

# Botulism !

(foodborne, wound, infant, unspecified and other)

## PROTOCOL CHECKLIST

- Enter available information into Merlin upon receipt of initial report (page 11)
- Review background on disease, clinical presentation, case definition, and laboratory testing (pages 2-13)
- Contact provider to obtain a detailed clinical history, and neurology consult and test notes.
- Contact the Bureau of Epidemiology (DCBE) Regional Epidemiologist/Laboratory Liaison
  - In coordination with DCBE and the physician, request botulinum antitoxin from the Centers for Disease Control and Prevention (CDC) or California Department of Health Services for infant botulism (page 5-6)
- Arrange appropriate specimen collection and shipment to the CDC (pages 8-9)
- Interview patient, family or guardian (page 9-11)
  - Review disease facts
    - Modes of transmission (page 10)
    - Incubation period (page 4)
    - Signs/symptoms (page 3)
    - Exposures of interest (pages 4 & 10)
  - Determine risk factors (page 4 and 10)
    - Identify potential exposures associated with botulism (pages 4 and 10)
    - Determine if others have experienced a similar illness (page 3)
    - Medical history
    - Travel history
  - Provide education on disease prevention (page 12)
  - Address questions or concerns
- Identify potentially exposed persons who may be at risk (page 11)
  - Conduct notification and active surveillance of potentially exposed persons
- Determine whether a widely distributed product may be associated with illness (page 10)
  - Coordinate with DCBE to identify and notify partner agencies.
- Follow-up on special situations
- Enter additional data obtained from interview into Merlin, including extended data screen

# Botulism

## 1. DISEASE REPORTING

### A. Purposes of reporting and surveillance

1. To assist in the diagnosis of potential case patients and facilitate prompt administration of either antitoxin or botulism immune globulin when indicated.
2. For foodborne botulism, to identify contaminated food(s) and to prevent further exposures.
3. For foodborne botulism, to identify and assure the proper evaluation and care of other persons who may be at immediate risk of illness because they have already eaten the implicated food items.
4. For wound botulism, to alert others at risk regarding the importance of promptly identifying illness and obtaining medical care.

### B. Legal reporting requirements

1. Laboratories and physicians are required to report persons with foodborne, wound, and unspecified botulism infections immediately 24/7 by phone upon initial suspicion or laboratory test order to the county health department (CHD).
2. Laboratories and health care providers are required to report infant botulism infections the next business day.

### C. County health department investigation responsibilities

1. Call DCBE immediately to report suspect cases and discuss the need to coordinate with partner agencies to acquire heptavalent botulinum antitoxin, or human-derived botulism immune globulin (BabyBIG®) for treating infant botulism.
2. Determine the most likely source of the exposure and prevent others from being exposed.
3. Facilitate the transport of appropriate specimens for laboratory testing.
4. Report all confirmed and probable cases of botulism in Merlin under the appropriate disease code.

## 2. THE DISEASE AND ITS EPIDEMIOLOGY

### Background

Botulism is a neurological disease caused by botulinum toxin. Although all types of botulism are medical emergencies and potentially fatal, only foodborne and inhalational botulism are public health emergencies, due to the risk posed to other exposed individuals.

- **Foodborne botulism** occurs when a person ingests toxin, which leads to illness within a few hours to days. Outbreaks of foodborne botulism have the potential to be a public health emergency because the contaminated food may be eaten by other people.

- **Wound botulism** is a rare disease that occurs when wounds infected with *Clostridium botulinum* secrete the toxin.
- **Infant botulism** is a rare disease that occurs after infants, usually less than six months-old, ingest spores of *C. botulinum*, which then multiply and produce botulinum toxin in the intestines.
- **Adult colonization botulism** is an even rarer type of intestinal colonization reported only a few times in the literature. It involves intestinal colonization with *C. botulinum* in a person older than one year of age. In the small number of these cases, most patients had a history of gastrointestinal surgery or illness, such as inflammatory bowel disease, which might have predisposed them to enteric colonization. No other specific risk factors have been identified.
- **Inhalational botulism** occurs after inhalation of botulinum toxin. This does not occur naturally. There have been only three reported cases in humans worldwide, associated with laboratory exposure.

