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Botulism

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All forms of botulism can be fatal and are considered medical emergencies. Suspected botulism cases thought to be the result of an intentional release; foodborne; a cluster or outbreak of infant botulism; or cases of unknown etiology not meeting **standard notification** criteria should be immediately reported to your [local public health agency](#) (LPHA). If the LPHA cannot be immediately reached, contact the Missouri Department of Health and Senior Services (MDHSS) at (800) 392-0272 (24/7).

Botulism is a rare but serious paralytic illness caused by botulinum neurotoxins (BoNTs) that are produced by the bacterium *Clostridium botulinum*. There are seven types of BoNTs designated by the letters A through G; only types A, B, E and F cause illness in humans. *Non-botulinum* species of *Clostridium* rarely may produce these neurotoxins and cause disease [*Clostridium butyricum* (type E) and *Clostridium baratii* (types E and F)]. *C. botulinum* spores can be found in soils and dust worldwide.

There are five main kinds of botulism. Foodborne botulism is caused by eating foods that contain the BoNTs. Wound botulism is caused by BoNTs produced from a wound infected with *C. botulinum*. Infant botulism is caused by consuming the spores of the botulinum bacteria, which then grow in the intestines and release the BoNTs. Adult intestinal toxemia (adult intestinal colonization) botulism is a very rare kind of botulism that occurs among adults by the same route as infant botulism. Lastly, iatrogenic botulism can occur from an accidental overdose of therapeutic BoNTs. Foodborne botulism is a public health emergency because many people can be poisoned by eating a contaminated food. In a bioterrorist attack, BoNTs could be delivered by aerosols, as well as in food or water. Should aerosol transmission occur the clinical disease is expected to be similar to foodborne botulism.

Classic botulism disease generally begins with evidence of cranial nerve dysfunction (such as double vision, blurred vision, drooping eyelids, slurred speech, difficulty swallowing, dry mouth), and then progresses to muscle weakness/paralysis. The latter is typically described as an afebrile descending symmetric paralysis that may progress to respiratory dysfunction as a result of involvement of the respiratory muscles. Abdominal pain, nausea, vomiting, and/or diarrhea can be present in some patients.

Infants with botulism appear lethargic, feed poorly, are constipated, and have a weak cry and poor muscle tone. These are all symptoms of the muscle paralysis caused by the BoNTs.

In foodborne botulism, symptoms generally begin 18 to 36 hours after eating a contaminated food, but they can occur as early as 6 hours or as late as 10 days.¹ In infant botulism, the incubation period is estimated at 3 to 30 days. For wound botulism, the incubation period is 4 to 14 days from time of injury, until onset of symptoms.⁷

Botulism can be tentatively diagnosed by the clinical signs and the exclusion of other neurologic diseases. The laboratory diagnosis relies on identifying the BoNTs and/or the bacterium in feces, blood/serum, vomitus, gastric aspirates, wounds or food samples.⁷



For a complete description of botulism, refer to the following texts:

- *Control of Communicable Diseases Manual*. (CCDM), American Public Health Association. 19th ed. 2008.
- American Academy of Pediatrics. *Red Book: 2012 Report of the Committee on Infectious Diseases*. 29th ed. 2012.

2011 Case Definitions – (12/13)⁴

Botulism, Foodborne

Clinical description

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

Laboratory criteria for diagnosis

- Detection of botulinum toxin in serum, stool, or patient’s food, or
- Isolation of *C. botulinum* from stool.

Case classification

Confirmed: a clinically compatible case that is laboratory confirmed or that 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).

Botulism, Infant

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.

Laboratory criteria for diagnosis

- Detection of botulinum toxin in stool or serum, or
- Isolation of *C. botulinum* from stool.

Case classification

Confirmed: a clinically compatible cases that is laboratory-confirmed, occurring in a child aged <1 year.

Botulism, Wound

Clinical description

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

Laboratory criteria for diagnosis

- Detection of botulinum toxin in serum, or
- Isolation of *C. botulinum* from wound.

