

Key Findings and Public Health Messages

- The California Department of Public Health (CDPH) received reports of 50 confirmed cases of wound botulism with estimated illness onset dates from 2009 through 2012. This corresponds to an annual incidence rate of 0.03 per 100,000 Californians.
- Wound botulism incidence rates remained relatively level in 2009 and 2010 and decreased by 50 percent from 2010 (16 case-patients; 0.04 per 100,000) to 2012 (7 case-patients; 0.02 per 100,000).
- During the surveillance period, 1 (2.0 percent) case-patient was reported to have died with wound botulism.
- The ratio of male to female cases was 4.0:1.0.
- Rapid diagnosis and treatment, including administration of botulinum antitoxin, may provide the best opportunities for minimizing the morbidity and mortality associated with wound botulism. Educating injecting drug users to seek medical care if typical symptoms develop may enable more timely administration of antitoxin.

Background

Clostridium botulinum toxin is a rare but potent neurotoxin. It is produced by *C. botulinum*, an anaerobic, spore-forming bacterium that is ubiquitous in the environment. Wound botulism is caused by *C. botulinum* colonization of a wound and in situ toxin production. Wound botulism occurred mainly in the setting of traumatic injury until the early 1990's when California began experiencing an epidemic of wound botulism among injecting drug users^{1,2}. *C. botulinum* toxin is listed among the Centers for Disease Control and Prevention (CDC) category A bioterrorism agents³.

Wound botulism is a neuroparalytic illness. Initial neurologic symptoms may appear up to 2 weeks after the wound is infected. Illness can progress to a symmetric, descending flaccid paralysis that begins in the cranial nerves. Untreated, botulism can progress to respiratory paralysis and death. If administered early in the course of illness, botulinum antitoxin can stop the progression of, but cannot reverse paralysis. Antitoxin is available exclusively

from public health authorities.

We describe here the epidemiology of confirmed wound botulism cases in California with estimated illness onset from 2009 through 2012. Cases reported as of September 10, 2014 are included. The epidemiologic description of wound botulism for the 2001-2008 surveillance period was previously published in the Epidemiologic Summary for Wound Botulism in California, 2001-2008⁴. Data for 2012 are provisional and may differ from data in future publications. For a complete discussion of the definitions, methods, and limitations associated with this report, please refer to Technical Notes⁵.

California reporting requirements and surveillance case definition

California Code of Regulations, Title 17, requires health care providers to report suspected cases of botulism to their local health department immediately by telephone. Laboratories must immediately communicate by telephone with the CDPH Microbial Diseases Laboratory for instruction whenever a specimen for laboratory diagnosis of suspected botulism is received. Laboratories must report to the local health department when laboratory testing yields evidence suggestive of *C. botulinum*; notification must occur within one hour after the health care provider has been notified.

California regulations require local health departments to report to CDPH cases of wound botulism immediately by telephone. CDPH officially counted cases that satisfied the CDC surveillance case definition. CDC defined a confirmed case of wound botulism as clinically compatible illness and detection of botulinum toxin in serum, or isolation of *C. botulinum* from the wound 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.

Epidemiology of wound botulism in California

CDPH received reports of 50 cases of wound botulism with estimated illness onset dates from 2009 through 2012. This corresponds to an annual incidence rate of 0.03 per 100,000 Californians. Wound botulism incidence rates remained relatively level in 2009 and 2010, and decreased by 50 percent from 2010 (16 case-patients; 0.04 per 100,000) to 2012 (7 case-patients; 0.02 per 100,000) [Figure 1]. During the surveillance period, 1 (2.0 percent) case-patient was reported to have died with wound botulism.

Incidence rates of wound botulism were highest among persons 45 to 54 years of age [Figure 2]. There were no case-patients under 16 years of age or over 65.

The majority of confirmed incidents of wound botulism were among intravenous drug users (49 case-patients; 98%). The ratio of male to female cases was 4.0:1.0. Among wound botulism cases with complete information on race/ethnicity (94 percent), Hispanic ethnicity (66 percent) was reported much more frequently than would be expected based on the overall demographic profile of California [Figure 3].

During the surveillance period, 15 counties reported at least 1 case of wound botulism. These counties were distributed throughout the state so that all but 2 regions of the state (the Sierras and Far North) reported at least 1 case. The Inland Empire (0.04 per 100,000), San Diego (0.05 per 100,000), and Bay Area (0.05 per 100,000) regions reported the highest annual incidence rates.