### A. Etiologic agent

Botulism is caused by seven immunologically distinct toxins (A-F) produced by the gram-positive *bacillus Clostridium botulinum*, or rarely *C. butyricum* (type E toxin) and *C. baratii* (type F toxin). The toxins irreversibly block acetylcholine transmission across the neuromuscular junction and cause a characteristic syndrome. Recovery reflects reinnervation of paralyzed muscle fibers, which can take weeks or months in an adult.

*Clostridium botulinum* forms spores, which can survive under a wide range of adverse environmental conditions including boiling. The higher temperatures (>120.5°C or 250.5°F) that can be achieved under pressure (e.g., in an autoclave or properly functioning home pressure cooker) are sufficient to kill spores. Spore germination and bacterial growth occur only under anaerobic and low-acid to non-acidic (generally pH>4) conditions. Toxin is produced as the bacteria multiply. Botulinum toxin is heat-labile and can be inactivated by boiling for ten minutes. Toxin types A, B and E are the most common sources of human disease; type E is highly associated with marine products (fish, seafood, or marine mammal meat). Type F is rare in humans and types C, D and G are not known to cause human illness. The toxin is a potential agent of bioterrorism.

### B. Description of illness

Symptoms of botulism may include the "4 Ds" – dysphagia (difficulty swallowing), dry mouth, diplopia (double vision), and dysarthria (difficulty articulating words) as well as blurred vision, ptosis (drooping eyelids), and muscle weakness. Symptoms reflect a descending, symmetrical flaccid paralysis that starts with the facial muscles and may progress downward. Respiratory distress may ensue if the muscles of breathing are compromised. Mental alertness and peripheral sensation are typically maintained. Neurologic symptoms may be preceded or accompanied by mild gastrointestinal disturbance such as constipation, vomiting, or diarrhea. The severity of symptoms and the rate of progression are highly variable, depending on dose and other factors. In severe cases, patients may recover only after months on a ventilator.

Botulism is frequently misdiagnosed in adults, most often as polyradiculoneuropathy (Guillain-Barré or Miller-Fisher syndrome), myasthenia gravis, or other diseases of the central nervous system.

In infants with intestinal botulism the first sign is often constipation, followed by lethargy, listlessness, a weak cry, ptosis, difficulty feeding (weak or absent sucking response) leading to weight loss, and generalized weakness (the “floppy baby” syndrome). The infant may present with “failure to thrive” and diagnosis may be difficult.

### C. Reservoirs

*C. botulinum* spores are common in soil and elsewhere in the environment including on vegetables.

### D. Modes of transmission

Modes of transmission for foodborne, wound and infant botulism are described below.

#### 1. Foodborne botulism

Foodborne botulism is caused by ingestion of preformed toxin. Typically, implicated foods have been low-acid, home-canned foods that have not been processed adequately during canning and not heated before consumption. Rarely, commercial products are implicated, usually after some breakdown in standard canning procedures has occurred. Examples of implicated foods include:

- Home-canned asparagus, beans, and other vegetables (including low-acid tomatoes), usually canned by the water-bath method
- Fish that has been improperly canned, dried, or stored
- Sausage or other prepared meats that are improperly processed (inadequate sodium nitrite) and improperly stored
- Chopped garlic or eggplant bottled in oil
- Among Alaska Natives, traditionally preserved foods including fermented (putrefied) whale blubber, salmon heads, salmon eggs, and other delicacies.
- Commercially-prepared products are rarely implicated (e.g., commercially canned chili in 2007, commercially produced carrot juice in 2006)

#### 2. Wound botulism

Wound botulism results from a local *C. botulinum* infection in devitalized tissue at a wound site, where semi-anaerobic conditions occur. As with intestinal botulism, the toxin is produced *in situ* and disseminated in the blood. Wound botulism is increasingly reported, especially due to intramuscular injection (“muscling”) or subcutaneous injection (“skin popping”) of black-tar heroin.

#### 3. Infant and adult intestinal colonization botulism

Intestinal botulism occurs when *C. botulinum* spores, ingested in food or soil, germinate in an intestine that does not have a mature flora, or has been altered by disease or surgery. Botulinum toxin is then produced in the intestine and enters the bloodstream. Although in the past, an association was suggested for intestinal botulism in infants and honey, recent cases have rarely consumed honey.

Most cases occur in infants less than three months-old (usually under six months old). Cases occur in both breast-fed and formula fed infants.