(Continued on next page)



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Botulism, Wound (continued)

Case classification

Confirmed: a clinically compatible case that is laboratory confirmed in a patient who has no suspected exposure to contaminated food and who has a history of a fresh, contaminated wound during the 2 weeks before onset of symptoms, or a history of injection drug use within the 2 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 2 weeks before onset of symptoms, or a history of injection drug use within the 2 weeks before onset of symptoms.

Botulism, Other

Clinical description

See Botulism, Foodborne.

Laboratory criteria for diagnosis

- Detection of botulinum toxin in clinical specimen, or
- Isolation of *C. botulinum* from clinical specimen.

Case classification

Confirmed: A clinically compatible case that is laboratory-confirmed in a patient aged greater than or equal to 1 year who has no history of ingestion of suspect food and has no wounds.

Information Needed for Investigation

Verify the diagnosis. Obtain demographic, clinical, laboratory information, and other epidemiological information necessary to complete the [Disease Case Report \(CD-1\)](#) for all suspected botulism cases. Complete the [Guide to Investigation of Infant Botulism](#) form for all infant botulism cases. Complete the [Botulism Alert Summary](#) form for all **non-infant** botulism reports. The [Record of Investigation of Enteric Illness \(CD-2C\)](#) should also be completed for all suspected foodborne botulism cases. The information to complete the forms can be obtained from the attending physician, hospital, and/or laboratory and patient or a knowledgeable family member.

Establish the extent of illness. Determine if household or other close contacts are, or have been ill, or are at risk for disease (consumption of suspected contaminated food) by contacting the health care provider, patient, or knowledgeable family member. Identify symptomatic household members, associates, or co-workers and strongly urge them to contact their healthcare provider **immediately** for a medical evaluation. Determine whether the case is associated with a food recall. **NOTE:** Laboratory examination or culturing of specimens is routinely available from the Centers for Disease Control and Prevention (CDC). Arrangements for such testing **must** be made through your [District Communicable Disease Coordinator](#) or the [Senior Epidemiology Specialist](#) for the District, and the Missouri State Public Health Laboratory (MSPHL).

Identifying the source of infection. *Every case of foodborne botulism should be treated as a public health emergency because the responsible food, whether homemade or commercial, might still be available for consumption and could make unsuspecting persons ill.* Information obtained from the

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[Botulism Alert Summary](#), the [Record of Investigation of Enteric Illness \(CD-2C\)](#), or the [Guide to Investigation of Infant Botulism](#), is used to identify the source. However, sometimes the source is not identified. *NOTE: No person-to-person transmission of botulism has been documented.*

Provide information about botulism to persons at risk for infection and the general public. Efforts should be made to promote botulism awareness and provide prevention information to the public to reduce the risk of disease. Most U.S. outbreaks of foodborne botulism are caused by home-processed and home-canned foods. Therefore, for foodborne botulism: 1) Persons who do home canning should follow strict hygienic procedures to reduce contamination of foods, and carefully follow instructions on safe home canning including the use of pressure canners/cookers as recommended through county extension services or from the U.S. Department of Agriculture. 2) Because the BoNT is destroyed by high temperatures, persons who eat home-canned foods should consider boiling the food for 10 minutes before eating it to ensure safety. 3) Oils infused with garlic or herbs should be refrigerated. Potatoes which have been baked while wrapped in aluminum foil should be kept hot until served or refrigerated. 4) Never taste a product to determine if it is safe; when in doubt, throw it out. Do not taste or eat foods from containers that are leaking, have bulges or are swollen, look damaged or cracked, or seem abnormal in appearance. For additional consumer information and resources on botulism, see CDC's website at: <https://www.cdc.gov/botulism/consumer.html>.

Wound botulism can be prevented by promptly seeking medical care for infected wounds and by not using injectable street drugs. Most infant botulism cases cannot be prevented because the bacteria that causes this disease is in soil and dust. The bacteria can be found inside homes on floors, carpet, and countertops even after cleaning. Honey can contain the bacteria that causes infant botulism, so children less than 12 months old should not be fed honey. Honey is safe for persons 1 year of age and older.

