



**GASTROENTERITIS OUTBREAK ATTRIBUTED TO
CLOSTRIDIUM PERFRINGENS TYPE A ENTEROTOXIN
MIAMI COUNTY, KANSAS
FEBRUARY 2006**

FINAL REPORT DATE

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OUTBREAK INVESTIGATORS

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REPORTED BY

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BACKGROUND

On Wednesday, February 15, 2006, a food protection investigator at the Southeast District office of the Kansas Department of Health and Environment (KDHE) received approximately five phone calls from individuals who reported illness after eating at a Miami County restaurant the previous evening, February 14th. Two complainants provided their contact information.

The food protection investigator notified the Epidemiology Services Section (ESS) of KDHE about the possible foodborne outbreak. ESS the Miami County Health Department (MCHD) initiated an outbreak investigation to determine the source of illness and to implement appropriate control and prevention measures.

The restaurant owner mentioned to ESS that some of her teenage employees had called in sick, and that there was some illness circulating in their high school.

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METHODS

EPIDEMIOLOGIC

ESS contacted the two complainants for whom contact information was available to obtain detailed illness and food histories. Cases were defined as individuals who experienced vomiting and/or diarrhea (more than three loose stools in a 24 hour period) after eating food served at the Miami County restaurant Tuesday, February 14.

A cohort study was planned to determine the cause of illness. The only method of identifying potential cases was through the restaurant's credit card receipts. ESS requested 20 receipts from each of the days surrounding the initial complaints, February 13, 14, and 15. The restaurant attempted to decipher the signatures from receipts from those dates, because their credit card machine did not print the name of the cardholder on the receipt. Few names were legible—the cohort study was aborted.

LABORATORY

One complainant sought care from a local physician. The individual obtained a stool kit, but no stool specimen was returned to the physician for testing—the individual's diarrhea ceased shortly after visiting the physician. KDHE discussed the potential benefits of stool collection and testing, even after symptoms have subsided, with the complainant. As a result, one stool sample was submitted directly to KDHE Laboratories.

ENVIRONMENTAL

KDHE performed two inspections at the catering facility, including a Hazard Analysis and Critical Control Point (HACCP) inspection. Basic inspections are routinely done following any consumer complaint; more in-depth HACCP inspections are performed if a foodborne outbreak is suspected.

A questionnaire was developed to gather information on each restaurant worker's illness history, work schedule, and food history (see appendix). The high school's nurse was contacted to determine the extent of illness among students in the community.

RESULTS

EPIDEMIOLOGIC

The two complainants that provided contact information were contacted by KDHE for interviews. One complainant ate a burrito with beans, beef, and pork; Spanish rice; lettuce; chips; salsa; water; and ice at approximately 5:30 p.m. February 14. Nine and a half hours later, the individual became ill with stomach cramps, nausea, diarrhea, chills, headache, and fatigue—these symptoms lasted for approximately 36 hours. A dining companion, who did not become ill, ate spinach quesadillas, chips, salsa, water, and ice.

The second complainant reported eating the same type of burrito, Spanish rice, chips, and salsa. The meal was eaten between 5:00 and 6:00 p.m. on February 14; about 12.5 hours later, the individual was ill with nausea, diarrhea, stomach cramps, chills, headache,

muscle aches, and fatigue. Symptoms persisted for about 27.5 hours. A dining companion ate the same type of burrito, and was ill eight hours later with diarrhea, abdominal cramps, and headache. The dining companion's duration of illness was not known; the individual could not be contacted for an interview.

The high school's nurse reported no notable illnesses among the students.

Thirty-four employees completed a questionnaire. Only one employee reported illness—diarrhea and stomach cramps approximately 2.5 hours after eating ground beef and cheese enchiladas, a ground beef taco, beans, Spanish rice, chips, and salsa from the restaurant on February 15. The employee recovered 19 hours later.