## E. Incubation period

1. **Foodborne botulism:** The incubation period for foodborne botulism varies from 12 hours to several days, but is usually 12 to 36 hours. A short incubation is associated with more severe disease.
2. **Wound botulism:** The incubation period can be up to two weeks or longer.
3. **Infant botulism:** The incubation period is unknown.

## E. Period of communicability

Botulism is not communicable from person to person.

## F. Treatment

Treatment should never be delayed pending laboratory confirmation of the diagnosis. All patients require close monitoring of respiratory function and aggressive supportive therapy is required in severe cases. Additional therapies depend on the type of botulism and are outlined below.

### 1. Foodborne botulism

Foodborne botulism is treated with botulinum antitoxin. Although the antitoxin cannot reverse symptoms caused by the toxin, treatment with antitoxin will halt further progression by removing free toxin, if given promptly after exposure. Antitoxin therapy should never be delayed pending laboratory confirmation of the diagnosis, which often takes several days.

Since March 13, 2010, a new heptavalent (for toxins A-G) botulinum antitoxin (HBAT, Cangene Corporation) is the only available antitoxin in the United States for treatment of all naturally occurring non-infant botulism. HBAT is provided under an investigational new drug protocol so providers must track patient outcomes with included paperwork. HBAT is equine-derived but there is no skin test for sensitivity needed prior to administration. In the United States, clinical experience with HBAT is limited but on average nine percent of recipients of earlier formulations of antitoxin, derived from horse serum, suffered allergic reactions. HBAT is administered intravenously at controlled rates to minimize allergic reactions. The half-life of HBAT is shorter than for earlier formulations of antitoxin so after HBAT treatment patients should be monitored for possible rebound of symptoms, particularly with potential ongoing toxin production such as with wound botulism or intestinal colonization botulism.

Centers for Disease Control and Prevention (CDC) controls the distribution of botulinum antitoxin, which is stocked at United States Public Health Service Quarantine Stations throughout the country. A Quarantine Station is located at Miami-Dade International Airport. If antitoxin use is being considered, **IMMEDIATELY** consult with Florida Department of Health (DOH) Bureau of Epidemiology (1-850-245-4401). Personnel at CDC can arrange to have the antitoxin transported to the hospital where the patient is being treated.

## 2. Wound botulism

Wound botulism is treated with heptavalent botulinum antitoxin. Antitoxin should be administered as for foodborne botulism. Debridement of the wound is indicated to remove devascularized tissue that provides the anaerobic conditions required for growth of *C. botulinum*. If antitoxin use is being considered, **IMMEDIATELY** consult with DOH Bureau of Epidemiology (1-850-245-4401), as for food botulism. Antimicrobial therapy should also be considered.

## 3. Infant botulism

Infants may do well with supportive care or may need weeks of hospitalization and mechanical ventilation. A human-derived botulism hyper-immune globulin (BIG-IV), now known as BabyBIG<sup>®</sup>, was approved by the Food and Drug Administration (FDA) in 2003 for treatment of infants. Though the cost for BIG-IV is substantial, its use may be cost-effective. A randomized, double-blind, placebo-controlled trial of BIG-IV found a three-week reduction in the mean length of hospital stay with an accompanying reduction in the mean hospital charges. Consultation or BabyBIG<sup>®</sup> can be obtained from the California Department of Health Services by **IMMEDIATELY** calling the 24-hour number at 510-231-7600. Also, contact DOH Bureau of Epidemiology to arrange for testing. Additional information about infant botulism is available at <http://www.infantbotulism.org/>.

## 4. Adult intestinal colonization botulism

Horse-derived antitoxin is used to treat adult intestinal colonization botulism. More than one dose of antitoxin may be required. If antitoxin use is being considered, **IMMEDIATELY** consult with DOH Bureau of Epidemiology (1-850-245-4401) as for food botulism.

## H. Botulism in Florida

Between 2001 and 2011, the Bureau of Epidemiology reported six infant botulism cases, two botulism cases associated with injection of botulinum toxin, one foodborne botulism case, and no wound botulism cases.