Botulism Surveillance. Review WebSurv to determine whether there have been other cases, especially in the same geographic area. When cases are related by person, place, or time, efforts should be made to identify a common source. Information obtained through the [Guide to Investigation of Infant Botulism](#), [Botulism Alert Summary](#), or [Record of Investigation of Enteric Illness \(CD-2C\)](#) is used to identify a possible source of the disease and to characterize persons or geographic areas in which additional efforts may be needed to raise awareness and reduce disease incidence.

Botulism is a potential Class A Bioterrorism Agent. If botulism is the result of a terrorist act or an intentional or deliberate release, BoNT would most likely be disseminated via an aerosol, but BoNT can also exist in forms ranging from crude microbiological cultures to isolated powders which may be white or colorless crystals. An intentional release of BoNT may result in ingestional or inhalational exposure. BoNT is a possible water threat. No natural cases of inhalational botulism have been reported. Symptoms are dose-dependent and may begin as early as 12-36 hours after inhalation, but can take several days to develop after exposure to low doses of toxin. Onset is 6 hours to 10 days (typically 12-36 hours) after ingestion.^{6, 12}

It may be difficult to determine whether an outbreak occurred through nefarious means. For additional bioterrorism resources for botulism, see CDC's website at: <https://www.cdc.gov/botulism/bioterrorism/index.html>.

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NOTE: *If botulism is suspected to be the result of a terrorist act or other intentional or deliberate release, the LPHA should:*

1. **Notify local law enforcement** and the [Senior Epidemiology Specialist](#) for the District or MDHSS' Emergency Response Center (ERC) at (800) 392-0272 (24/7) immediately.
2. Work with law enforcement and implement "Chain of Custody" procedures for all laboratory samples, as they will be considered evidence in a criminal investigation.
3. Work to define the population at risk which is essential to guide response activities. Public health authorities will play the lead role in this effort, but must consult with law enforcement, emergency response and other professionals in the process.
4. Once the mechanism and scope of delivery has been defined, identify symptomatic and asymptomatic individuals among the exposed and recommend medical evaluation/treatment as appropriate.
5. Establish and maintain a detailed line listing of all cases and contacts with accurate identifying and locating information. A botulism questionnaire for community use in a mass casualty incident is available at: [Form 3A: Bioterrorism Agent Case Exposure Investigation Form](#).

Notification

- Contact the [District Communicable Disease Coordinator](#), the [Senior Epidemiology Specialist](#) for the District, or MDHSS' – Bureau of Communicable Disease Control and Prevention (BCDCP), phone (573) 751-6113, Fax (573) 526-0235, or for after hours notification contact the MDHSS' ERC at (800) 392-0272 (24/7) immediately if botulism is suspected.
- If a case(s) is associated with a childcare center, BCDCP or the LPHA will contact the Bureau of Environmental Health Services (BEHS), phone (573) 751-6095, Fax (573) 526-7377 and the Section for Child Care Regulation, phone (573) 751-2450, Fax (573) 526-5345.
- If a case(s) is thought to be the result of a product obtained through a commercial food operation, BCDCP or the LPHA will contact BEHS, phone (573) 751-6095, Fax (573) 526-7377.
- If a case(s) is associated with a long-term care facility, BCDCP or the LPHA will contact the Section for Long Term Care Regulation, phone (573) 526-8524, Fax (573) 751-8493.
- If a case is associated with a hospital, hospital-based long-term care facility, or ambulatory surgical center, BCDCP or the LPHA will contact the Bureau of Health Services Regulation phone (573) 751-6303, Fax (573) 526-3621.
- Contact the Department of Natural Resources, Public Drinking Water Branch, at (573) 751-1187, Fax (573) 751-3110 if cases are associated with a public water supply, or BEHS, phone (573) 751-6095, Fax (573) 526-7377, if cases are associated with a private water supply.

Control Measures ^{1, 2, 3, 6, 7, 12, 13}

Botulism presenting as endemic disease.