LABORATORY

KDHE Laboratories tested the stool sample for bacterial pathogens and Norovirus—all tests were negative. The sample was forwarded to the regional public health laboratory at the Minnesota Department of Health for foodborne toxin testing. *Clostridium perfringens* type A enterotoxin was detected by an enzyme immunoassay (EIA).

ENVIRONMENTAL

Critical violations were observed during the initial inspection. Hot holding violations were recorded for rice, hamburger, and pork. Cold holding violations were recorded for pork, shredded beef, ground beef, beef tamales, and refried beans—these items were stored in a walk-in cooler. On February 15, the date of the initial inspection, the ambient air temperature of that walk-in cooler was 57 degrees Fahrenheit. The restaurant reported that the foods served on the night of February 14 had been prepared February 12, the day prior to the restaurant's opening, and stored in the walk-in cooler. Over 200 pounds of food were destroyed upon request by KDHE. No food samples were collected for testing.

The HACCP inspection, February 21, documented several problems with the restaurant's procedures, most notably the improper cooling of ground beef, diced pork, Spanish rice, refried beans, and salsa. The Kansas food code requires these foods be cooled from 140°F to 70°F within two hours of cooking, and cooled from 70°F to 41°F in four hours or less. Each of the observed foods failed to meet one or both of these cooling requirements.

CONCLUSION

The clinical and laboratory data collected regarding this outbreak are consistent with a point-source outbreak of *C. perfringens* type A enterotoxin. The inability to identify others exposed to the restaurant prevented the investigators from determining the number of individuals affected. Four illnesses were confirmed—three from two different parties that dined at the restaurant February 14, and one restaurant employee that ate February 15. The mean incubation period was 8.1 hours (range, 2.5-12.5 hours; median, 8.8 hours) and the mean duration was 27.5 hours (range, 19-36 hours; median, 27.5 hours).

C. perfringens type A enterotoxin is a common cause of foodborne illness in the United States; an estimated 248,520 people are infected with *C. perfringens* every year—100% of these infections are foodborne.[#] The sudden onset of diarrhea is common 10-12 hours after infection, and usually subsides within 24 hours. Nausea and abdominal cramps may occur; vomiting and fever are usually absent.[¶] *C. perfringens* may proliferate in meats, stews, or gravies when "spores survive normal cooking temperatures, germinate and multiply during slow cooling, storage at ambient temperatures, and/or inadequate rewarming."[¶]

No single food item could be implicated as the cause of illness; however, all three of the ill patrons reported eating a burrito containing diced pork, ground beef, and refried beans, served with Spanish rice. An ill restaurant employee also reported illness after eating a menu items containing ground beef, refried beans, and Spanish rice, suggesting one of these ingredients was the cause of the outbreak. Presumably, *C. perfringens* survived the initial cooking procedure in one or more of these foods, which were prepared February 12. After being stored at an inappropriately warm temperature in the walk-in cooler, the foods were served at the restaurant on February 14, causing illness.

RECOMMENDATIONS

Special care should be taken to avoid the proliferation of *C. perfringens* enterotoxin. Foodhandlers should be educated about proper preparation and storage techniques.

Although approximately five individuals notified KDHE regarding possible foodborne illness, only two individuals left a message including their contact information. As a result, KDHE was unable to interview at least three potential cases. Whenever possible, a name and telephone number should be obtained from complainants. If complaints are received outside of normal business hours, the voicemail message should instruct complainants to provide all necessary information, including contact information.

Food that was improperly stored in a malfunctioning walk-in cooler was destroyed during the restaurant's initial inspection to prevent further illness. Inspectors should consider collecting a sample from each menu item prior to their destruction for pathogen testing. Testing the food samples may help to conclusively determine the cause of foodborne outbreaks.

[#] Mead PS. Food related illness and death in the United States. *Emerging Infectious Diseases*, 1999. 5(6):607-625.

[¶] Heymann DL, ed. *Control of Communicable Diseases Manual*. 18th ed. Washington, D.C.: American Public Health Association; 2004.

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