## 3. CASE DEFINITIONS

### Clinical description

Botulism has several distinct clinical forms:

- **Foodborne:** An illness caused by ingestion of botulinum toxin with variable severity. Common symptoms are diplopia, blurred vision, and bulbar weakness. Symmetric paralysis may progress rapidly.
- **Infant:** An illness of infants less than 12-months of age, characterized by constipation, poor feeding, and “failure to thrive” that may be followed by progressive weakness, impaired respiration, and death.
- **Wound:** An illness resulting from toxin produced by *Clostridium botulinum* that has infected a wound. A history of a fresh, contaminated wound during the two weeks before onset of symptoms should be present. Common symptoms are diplopia, blurred vision, and bulbar weakness. Symmetric paralysis may progress rapidly.

- **Other, Unspecified:** An illness in a patient over 12 months of age who has no history of ingestion of suspect food and has no wounds. Common symptoms are diplopia, blurred vision, and bulbar weakness. Symmetric paralysis may progress rapidly.

## Botulism, Foodborne

### A. Clinical description

Ingestion of botulinum toxin results in an illness of variable severity. Common symptoms are diplopia, blurred vision, and bulbar weakness. Symmetric paralysis may progress rapidly.

### B. Laboratory criteria for diagnosis

- Detection of botulinum toxin in a clinical specimen or food for foodborne botulism,  
**OR**
- Isolation of *Clostridium botulinum* from a clinical specimen

### C. Case classification

Confirmed: A clinically compatible case that is laboratory confirmed or occurs among persons who ate the same food as persons who have laboratory-confirmed botulism.

Probable: A clinically compatible case with an epidemiologic link (e.g., ingestion of a home-canned food within the previous 48 hours).

### D. Comment

Note that this is one of the few diseases in which an epidemiologically-linked case without laboratory confirmation is considered confirmed.

## Botulism, Infant

### A. Clinical description

An illness of infants, characterized by constipation, poor feeding, and “failure to thrive” that may be followed by progressive weakness, impaired respiration, and death.

### B. Laboratory criteria for diagnosis

- Detection of botulinum toxin in stool or serum,  
**OR**
- Isolation of *Clostridium botulinum* from stool

### C. Case classification

Confirmed: A clinically compatible case that is laboratory confirmed, occurring in a child aged less than one year.

## Botulism, Wound

### A. Clinical description

An illness resulting from toxin produced by *Clostridium botulinum* that has infected a wound. Common symptoms are diplopia, blurred vision, and bulbar weakness. Symmetric paralysis may progress rapidly.

### B. Laboratory criteria for diagnosis

- Detection of botulinum toxin in serum,  
**OR**
- Isolation of *Clostridium botulinum* from wound

### C. Case classification

Confirmed: A clinically compatible case that is laboratory confirmed in a patient who has no suspected exposure to contaminated food and has a history of a fresh, contaminated wound during the two weeks before onset of symptoms, or a history of injection drug use within the two weeks before onset of symptoms.

Probable: A clinically compatible case in a patient who has no suspected exposure to contaminated food and who has either a history of a fresh, contaminated wound during the two weeks before onset of symptoms, or a history of injection drug use within the two weeks before onset of symptoms.

## Botulism, Other

### A. Clinical description

An illness in a patient over 12-months of age who has no history of ingestion of suspect food and has no wounds. Common symptoms are diplopia, blurred vision, and bulbar weakness. Symmetric paralysis may progress rapidly.

### B. Laboratory criteria for diagnosis

- Detection of botulinum toxin in clinical specimen,  
**OR**
- Isolation of *Clostridium botulinum* from clinical specimen

### C. Case classification

Confirmed: A clinically compatible case that is laboratory confirmed in a patient aged greater than or equal to one year who has no history of ingestion of suspect food and has no wounds

**Specimens (food or clinical) must be sent to Bureau of Public Health Laboratories for laboratory diagnosis (toxin testing) from suspected cases of botulism and must be cleared through the Bureau of Epidemiology (850) 245-4401. Heptavalent botulinum antitoxin is available through the Bureau at the above telephone number, 24 hours**

per day. This condition has been identified as a potential bioterrorism agent by the CDC.

#### 4. DIAGNOSIS AND LABORATORY SERVICES

##### A. Criteria for diagnosis

Presumptive tests for botulism toxin may be completed in one day but the confirmatory assay used to detect botulism toxin and cultures for *C. botulinum* take several days to complete. Therefore, treatment should never be delayed pending laboratory confirmation of the diagnosis.