Comment

Although wound botulism remained a rare occurrence in California, each case represented a medical and public health emergency. Cases occurred almost exclusively among injecting drug users. A declining trend was observed in incidence of wound botulism during this surveillance period.

Rapid diagnosis and treatment, including administration of botulinum antitoxin, may provide the best opportunities for minimizing the morbidity and mortality associated with wound botulism. Additionally, educating injecting drug users to seek medical care if typical symptoms develop may enable more timely administration of antitoxin.

References and resources

¹ Werner SB, Passaro D, McGee J, Schechter R, Vugia DJ. Wound botulism in California, 1951-98: Recent Epidemic in Heroin Injectors. *Clin Infect Diseases* 2000;31:1018-24.

² Yuan J1, Inami G, Mohle-Boetani J, Vugia DJ: Recurrent wound botulism among injection drug users in California. *Clin Infect Dis.* 2011 Apr 1;52(7):862-6.

³ CDC botulism website <http://www.cdc.gov/nczved/divisions/dfbmd/diseases/botulism/professional.html>; and

<http://www.bt.cdc.gov/agent/Botulism/clinicians/>

⁴ Epidemiologic Summary of Wound Botulism in California, 2001 - 2008.

<http://www.cdph.ca.gov/programs/sss/Documents/Epi-Summaries-CA-2001-2008-083111.pdf#page=81>

⁵ Epidemiologic Summaries of Selected General Communicable Diseases

in California, 2001 - 2008 and 2009 - 2012: Technical Notes

<http://www.cdph.ca.gov/programs/sss/Documents/TechnicalNotes01-08and09-12.pdf>

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Figure 1. California wound botulism case counts and incidence rates, 2001–2012*

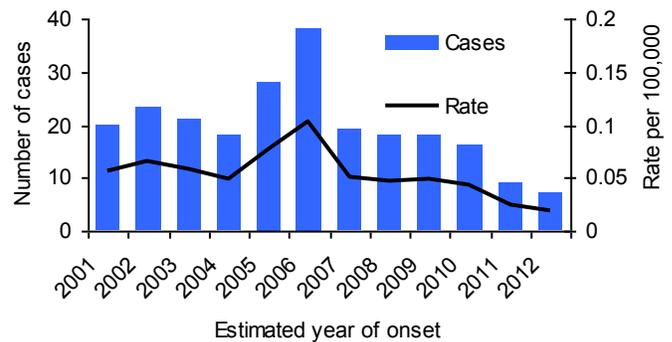


Figure 2. California wound botulism incidence rates by age, 2009–2012*

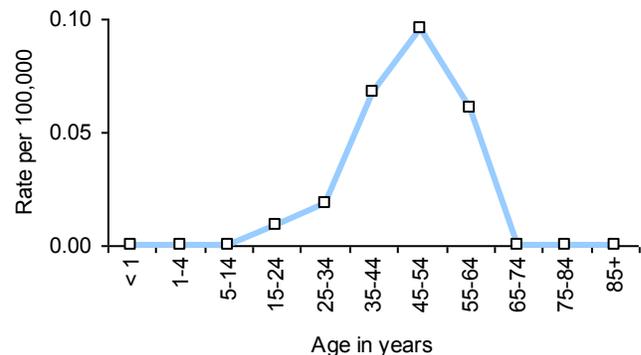
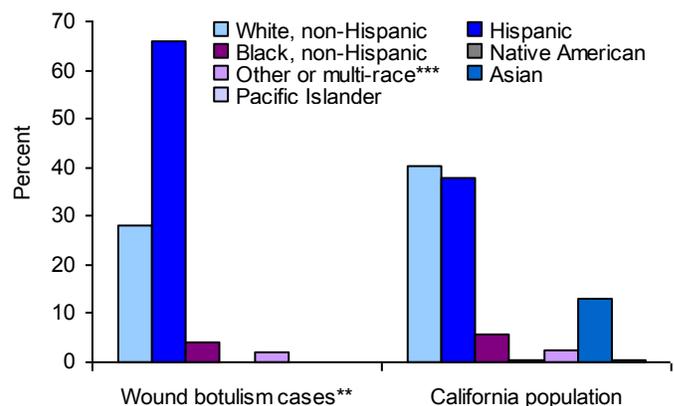


Figure 3. California wound botulism cases and population by race/ethnicity, 2009 - 2012*



Notes for Figures 1-3

*2012 data are provisional

**Unknowns were excluded

***Includes cases who identified 'other' as their race and Californians ('population') who identified more than one race