- Any botulism case should be reported immediately to the [LPHA](#) or to MDHSS upon first knowledge or suspicion of botulism; do not wait for lab confirmation. MDHSS may be contacted 24 hours a day, 7 days a week at (800) 392-0272.
- Determine the source of infection to prevent other cases. In identifying suspect food sources, home-canned foods have traditionally been the major culprit, however it is extremely important to consider

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all possible food sources. Recent botulism cases have been traced to baked potatoes, frozen pot pies, garlic stored in oil, grilled onions, and fermented ethnic foods. **NOTE:** Prophylactic equine antitoxin is not recommended for asymptomatic persons who have ingested food known to contain BoNT.⁷

- *Immediate administration of antitoxin is the key to successful therapy.*
- Public health education is the primary means of control and prevention. Education regarding safe practices in food preparation and home-canning methods should be promoted. For consumer information and resources on botulism, see CDC’s website at: <https://www.cdc.gov/botulism/consumer.html>.
- Wound botulism can be prevented by promptly seeking medical care for infected wounds and by not using injectable street drugs. Should wound botulism occur, it is usually treated surgically to remove the source of the toxin-producing bacteria, followed by administration of appropriate antibiotics (penicillin or metronidazole). Antibiotics should be given to patients with wound botulism after antitoxin has been administered.
- Most infant botulism cases cannot be prevented because the bacteria that causes this disease is in soil and dust. The bacteria can be found inside homes on floors, carpet, and countertops even after cleaning. **COMMENTS:** Most cases occur in breastfed infants at the time of first introduction of nonhuman milk substances. Human-derived antitoxin is given urgently. Antimicrobial therapy is **not** indicated for infant botulism. **NOTES:** The role of antimicrobial therapy in the adult intestinal colonization form of botulism is not established. *Aminoglycoside agents potentiate paralytic effects of the toxin and should be avoided.*⁷
- Honey can contain the bacteria that causes infant botulism, so children less than 12 months old should not be fed honey. Honey is safe for persons 1 year of age and older.

IMPORTANT: To obtain botulinum antitoxin for **infant** forms of botulism: BabyBIG[®] is a product licensed to treat type A and B infant botulism cases and only available through the California Department of Public Health, Infant Botulism Treatment and Prevention Program (IBTPP). For maximum benefit, treatment with BabyBIG[®] should occur as early as possible.

Clinicians and health departments with a suspect infant botulism case should contact IBTPP immediately (24/7) at (510) 231-7600 for clinical consultation and/or obtaining BabyBIG[®]. General information about infant botulism can be found on the IBTPP website: www.infantbotulism.org

IMPORTANT: To obtain botulinum antitoxin for **non-infant** forms of botulism from CDC, contact the MDHSS’ ERC at (800) 392-0272 (24/7). If contact cannot be made, the CDC Emergency Operations Center can be contacted at (770) 488-7100 for botulism case consultation and antitoxin.

For information on the medical management of botulism, see: [Botulism in the United States 1899-1996: Handbook for Epidemiologists, Clinicians & Laboratory Workers](#), or the [Medical Management of Biologic Causalities Handbook](#), or the most current edition of the *Red Book: Report of the Committee on Infectious Diseases*, or the *Principles and Practice of Infectious Diseases*, or other suitable reference.

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Botulism suspected to be the result of a terrorist act or intentional/deliberate release.

If the source of infection cannot be determined and cases are presenting as multiple cases, temporally/spatially clustered and/or the epidemiologic clues suggest an intentional or deliberate use of a biological agent, then – **law enforcement must** be involved in the investigation. Because the laboratory confirmation could be delayed, specific epidemiological, clinical, or laboratory findings that suggest an intentional release of BoNT should result in the issue of a MDHSS Health Alert.