1. **Foodborne botulism:** Diagnosis is made by detecting botulism toxin in serum, stool, or implicated food or by culturing *C. botulinum* from stool. Vomitus or gastric aspirate can be tested for toxin if obtained within a few hours of food ingestion.
2. **Wound botulism:** Diagnosis is made by detecting botulism toxin in serum or by culturing *C. botulinum* from the infected wound. Stool should be obtained in addition to rule out foodborne botulism.
3. **Infant botulism:** Diagnosis is made by detecting botulism toxin or by culturing *C. botulinum* from stool. In contrast to foodborne and wound botulism, the toxin is rarely detected in serum.

##### B. Services available at the Bureau of Public Health Laboratories (BPHL)

The BPHL does not normally perform laboratory tests for botulism. Clinical specimens and food samples are to be sent directly to CDC laboratories for *C. botulinum* testing. If they are received by the BPHL, they will be forwarded to the CDC.

In the event of a public health emergency (i.e., bioterrorism attack, multi-person outbreaks), the BPHL-Tampa, as part of the Laboratory Response Network, has the ability to perform presumptive botulinum toxin enzyme-linked immunosorbent assay (ELISA) and toxin gene PCR assays for some clinical, food, and environmental samples. Consult with the Bureau of Epidemiology to arrange for testing.

##### C. Specimen collection

**Collect serum prior to the administration of antitoxin.** Once antitoxin is administered, it binds to free toxin in the blood and prevents it from being detected by assay. Obtain all other clinical specimens early in the course of illness and if possible before administration of antitoxin. Collect all clinical specimens in sterile leak-proof containers. Additional information is available at <http://www.cdc.gov/nczved/divisions/dfbmd/diseases/botulism/>.

1. For **stool** testing, submit 10-50 grams of stool. If enema, use sterile non-bacteriostatic water. For post-mortem testing, collect multiple 15-gram specimens from different parts of the small and large intestine. If an enema must be given because of constipation, a minimal amount of fluid (preferably sterile, non-bacteriostatic water) should be used to obtain the specimen so that the toxin will not be unnecessarily diluted. Place ~20 ml into sterile unbreakable container and label carefully.

2. For **serum** testing, submit 15 ml (at least 5 ml) of serum (not blood) without anticoagulant, 3-4 ml for an infant. Serum left over from other testing may be used.
3. For **food** testing, send as much implicated food as possible from the source suspected of being consumed. Foods should be left in their original containers or placed in sterile unbreakable containers.
4. For **wound** testing, suitable specimens for examination are serum, debrided tissue, swab samples from wounds, and feces. Anaerobic cultures of tissue generated by the hospital, commercial, or other laboratory may also be submitted for identification.
5. For **gastric aspirate** or **vomit**, send at least 20 ml.

All specimens should be kept refrigerated (not frozen) during storage and transport. Use cold packs to maintain a shipping temperature of 4° C (39° F). Specimens must be properly packaged using guidelines for shipping and packaging of diagnostic specimens. Be sure to use absorbent material around the primary container, particularly food specimens, which could have high levels of toxin and present a danger if there is leakage. Include a specimen submission form (**CDC form 50.34**) as well as the hospital phone and fax numbers with all specimens.

## 5. CASE INVESTIGATION

If you identify more than one case of botulism without an obvious source of infection, consider the possibility of an outbreak associated with a commercial product or an act of bioterrorism and call the Bureau of Epidemiology **IMMEDIATELY** at (850-245-4401) (see Section 7).

### A. Evaluate the diagnosis and arrange for treatment

Obtain information from the provider and family regarding the patient's history and physical exam findings, particularly neurologic exam findings (e.g., cranial nerve function) and call DCBE **immediately** (850-245-4401) to discuss the patient. For suspected foodborne or wound botulism, an epidemiologist with the DCBE will call CDC to release botulinum antitoxin if needed. For suspected intestinal botulism in an infant, the provider should immediately be referred to the California Department of Health Services (24-hour number 510-231-7600). Treatment should never be delayed pending laboratory confirmation of the diagnosis since laboratory confirmation can take several days and treatment needs to be given immediately.

While the heptavalent antitoxin or BabyBIG® is being released, arrange for diagnostic specimens to be sent directly to the CDC (see Section 4 above).

