes help with food collection.
- Specimens should be refrigerated, not frozen.
- All specimens and a specimen form for each should be sent to the Alaska State Public Health Laboratory in Anchorage.
- Specimen forms available at: <http://dhss.alaska.gov/dph/Labs/Documents/publications/AncSupplyReq.pdf>

### **Additional Notes:**

**Afterhours contact # for the Lab is 1-855-222-9918. Contact the Lab on-call person 24/7 to alert them that you are working on a suspected botulism investigation. This ensures they are aware and can begin making plans for testing before the next work day. Emails to the Special Pathogens group should include: Janet Fahrni, John Laurance, and Bernard Jilly.**

### **Contact and Control Measures**

- The goal is to identify other persons at risk and evaluate them for symptoms of botulism. This can be done through the Community Health Aide or the Public Health Nurse. If neither of these individuals is available, staff from the Infectious Disease Program should travel to the area.
- An Alaska Botulism Factsheet (Oct 2015) is available at: <http://dhss.alaska.gov/dph/Epi/id/SiteAssets/Pages/Botulism/BotulismFactSheet.pdf>
- Determine the source of infection to prevent other cases. This is done through interviews and epidemiology principles applied as in any foodborne outbreak.
- Determine the need for administration of botulism antitoxin and if necessary send more out to the regional health care facility.
- Educate consumers about safe food preparation methods, see Botulism Monograph: <http://dhss.alaska.gov/dph/Epi/id/siteassets/Pages/botulism/monograph.pdf> or <http://www.uaf.edu/files/ces/publications-db/catalog/hec/FNH-00268.pdf>

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## Hospital Considerations

- Use Standard Precautions. Not transmitted person-to-person.
- Siegel JD, Rhinehart E, Jackson M, Chiarello L, and the Healthcare Infection Control Practices Advisory Committee. 2007 Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings. Available at <http://www.cdc.gov/hicpac/pdf/isolation/isolation2007.pdf>

## Reporting Requirements

- SOE nurses, for every release of BAT<sup>®</sup>, send an email to CDC's Botulism Program **the next work day after you learn of release.**
  - Email addresses are: Seth Edmunds [wex2@cdc.gov](mailto:wex2@cdc.gov); and Mike Judd [vuj4@cdc.gov](mailto:vuj4@cdc.gov) .
  - Include: Age, sex, hospital city, onset date, suspected vehicle, type (i.e., foodborne)
- Collect the two forms provided in PART B of the BAT<sup>®</sup> kit. Often facility staff will complete and fax forms to SOE; however, if needed transcribe required information from medical records.
  - There are two forms to return to CDC for national surveillance. Once completed, redact the name, DOB (age ok), and address, and then fax to CDC.
  - FTR: Write up all confirmed and probable cases using the Botulism FTR template on the P:drive available in the MMM chapter folder. Store these at this location:  
P:\Infectious\Disease-Specific/Botulism/FTR.
- AK STARS: Enter all confirmed and probable cases.
- NORS and foodborne outbreaks linelist:
  - Enter all cases on the linelist; outbreaks (or >1 case) will be subsequently entered in NORS. Excel linelist located here: P:\Infectious
  - CDC will reconcile all instances of BAT<sup>®</sup> administration at the end of the year. This often is not exactly the same as the official case count so it is important to maintain information on suspected cases that were subsequently ruled out.
- CDC Case Definition is used to define confirmed and probable cases of botulism; see: <https://wwwn.cdc.gov/nndss/conditions/botulism/> (definition last updated 2011).

# **Botulism, Infant**

**Organism:** *Clostridium botulinum* and other clostridial species; *C. baratti*, *C. butyricum*. Usually toxin type A or B in U.S.

**Incubation Period:** Unknown since precise time of ingestion can often not be determined.

**Infectious Period:** None. No secondary cases ever documented although an infant may potentially excrete toxin.

## **Treatment:**

- Primarily supportive; mechanical ventilation can be lifesaving. Antimicrobials, particularly aminoglycosides, have been reported to increase the incidence of respiratory paralysis. However, complications, such as respiratory infections, may require antimicrobial therapy. Antitoxin, such as is used in cases of foodborne botulism, has **not** been shown to affect the outcome of infant botulism.
- Treatment with human-derived Botulism Immune Globulin Intravenous (BabyBIG®) might reduce the length of time needed for recovery. BabyBIG® can be obtained from the California Department of Health Services, Infant Botulism Treatment and Prevention Program (IBTPP); <http://www.infantbotulism.org/>.
  - 24/7 number is **510-231-7600**
  - [ibttp@infantbotulism.org](mailto:ibttp@infantbotulism.org)
- BabyBIG® has been shown to be most effective if given within 7 days of hospital admission. FDA approval of BabyBIG® was based upon studies that its use produced a statistically significant reduction in the durations of hospital stay, mechanical ventilation, and tube feeding.

## **Information Needed for the Investigation**

Infant botulism is the most commonly reported form of botulism in the United States. In Alaska five infants have been diagnosed with this disease. Four cases are summarized in a 2009 Bulletin ([http://epi.alaska.gov/bulletins/docs/b2009\\_17.pdf](http://epi.alaska.gov/bulletins/docs/b2009_17.pdf)). A fifth case occurred in 2015, and the infant received BABYBIG®; that case is also summarized in the 2017 Botulism monograph (<http://dhss.alaska.gov/dph/Epi/id/SiteAssets/Pages/Botulism/Monograph.pdf>). In a study conducted outside of Alaska, affected infants had higher birth weights, their mothers tended to be Caucasian, and they were more commonly breast-fed.

In contrast to foodborne botulism where the toxin is ingested, infant botulism results from ingestion of *C. botulinum* spores with subsequent intestinal colonization and toxin production. Most infants affected by botulism are between 3 and 20 weeks of age. The first symptom is often constipation, followed in several days by progressive muscular weakness, poor suck, weak cry, and difficulty swallowing. Respiratory arrest occurs in half of affected infants. Numerous examples exist of infants presenting with apnea, or becoming apneic, during a diagnostic procedure. Examination may show a decreased gag reflex; cranial nerve involvement including

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ptosis, ophthalmoplegia, and facial nerve palsy; mydriasis; and areflexia and generalized hypotonia. Patients are usually afebrile and have normal cerebrospinal fluid. Electromyography may be helpful in differentiating botulism from other causes of neuromuscular disease.

### **Verify the Diagnosis**

- Demonstration of botulinum toxin in stool and positive stool culture; unusual to find toxin in serum.
- Interview the patient's parents/guardians using the CA IBTPP questionnaire available in the Botulism Chapter folder (see P:\Infectious\Disease-Specific\Botulism\MMM Chapter\).

### **Laboratory Specimens**

- Collect bulk stool; send to ASPHL for direct toxin assay and culture.
- Serum should not be submitted.
- Environmental and food specimens usually not helpful; consult with California Department of Health Services prior to any collection efforts.

### **Contact and Control Measures**

- Not applicable.

### **Prevention**

- Approximately 20% of infant botulism cases reported to the CDC have been associated with the ingestion of honey. The sources for the other cases are unknown, but hypotheses include soil, household dust, and other foods. Honey should not be fed to infants less than 1 year of age. No other specific prevention measures exist.

### **Reporting Requirements**

- FTR: write up all *suspect* or *confirmed* cases
- AK STARS Database: enter all *confirmed* cases
- CDC Case Definition is used to define confirmed and probable cases of botulism; see: <https://wwwn.cdc.gov/nndss/conditions/botulism/> (definition last updated 2011).