Laboratory Procedures

Because laboratory testing for botulism can take several days, the initial diagnosis depends on accurate and rapid clinical assessment of the patient. After appropriate assessment, if botulism is still suspected, the requestor/health care provider should contact the [District Communicable Disease Coordinator](#), or the [Senior Epidemiology Specialist](#) for their area. One of these staff will discuss the case with the requestor/health care provider and a Scientist from the MSPHL, and the state epidemiologist as needed. If testing is indicated, the MSPHL Scientist will provide a MSPHL number that will accompany the specimen(s) to be tested. (**NOTES:** *Specimen(s) require a MSPHL number.* To obtain a MSPHL number, the District Communicable Disease Coordinator, or the Senior Epidemiology Specialist should call (573) 751-3334 (MSPHL) and ask for David Byrd, Sarah Sharr, or Stephen Gladbach. The MSPHL Scientist can also provide technical assistance on the collection and shipment of specimens to CDC. The specimen(s) should be sent directly from the requestor/health care provider to the CDC. The specimen(s) should NOT be sent to the MSPHL. A [CDC form 50.34](#) will need to be properly filled out by the requesting health agency and accompany the specimen(s) to the CDC.)

The Senior Epidemiology Specialist, District Communicable Disease Coordinator, or MSPHL Scientist will call the CDC Emergency Operations Center (EOC) (770) 488-7100, which will page the Foodborne and Diarrheal Diseases Branch medical officer holding the botulism beeper and provide CDC with the name of the medical facility as well as the patient’s name.

Reporting Requirements

Botulism is a Category 1 (A) state reportable disease or finding and is immediately reportable by telephone, facsimile, or other rapid communication to the [LPHA](#) or MDHSS upon first knowledge or suspicion of botulism; do not wait for lab confirmation. MDHSS may be contacted 24 hours a day, 7 days a week at **(800) 392-0272**.

As a Nationally Notifiable Condition – botulism cases thought to be the result of an intentional release; foodborne; a cluster or outbreak of infant botulism; or cases of unknown etiology not meeting standard notification (see box below) require an IMMEDIATE, EXTREMELY URGENT report to the CDC **prior to case classification**. IMMEDIATE, EXTREMELY URGENT reporting requires MDHSS to call CDC within 4 hours of a case meeting the notification criteria, followed by submission of an electronic case notification via WebSurv to CDC by the next business day.

As a Nationally Notifiable Condition – sporadic infant and wound botulism cases are a **STANDARD** report to CDC **prior to case classification**. **STANDARD** reporting requires MDHSS to report to CDC by electronic transmission via WebSurv within the next normal reporting cycle.



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1. For all cases prior to classification, complete a “[Disease Case Report](#)” (CD-1).
2. For cases of infant botulism complete a [Guide to Investigation of Infant Botulism](#) (CDC52.73).
3. For all non-infant botulism cases prior to classification complete the [Botulism Alert Summary](#) form.
4. For suspected foodborne botulism cases also complete the [Record of Investigation of Enteric Illness](#).
5. If a terrorist act and/or the intentional or deliberate release of BoNT is suspected, an investigation tool will be provided by the [District Communicable Disease Coordinator](#), or the [Senior Epidemiology Specialist](#), or state epidemiologist. A botulism questionnaire for community use in a mass casualty incident to help identify exposed persons is available at: [Form 3A: Bioterrorism Agent Case Exposure Investigation Form](#).
6. MDHSS will report to CDC following the above reporting criteria (see boxes above).
7. Entry of the completed CD-1 into the WebSurv database negates the need for the paper CD-1 to be forwarded to the District Health Office.
8. Send the completed secondary investigation form(s) to the District Health Office.
9. All outbreaks or “suspected” outbreaks must be reported as soon as possible (by phone, fax or e-mail) to the District Communicable Disease Coordinator. This can be accomplished by completing the [Missouri Outbreak Surveillance Report \(CD-51\)](#).
10. If an outbreak is associated with food, a CDC 52.13 form ([National Outbreak Reporting System – Foodborne Disease Transmission](#)) is to be completed and submitted to the District Communicable Disease Coordinator at the conclusion of the outbreak.
11. If an outbreak is associated with the use of water for drinking, or ingestion, a CDC 52.12 form ([National Outbreak Reporting System - Waterborne Disease Transmission](#)) is to be completed and submitted to the District Communicable Disease Coordinator at the conclusion of the outbreak.
12. Within 90 days from the conclusion of an outbreak, submit the final outbreak report to the District CD Coordinator.

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