Complete the Botulism Alert Summary case report form available on the CRF website at: <http://www.floridahealth.gov/diseases-and-conditions/disease-reporting-and-management/disease-reporting-and-surveillance/documents/crf-botulism.pdf>.

### B. Identify source of infection

1. **Foodborne Botulism:** Interview the patient and family who may be able to provide pertinent information about foods eaten. A home visit is strongly recommended when

home-canned foods are implicated or if the source is not readily apparent. Identify the following products that were consumed in the week prior to onset of symptoms:

- a. Home canned, vacuum-packed, or traditionally preserved foods. The most suspect foods are those eaten less than two days before onset, those that are low in acid (e.g., fish, meat and vegetables), and those that were not eaten by other persons who remain well; keep in mind, however, that some cases may develop symptoms several days after the index case. Identify and collect all remaining jars of the home-canned foods.
  - b. Commercially canned or vacuum-packed foods or mishandled commercial products (e.g., refrigeration not maintained); such products are implicated only rarely. For implicated foods, determine the brand, manufacturer, package size, lot number, and place and date of purchase. When a commercial product or environmental exposure is implicated (see Section 6).
  - c. Sausage, preserved or traditionally preserved meat and inadequately refrigerated meats; such products are implicated only rarely.
  - d. Preserved or traditionally prepared fish and marine products.
  - e. Items stored in oil (e.g., onions, garlic); especially when no citric acid has been added.
  - f. Items cooked and held in foil (e.g., baked potatoes).
  - g. With the identification of more than one case of botulism without a likely source of exposure, consider the possibility of intentional exposure through deliberately contaminated food and interview the case and others who may be able to provide pertinent information about possible exposures such as locations where food and water were consumed, particularly at gatherings and public events.
2. **Wound Botulism:** Ask the patient about illicit drug use. Specifically, ask about the type of drugs used and how the drugs are used (e.g., injected into veins, injected into tissues, snorted, etc.). It is often difficult to specifically identify sources of heroin. Testing of heroin or drug paraphernalia is not encouraged. In addition to illicit drug use, interview regarding potential foodborne exposures.
  3. **Infant Botulism:** No specific exposures are well described. Although honey was associated with intestinal botulism in the past, it is rarely implicated in cases.
  4. **Botulism, other:** If the type of botulism or exposure route cannot be determined, identify public events and gatherings that the case attended.

### C. Identify potentially exposed persons

1. Obtain the name, address, and telephone number of every person who may have eaten the suspected food item or shared an environmental exposure.
2. Obtain the organization name, contact telephone number, and attendance lists (particularly e-mail or telephone lists) for every suspected gathering, public event, or other shared environmental exposure.
3. Obtain the name, address, and telephone number of every person who may have the suspect home-processed food in his or her possession.

#### D. Environmental evaluation

If a restaurant is implicated, conduct an immediate inspection with Environmental Health and the Department of Business and Professional Regulation (DBPR) to identify home-canned or mishandled product in the facility. If an environmental exposure is suspected, contact DCBE immediately for assistance with sampling.

#### E. Merlin data entry

Create a case in Merlin under disease code **BOTULISM - 00510 (Foodborne), 00511 (Infant), 00513 (Wound), or 00512 (Other, Unspecified)**. Enter the data collected into Merlin, being sure to include all required fields on the Basic Data screen, complete the Case Symptoms screen, and attach all relevant laboratory results. Please enter and attach **ALL** laboratory results received to the case and complete the extended data screens. Attach the completed Botulism Alert Summary to the case.

### 6. CONTROLLING FURTHER SPREAD

#### A. Infection control recommendations

Hospitalized patients should be treated with standard precautions.

#### B. Case management

No case follow-up is needed after the case receives treatment. Ask the hospital about the patient's outcome and record in Merlin.

#### C. Contact management (non-exposed persons)

No contact follow-up is needed since botulism is not transmitted from person to person.

#### D. Management of other exposed persons

1. **Foodborne botulism:** If reachable within six hours of exposure, other persons who have eaten implicated food should be purged and given gastric lavage to remove any unabsorbed toxin. They should be monitored for signs of botulism at least twice daily for three days and instructed to seek medical care immediately should symptoms develop.
2. **Wound botulism:** When possible, provide education to risk groups and to health care providers serving those groups regarding typical symptoms of botulism and the importance of rapid diagnosis and treatment. Potential routes for education include needle exchange programs and urban hospital emergency departments.

