

Five Key Facts about Equine Botulism

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- Sources of toxin in the diet:** *Clostridium botulinum* (*C. botulinum*) spores are widespread in soils throughout North America. Most cases of botulism in adult horses result from ingestion of pre-formed botulism neurotoxin (BoNT) in wet or spoiled forages (serotypes A and B) or in forages such as hay, haylage, or alfalfa cubes which have been contaminated by an animal carcass (serotype C).
- Clinical signs:** The dose-dependent flaccid paralysis caused by BoNT is identified clinically as a syndrome of progressive and symmetrical cranial nerve deficits and skeletal muscle weakness (dysphagia, weak tongue and eyelid tone, recumbency, flaccid paralysis, and terminal diaphragmatic failure) but with normal mentation. Cases of type C botulism have been reported to also show muscle trembling, profound cervical muscle weakness (inability to raise the head), and accompanying edema of the muzzle and face.
- Diagnosis:** Horses are estimated to be 1,000 - 10,000 times more sensitive to BoNT than are the mice used in the "gold standard" Mouse Bioassay (MBA) diagnostic test. This species difference in sensitivity to BoNT often leads to negative MBA findings despite classic clinical signs in affected horses. Clinical recognition of the classic botulism neurologic syndrome in equine is therefore widely accepted as more sensitive and timely than the MBA, which is still important to confirm the diagnosis. Samples of the fed forage are most useful, followed by fecal or gastric contents; demonstration of pre-formed toxin in submitted plasma or tissues is rare.
- Geospatial distribution of *C. botulinum* serotypes, and relevance to treatment:** Both types A and C are more likely than type B to be the causative agents of equine botulism in California. A 2010 review of the geospatial distribution of equine botulism cases across the United States from 1998 - 2008 found that **type A is the predominant equine serotype in the Western states**, whereas type B predominates east of the Mississippi River, and **type C is found sporadically throughout the country**. This pattern is found in soil surveys of spore distribution dating back to 1922, as well as nearly 100 years of CDC human case surveillance data (1899-1996): 86 percent (144 /167) of reported type A outbreaks occurred west of the Mississippi River, and 61 percent (37/61) of type B outbreaks occurred in Eastern states.
- Treatment:** The majority of untreated equine clinical cases die or require euthanasia within 72 hours; thus every hour of delay between initial examination and antitoxin treatment implies reduced survivability. Horses that are still able to stand are considered appropriate candidates for therapy; a commercially available trivalent antiserum (<http://www.lakeimmunogenics.com/equineab.html>) serotypes A, B, C; \$495/dose provides therapeutic levels of antitoxin for all three clinically important serotypes known to affect horses in North America.



Clinical signs of botulism:
flaccid paralysis, weak tongue
and eyelid tone.