

WASHOE COUNTY DISTRICT HEALTH DEPARTMENT

BOTULISM FINAL REPORT ATTORNEY WORKING COPY

BACKGROUND

On December 29, 2006, the Washoe County District Health Department (WCDHD) was notified by a local infectious disease specialist of two probable cases of foodborne botulism from one household in Sparks. Both cases were 44 years of age. The couple developed respiratory compromise and both were transferred to a Cardiac Intensive Care Unit (CICU) for medical care. The couple was interviewed by WCDHD staff on December 29, 2006 regarding recent foods consumed. On December 30, 2006, WCDHD staff collected leftover and unopened food specimens from the couple's residence.

The WCDHD Epi Team collaborated with the Food and Drug Administration (FDA), the Nevada State Health Laboratory (NSHL), and the Centers for Disease Control and Prevention (CDC) to conduct an active investigation. The purpose of this report is to provide findings of the environmental, epidemiological, and laboratory investigation.

EPIDEMIOLOGICAL INVESTIGATION

Methods

On December 29, 2006, the cases were admitted to a local hospital with similar symptoms including vomiting, sore throat, dry mouth, weakness, slurred speech, dysphagia, diplopia, blurred vision, ptosis, dyspnea, etc. The male case had an onset of dry mouth and sore throat on December 26, 2006. The female case had an onset of dry mouth, dry throat, throat pain, and hoarseness on December 28, 2007. The cases developed respiratory compromise and both were transferred to a Cardiac Intensive Care Unit (CICU) for medical care. Electromyography demonstrated characteristic incremental response to repetitive stimulation consistent with botulism. *Clostridium botulinum* (C. botulinum) antitoxin was requested by WCDHD through the Nevada State Health Division (NSHD) and supplied by CDC. The antitoxin was administered to both patients on the morning of December 30.

On December 29, 2006, WCDHD staff attempted to interview the cases regarding recent foods consumed. Due to the cases' medical conditions and difficulty speaking, various interviewing techniques were utilized. WCDHD staff initially interviewed both cases with open ended questions regarding foods/drinks consumed at home; homemade canned goods; homemade food/drink gifts; special events/parties attended; store location where cases normally shop; recent visitors; homemade food/drink received as gifts; meals consumed at food establishments; and foods consumed by cases that were not consumed by cases' children. The cases had difficulty in answering above questions due to their medical condition. WCDHD staff attempted to question the cases with questions requiring a yes or no response. Staff then requested the cases to respond to answers with the following methods: nodding their head; raising one finger or two fingers; and moving one foot.

In addition, the cases were requested to provide name and contact information for another family member or friend in order to answer any follow up questions. Staff was provided with name and

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phone number of the cases' adult daughter. The daughter was interviewed on December 29, 2006. The daughter, who does not live at the cases' residence, indicated that she had been out of town recently and was unable to answer questions regarding foods consumed by her parents. WCDHD staff requested to meet at the cases' residence on December 30, 2006, in order to interview the cases' two younger children.

On December 30, 2006, WCDHD staff met with the cases' daughter at their residence and interviewed the cases' two younger children regarding foods consumed; homemade gifts; parties or special events attended; homemade foods/gifts received or consumed; location of grocery stores where their parents shopped; verified parent's occupation; and confirmed that the children were not having symptoms.

Results

The results of the interviews conducted with the cases and cases' children identified various highly suspicious food items that were consumed by the cases on 12/25/06. These items, which were not consumed by the cases' children, include the following: turkey, canned cranberry sauce, and a mashed potato dish that consisted of boiled potatoes and a canned garlic chicken broth. During the initial interview conducted on December 29, 2006, both cases stated the garlic chicken broth and mashed potato dish "tasted bad". On February 1, 2007, a questionnaire compiled by WCDHD staff and administered by the female case's father to the female case, who prepared the meal, indicated that there was no unusual taste or odor from the can of garlic chicken broth, other than a "garlic taste". The female case indicated she prepared the dish by boiling the potatoes in water and a canned garlic chicken broth was added, without heating, to the potatoes after they were cooked. The potato dish was prepared and consumed the same day.

The two cases reported having a self-prepared turkey dinner in the home on December 25th, 2006 with their two sons who were not ill. Epidemiological and intensive environmental investigations found that a boiled mash potato dish prepared with a garlic chicken broth and consumed by the couple, but not by two children, was the most likely source of the disease.

On January 2, 2007, a Physician's Alert was issued by WCDHD notifying Washoe County physicians of the two probable cases of foodborne botulism from one household. The objectives of the alert were to provide a description of clinical symptoms of the two probable cases in an effort to increase awareness of the disease and to increase the likelihood of rapid diagnosis of additional cases in the event that a commercial product had been contaminated and more widely distributed.

ENVIRONMENTAL INVESTIGATION

Methods

On December 29, 2006, WCDHD staff spoke with the cases' adult daughter and inquired as to who had access the cases' residence. The daughter indicated that no one was currently at the residence and the cases' two younger children would be staying with her and insured staff that no

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one would access the residence. She agreed to meet with WCDHD staff at the residence on December 30, 2006 in order to possibly obtain food specimens from the cases' residence.

The local FDA representative was notified via voice mail message on December 29, 2006.

On December 30, 2006, WCDHD staff met with the cases' adult daughter and two younger children at the cases' residence. A walk through of the residence (kitchen, bathrooms, bedrooms, garage, storage areas, outside storage areas) with the cases' daughter was conducted in order to look for any homemade foods or drinks that may have been located in the residence.

On December 30, 2006, the San Francisco District of the FDA was notified of the suspect botulism cases and ongoing epidemiological and environmental investigations.

