**BOTULISM TOXICOSIS**

<table>
<thead>
<tr>
<th>Animal Group(s) Affected</th>
<th>Transmission</th>
<th>Clinical Signs</th>
<th>Severity</th>
<th>Treatment</th>
<th>Prevention and Control</th>
<th>Zoonotic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mammals, including humans; birds</td>
<td>Ingestion of toxin contaminated food or tissues. Wound contamination.</td>
<td>Mostly neurologic, involving flaccid paralysis. Gastrointestinal signs.</td>
<td>Dose-related severity of mild to lethal.</td>
<td>Supportive care; antitoxin when appropriate.</td>
<td>Proper food preparation and storage. Avoid wound contamination</td>
<td>No</td>
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</tbody>
</table>

**Fact Sheet compiled by:** Danielle R. Graham Snyder  
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**Fact Sheet Reviewed by:** Melissa Kennedy; Stephanie Kottler

**Susceptible animal groups:** Most mammalian and avian species are susceptible to this problem. Wild fowl and mink have a high incidence of clinical disease.

**Causative organism:** *Clostridium botulinum* bacteria Types A-G: gram positive, slightly curved to straight, motile, spore-forming, saprophytic, anaerobic rod. Type C is the most common in animal species, and Types A, B and E most common in humans.

**Zoonotic potential:** No

**Distribution:** Soil, fresh water and sea sediments, the intestinal tracts of mammals and birds, and foods such as home-canned foods, sausages, meat products, canned vegetables and seafood products. These toxin-contaminated sources can be either ingested or contaminate a wound.

**Incubation period:** Normally 12-36 hrs, but can be as much as a week if a small amount is ingested.

**Clinical signs:**

- **Humans:** Three types of botulism: food-borne, wound, and infant.
  
  Food-borne botulism is caused by consumption of toxin-tainted food. In these infections, signs can include gastrointestinal issues such as nausea, vomiting and abdominal pain; symmetric, descending flaccid paralysis, and drooping palpebrae; and dry mouth, slurred speech, and muscle weakness. Descending paralysis of the respiratory muscles - potentially fatal, arms and legs may occur within 24 hours in severe cases. Wound botulism is caused by a wound that is contaminated, usually from toxins in the soil. Signs are consistent with food-borne illness, but usually without gastrointestinal signs. Infant botulism is seen only in infants less than one year of age and caused by spores germinating in the intestinal tract. Signs include constipation, poor suckling reflexes, peripheral weakness (“floppy baby” syndrome), and in severe cases, respiratory distress and death.

- **Animals:** Clinical signs are mostly neurologic and caused by muscle paralysis. A symmetrical, ascending weakness starting from the rear limbs and progressing to the forelimbs is typical. Cranial nerve deficits are usually present and may include decreased palpebral reflex, decreased gag or swallowing reflex, ptalism, decreased jaw tone, mydriasis, and sluggish pupillary responses. Respiratory or cardiac paralysis can occur and usually causes death.

**Post mortem, gross, or histologic findings:** Most post mortem or histologic findings are the result of muscle paralysis. Mammals with wound botulism may have lesions, but the wounds are generally not obviously or grossly infected.

**Diagnosis:**

- History of exposure and clinical signs. The toxin can be hard to find in feed or in tissues, so most
diagnosis is done by eliminating out other differentials.
- Cultures from wounds or tissues can be taken to potentially isolate the organism. The toxin can also be isolated from serum, feces, vomitus, or samples of food that were ingested.
- ELISA testing can detect neurotoxin, but each subtype of toxin must be evaluated individually.
- Mouse inoculation: Serum or an extract of contaminated material is injected alone and in combination with a type-specific antitoxin into the mice. Survival of the group of mice protected with antitoxin and death of the other group from signs consistent with botulism confirms the presence of botulism toxin. This test is considered the standard and most reliable method of identifying botulism toxin.

**Material required for laboratory analysis:** Serum, feces, vomitus, stomach or intestinal contents, contaminated food, or culture of tissues if wound botulism is suspected.

**Relevant diagnostic laboratories:**
- National Botulism Reference Laboratory at New Bolton Center (University of Pennsylvania)
- National Veterinary Services Laboratories (NVSL) Ames, Iowa

**Treatment:**
Supportive care is most important. Hospitalization may be necessary. Therapeutic monitoring involves intensive care of recumbent animals. Wounds or abscesses should be cleaned and debrided where possible. Selective padding and respiratory support is essential to avoid complications of recumbency. Antitoxins can be effective to improve survival rates, depending on the toxin involved and the host species. Type C antitoxin seems to work well in some birds and mink. Antibiotics are only used in cases of wound botulism or to treat secondary infections due to the paralysis. Recovery typically takes 14 - 24 days.

**Prevention and control:** Vaccines are available for humans and animals with high risk of exposure. To ensure food is properly stored and prepared, botulism toxin is destroyed by heating food to 80°C for 30 minutes or to 100°C for 10 minutes. Wounds should be kept clean and avoid contamination as much as possible. For wildlife, prompt removal of carcasses that could be infected is critical as decaying carcasses are known to support toxin production. Maggots feeding on decaying carcasses are sources of infection for many waterfowl as the maggots are unaffected by the toxin, but effectively concentrate it. Waterfowl consume the maggots and become infected. Stagnant water should be avoided as this creates an environment for Clostridium botulinum bacteria to grow and for spores to germinate.

**Suggested disinfectant for housing facilities:** Clean areas with diluted bleach when possible. Sunlight inactivates the toxins within 1-3 hours. Adding chlorine to water if possible will destroy toxins as well.

**Notification:** Notification for animals is not necessary at this time.

**Measures required under the Animal Disease Surveillance Plan:** Currently none

**Measures required for introducing animals to infected animal:** Infected animals should be kept in a hospital or other stable environment until they are fully recovered.

**Conditions for restoring disease-free status after an outbreak:** Removal of decaying vegetable matter and carcasses should be carried out and areas should be cleaned with diluted bleach if possible.

**Experts who may be consulted:**
- Julie A. Coffield, DVM, PhD
  Dept of Physiology and Pharmacology
  University of Georgia CVM
  coffield@uga.edu

- Raymond Sweeney, VMD
  Professor of Medicine; Director, National Botulism Reference Laboratory
  University of Pennsylvania CVM
rsweeney@vet.upenn.edu

**References:**