#### E. Environmental measures

1. Home Canned Food Implicated
  - a. Samples of any implicated home-canned food should be sent to CDC for testing (after pre-approval), and the remainder destroyed. To avoid endangering trash haulers or others, these foods should be autoclaved before discarding; as an alternative, bring contents of containers to a full boil for a least ten minutes. Any empty containers should be boiled likewise.

- b. The person who prepared the home-canned food should be thoroughly instructed in proper canning techniques.
2. Commercial Products Implicated: The DCBE should be notified **immediately** when a commercial product is implicated or suspected as the source of contamination. They will coordinate follow-up with relevant outside agencies (FDA, United States Department of Agriculture [USDA], CDC, etc.).

## 7. MANAGING SPECIAL SITUATIONS

### A. Outbreak

If more than one patient with a botulism infection (without an obvious source of exposure) is identified, consider the possibility of a contaminated commercial food product. **In such situations, call the Bureau of Epidemiology IMMEDIATELY: 1-850-245-4401.** The patients will need to be extensively interviewed to identify possible exposures such as locations where food was consumed, particularly at gatherings and public events.

### B. Bioterrorism

*C. botulinum* toxin has been classified as a possible agent of bioterrorism because it is extremely potent and lethal. The toxin is also easy to produce and transport, and affected individuals often need extensive and prolonged intensive care. Aerosol dissemination through air or on to food would be the most likely mode of spread. Aerosol dissemination could produce many cases in a geographic area. Botulism produced by an act of bioterrorism should be considered for two or more botulism cases, which are linked temporally and geographically but without a likely common foodborne or drug exposure. **In such situations, call the Bureau of Epidemiology IMMEDIATELY: 1-850-245-4401.** The patients will need to be extensively interviewed to identify possible exposures such as gatherings, public events, specific geographic locations, large buildings or shopping areas, and public transportation.

## 8. ROUTINE PREVENTION

### A. Vaccine Recommendations

None

### B. Prevention Recommendations

1. Foodborne botulism
  - Persons who do home canning should follow strict hygienic procedures to reduce contamination of foods.
  - Oils infused with garlic or similar moist flavoring should be refrigerated.
  - Potatoes, which have been baked while wrapped in aluminum foil, should be kept hot until served or refrigerated.
  - Because the botulism toxin is destroyed by high temperatures, persons who eat risky home-canned foods (i.e., low acidity, non-pickled foods) should consider boiling the

- food for ten minutes before eating it to ensure safety. Pickling, sugar syrup, or sufficient brining should prevent the growth of *C. botulinum*.
- Instructions on safe home canning can be obtained from county extension services or from the USDA.
2. Wound botulism
- Wound botulism can be prevented by promptly seeking medical care for infected wounds and by not using injectable street drugs.
  - IV drug users and health care providers serving them should be educated regarding typical symptoms of botulism and the importance of rapid diagnosis and treatment. Potential routes for education include needle exchange programs and urban hospital emergency departments.
3. Infant botulism
- Because honey can contain spores of *C. botulinum* and this has been a source of infection for infants, children less than 12-months-old should not be fed raw honey or otherwise.
  - Honey is safe for persons one year of age and older.

## RESOURCES

### A. Infant Botulism Guidelines for Treatment

[www.floridahealth.gov/diseases-and-conditions/disease-reporting-and-management/disease-reporting-and-surveillance/documents/botulism-guidelines-for-infant-treatment-and-testing.pdf](http://www.floridahealth.gov/diseases-and-conditions/disease-reporting-and-management/disease-reporting-and-surveillance/documents/botulism-guidelines-for-infant-treatment-and-testing.pdf)

### B. Guidelines for Specimen Collection and Shipment

[www.floridahealth.gov/diseases-and-conditions/disease-reporting-and-management/disease-reporting-and-surveillance/documents/botulism-guidelines-for-specimen-collection-and-shipment.pdf](http://www.floridahealth.gov/diseases-and-conditions/disease-reporting-and-management/disease-reporting-and-surveillance/documents/botulism-guidelines-for-specimen-collection-and-shipment.pdf)