

# Botulism (*Clostridium botulinum*)

## DISEASE IN ANIMALS

*Clostridium botulinum* is a spore-forming obligate anaerobic bacillus that produces seven potent neurotoxins, A to G. It exists as a spore in the environment, and requires anaerobic conditions to grow and produce toxin.

The seven neurotoxins are designated by letters A through G. Type C is responsible for most animal cases although Type D is occasionally seen in dogs and cattle. Type B can occur in horses, and type A and type E are found in mink and birds. Types A, B, E, F, and rarely G affect humans. All types produce the same symptoms but the toxin type is important if antiserum is used for treatment.

**Reporting:** Unusual mortality and/or outbreaks of flaccid paralysis in waterfowl can be reported to the county wildlife officer. If this is associated with a water source with public access, the [local health department](#) can be notified. Animal cases are not required to be reported to ODA, unless there is an unusual mortality/morbidity event.

**Transmission:** Disease can result from ingestion of preformed neurotoxin or from bacterial growth in anaerobic tissues as when wounds are contaminated with spores. *Clostridium botulinum* is ubiquitous and spores are found in soil, fresh and coastal waters and in the intestinal tracts of animals, including fish. Animals are usually infected through ingestion of feed contaminated with pre-formed toxin. Cases of botulism in horses and cattle are primarily associated with infected forage, especially silage. Outbreaks in waterfowl and wild birds occur sporadically in Ohio, usually in late summer. The disease is associated with decomposing feed and carcasses, especially in a water source. Tissues from dead animals can be toxic if ingested by other animals.

**Clinical signs:** The incubation period ranges from a few hours to two weeks with most developing signs in the first two days. Botulism causes progressive motor paralysis including incoordination, drooling, muscle tremors, weakness, paralysis, difficulty chewing and swallowing, and visual disturbances. Death typically results from paralysis of the cardiac or respiratory muscles. Additional signs are species specific.

<b>TYPICAL SIGNS OF BOTULISM IN ANIMALS</b>		
<b>Species Affected</b>	<b>Most common toxin type</b>	<b>Clinical signs</b>
Cattle	Type C, rarely Type D	Restlessness, urine retention, dysphagia, incoordination, and paralysis
Sheep	Type C	Drooling, serous nasal discharge, stiffness, and incoordination,
Horses	Type B	Incoordination, drooling, ascending paralysis, restlessness, and knuckling. Shaker Foal Syndrome (stilted gait, muscle tremors, inability to stand for more than four to five minutes) is seen in foals less than four weeks old
Pigs	Type C	Relatively resistant. Anorexia, vomiting, mydriasis, and paralysis
Foxes and Mink	Type C, rarely Types A & E	Typically found dead. Paralysis and dyspnea
Birds	Type C, rarely Type E	Flaccid paralysis is usually seen in the neck ("limberneck"), wings, legs, and eyelids. Drowning may occur due to neck paralysis. May see large die-offs
Fish	Type E	Die-offs
Dogs	Type D	Rare, most recover within two weeks

**Diagnostics:**

- ELISA, electrochemiluminescent (ELC), mouse inoculation: identifies toxin in feed, stomach contents, feces, vomitus, blood or fetus
- Culture: from stool or tissues

**Case classification:**

- Suspected: a clinical case with signs consistent with botulism
- Probable: a clinically suspect case with laboratory evidence from a screening or unvalidated test
- Confirmed: a case that meets confirmatory testing criteria determined by a state or federal diagnostic laboratory

## DISEASE IN HUMANS

**Reporting:** Report immediately via telephone the case or suspected human case and/or a positive laboratory result to the LHD where the patient resides. If unknown, report immediately to the LHD within the jurisdiction of the health facility or ODH. Timely diagnoses and reporting is critical, as if diagnosed early, foodborne and wound botulism can be treated with an antitoxin (only available through CDC).

**Human illness:** Most human cases are associated with inappropriate home canning procedures. Cooking does not eliminate the toxin.

- Foodborne, wound and other botulism: Initial complaints can include gastrointestinal symptoms (vomiting, diarrhea, and abdominal pain), ptosis (droopy eyelids), visual difficulty (blurred or double vision), dry mouth, sore throat and dysphagia (difficulty swallowing). Paralysis can occur and continue for days or weeks. Fever is absent. Respiratory failure can also occur.
- Infant botulism: Infant botulism is a novel form of human botulism in which ingested spores of *Clostridium botulinum* colonize and grow in the infant's large intestine and produce botulinum neurotoxin. The action of the toxin in the body produces constipation, weakness (notably of gag, cry, suck and swallow), loss of muscle tone, and ultimately, flaccid ("limp") paralysis. Affected infants have difficulty feeding and often, breathing. However, in the absence of complications, patients recover completely from the disease.

**Personal protection:** Since the organism is shed in the feces of animals, eating and drinking around animals or manure should be avoided and hands should be thoroughly washed after working with animals and before eating.

## FOR MORE INFORMATION

**Disease in Animals**

[Merck Veterinary Manual Botulism](#)

[OIE Manual of Diagnostic Tests](#)

[Iowa State University Center for Food Security and Public Health Animal Disease Factsheets](#)

**Disease in Humans**

[ODH Infectious Disease Control Manual](#)

[CDC Bioterrorism Agent Botulism](#)

[CDC Botulism](#)

[ABCs of bioterrorism for veterinarians, Category A agents, JAVMA pdf](#)