Results

On December 30, 2006, WCDHD collected a total of twenty food specimens from the cases' refrigerator, kitchen cupboards, kitchen countertops, and the garbage. The specimens included leftover foods, opened containers of foods from the kitchen cupboards and countertops, sealed containers of unopened foods, and discarded food items and containers from the garbage. Among the food specimens collected included a leftover mashed potato dish that had turkey meat on top of the potato dish and was stored in the refrigerator. In addition, an opened can of a commercially canned seasoned chicken broth with roasted garlic was collected from the garbage. The can contained some residual liquid and had a slight bulge around the pop-top area. The can also had rust on top of the can.

On December 31, 2006, FDA staff shipped five food specimens to the California Animal Health and Food Safety Laboratory System (CAHFS) for *C. botulinum* and toxin testing. These specimens consisted of commercially processed food items that had been previously opened. Four of these specimens were canned items that were obtained from the cases' garbage.

On January 2, 2007, FDA staff shipped nine food specimens to CAHFS for *C. botulinum* and toxin testing. These specimens consisted of leftover foods obtained from the cases' refrigerator, garbage, and cupboard.

The remaining six unopened cans of commercially processed foods were not tested and are stored at the WCDHD.

On January 4, 2007, CDC issued an alert to local and state epidemiologist stating that a husband and wife with clinically suspected botulism were admitted to a hospital in NV. The alert stated that a commercially canned seasoned chicken broth with roasted garlic was a suspected source and that laboratory results were pending.

FDA inspected the processing plant where the commercially canned chicken broth was produced. According to FDA, no irregularities were noted at the plant. WCDHD has been unable to obtain a copy of the inspection results. The processing plant also submitted one

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unopened can of seasoned chicken broth with roasted garlic (same lot number as suspect can) to the CAHFS for *C. botulinum* and toxin testing.

LABORATORY INVESTIGATION

Human specimens including serum, gastric fluid, and stool were collected from both cases on December 30, 2006 and sent to the Utah State Public Health Laboratory on January 2, 2007. Laboratory tests for the stool specimens yielded *C. botulinum* by stool culture for one case. *C. botulinum* type A toxin was detected in the stool specimen for one case and serum for the other case.

A total of twenty food specimens were collected from the cases' residence. Fourteen of these specimens were sent to CAHFS for *C. botulinum* and toxin testing. Ten of the specimens were negative for botulinum toxin. One specimen, a canned food item collected from the garbage, was not tested because the can was empty.

C. botulinum type A toxin was detected by mouse bioassay and *C. botulinum type A* was isolated from the mashed potato. The mashed potato mixed with the turkey meat was also positive for *C. botulinum* type A toxin. The residual chicken broth (~1 ml) caused typical signs of botulism in mice, but did not cause mortality.

The unopened can that was submitted by the processing plant was negative for botulinum toxin.

DISCUSSION AND CONCLUSIONS

C. botulinum is an anaerobic, gram positive, spore forming rod that produces a potent neurotoxin.¹ The incubation period for onset of neurological symptoms of foodborne botulism is 12-72 hours. The symptoms include vomiting, diarrhea, blurred vision, diplopia, dysphagia, and descending muscle weakness. Duration of illness is variable from days to months. It can be complicated by respiratory failure and death.² Foodborne botulism is a severe type of food poisoning caused by the ingestion of food containing the potent neurotoxin formed during growth of the organism. The toxin is heat labile and can be destroyed if heated at 176 F (80 C) for 10 minutes or longer. The spores are heat-resistant and can survive in foods that are incorrectly or minimally processed.¹

A total of 138 cases of botulism intoxication were reported to CDC in 2004. Of 138 cases, 10% (14 cases) were foodborne, 20% (28 cases) were wound botulism, and 66% (91 cases) were infant botulism. Vehicles of transmission have included homemade salsa, baked potatoes cooked in aluminum foil, cheese sauce, garlic in oil, and traditionally prepared salted or fermented fish in Alaska. Most outbreaks of foodborne botulism in the United States result from eating improperly preserved home-canned foods. Vegetables (especially asparagus, green beans, and peppers) account for most outbreaks caused by home canning.²

¹ FDA, Center for Food Safety and Applied Nutrition, Bad Bug Book, 1992

² Summary of Botulism Cases Reported in 2004. http://www.cdc.gov/ncidod/diseaseinfo/files/Botulism_CSTE_2004.pdf

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The male case was hospitalized in the acute care hospital for 75 days, including 47 days on mechanical ventilation and spent additional 16 days in a local rehabilitation facility. The female case was hospitalized for 69 days, including 38 days on mechanical ventilation. The female case spent additional eight days in the same local rehabilitation facility.

As of May 7, 2007, both cases were feeling better overall but not completely recovered. The male case reported that he was currently experiencing fatigue, muscle weakness, and difficulty swallowing. The female case reported that she was currently experiencing fatigue, muscle weakness and decreased functioning, and dry mouth. She was on one liter of oxygen while sleeping, driving, and any exertion. She was seeing a physician once a month for follow-up. She planned to return to work on a part-time basis in approximately May 14, 2007.

In conclusion, two cases reported having a self-prepared turkey dinner in the home on December 25th, 2006 with their two sons who were not ill. Epidemiological and intensive environmental investigations found that a boiled mash potato dish consumed by the couple but not by the two children was the most likely source of the disease. *C. botulinum* type A toxin was detected from the mashed potato dish and the leftover turkey that was stored on top of the potato dish. In addition, the residual chicken broth (~1 ml) caused typical signs of botulism in mice, but did not cause mortality.

ACKNOWLEDGEMENTS

The WCDHD Epi Team would like to acknowledge staff of the FDA, CDC, and NSHL for their assistance in this investigation. The WCDHD Epi Team would also like to acknowledge the cases and their families for their cooperation in this investigation.