

Outbreak of Staphylococcal Food Poisoning Associated with Carniceria Camecuaro — Shawnee County, April 2013



Background

On Sunday, April 28, 2013, at 3:20 p.m., a Shawnee County hospital notified the Kansas Department of Health and Environment's Infectious Disease Epidemiology and Response section (KDHE) of a possible foodborne disease outbreak. The hospital reported that four patients from two different households sought care in the emergency department that afternoon after eating food from Carniceria Camecuaro, a restaurant and butcher shop located at 1016 SE 6th St., Topeka, Kansas. No other common exposures between the households were reported.

KDHE immediately notified the Shawnee County Health Agency (SCHA) and the Kansas Department of Agriculture (KDA). KDHE recommended closing the restaurant, pending further investigation into the ill consumers. A KDA food inspector arrived at the restaurant at 4:30 p.m. A full inspection was not conducted, but the inspector checked temperatures of the food items being served: pork carnitas, pork al pastor, pico de gallo, tomato salsa, tomatillo salsa, and jalapeño and tomatillo salsa. The three salsas were all near 49°F, above the required cold holding temperature threshold of 41°F. Samples of these food items were collected. All three salsas on the make table in the front of the restaurant were discarded in a trash dumpster. The restaurant agreed to close voluntarily. The inspector instructed the establishment to close until a reopening inspection was conducted and to clean and sanitize all walls, fixtures, countertops, and food preparation equipment.

The following day, Monday, April 29, at 3:56 p.m., a complaint was received by KDA regarding the same restaurant. The complainant stated that 25 pounds of pork carnitas were purchased on April 28, after the restaurant voluntarily closed. The pork carnitas were served at a private family event on the evening of April 28, along with rice, beans, and pasta salad prepared by family members. The complainant stated approximately 20 of 50 attendees became ill after eating at the event. In light of these additional illnesses caused by food sold after the restaurant voluntarily closed, KDA issued a temporary suspension order on April 30 to prohibit the restaurant from operating.

KDHE, SCHA, and KDA conducted a joint investigation to determine the cause and scope of illness and to implement prevention and control measures.

Methods

A retrospective cohort study was conducted among attendees of the family event on April 28, and additional analysis was conducted among all known individuals who ate food purchased from Carniceria Camecuaro on April 28. SCHA contacted the complainant and obtained contact information for all the event attendees, and obtained contact information for the four patients seen at the Shawnee County hospital. Additionally, SCHA contacted another Shawnee County hospital about other potential cases who visited its emergency department; six patients were identified at that facility, including three who attended the family event. A questionnaire was created to ask individuals about their symptoms and foods they consumed. Interviews were conducted by SCHA via telephone. Questionnaire administration began on April 29 and was completed on May 6. A case was defined as any individual experiencing vomiting or diarrhea (three or more loose stools within a 24-hour period) within eight hours of eating food purchased from Carniceria Camecuaro on April 28, 2013.

Odds ratios and 95% confidence intervals were calculated, and associations between illness and food exposures were assessed using the Chi-square test. Statistical analysis was conducted using SAS[®] software (Release 9.2, Cary, North Carolina).

In addition to the food samples collected on April 28, KDA collected additional samples from the restaurant on April 30 of pork carnitas, pork al pastor, rice, beans, and pico de gallo. The food samples collected April 28 were shipped to a private laboratory on April 30 for staphylococcal enterotoxin testing via enzyme-linked immunosorbent assay (ELISA); samples collected April 30 were shipped for ELISA testing on May 7.

Clinical specimens from ill individuals were not collected.

As mandatory conditions of the restaurant's re-opening, KDA provided food safety education to Carniceria Camecuaro employees on May 1, and conducted Hazard Analysis and Critical Control Points (HACCP) inspections on May 3 and May 6. The HACCP inspection observed the restaurant's processes for receiving, preparing, cooking, and cooling the pork carnitas.

Results

SCHA interviewed 42 individuals who reported eating food purchased from Carniceria Camecuaro on April 28. Thirty-five individuals from nine different households dined at the family event on the evening of April 28. Seven individuals from three different households ate food purchased from Carniceria Camecuaro earlier that day. SCHA attempted to interview one additional household that notified a local newspaper of two ill family members linked to the restaurant, but the household did not respond to email inquiries.

Twenty-two individuals who attended the family event reported illness; 19 met the case definition. All seven ill individuals who did not attend the family event met the case definition.

Cases ranged in age from 1 to 63 years (median age, 23 years). Fifteen (58%) cases were female.

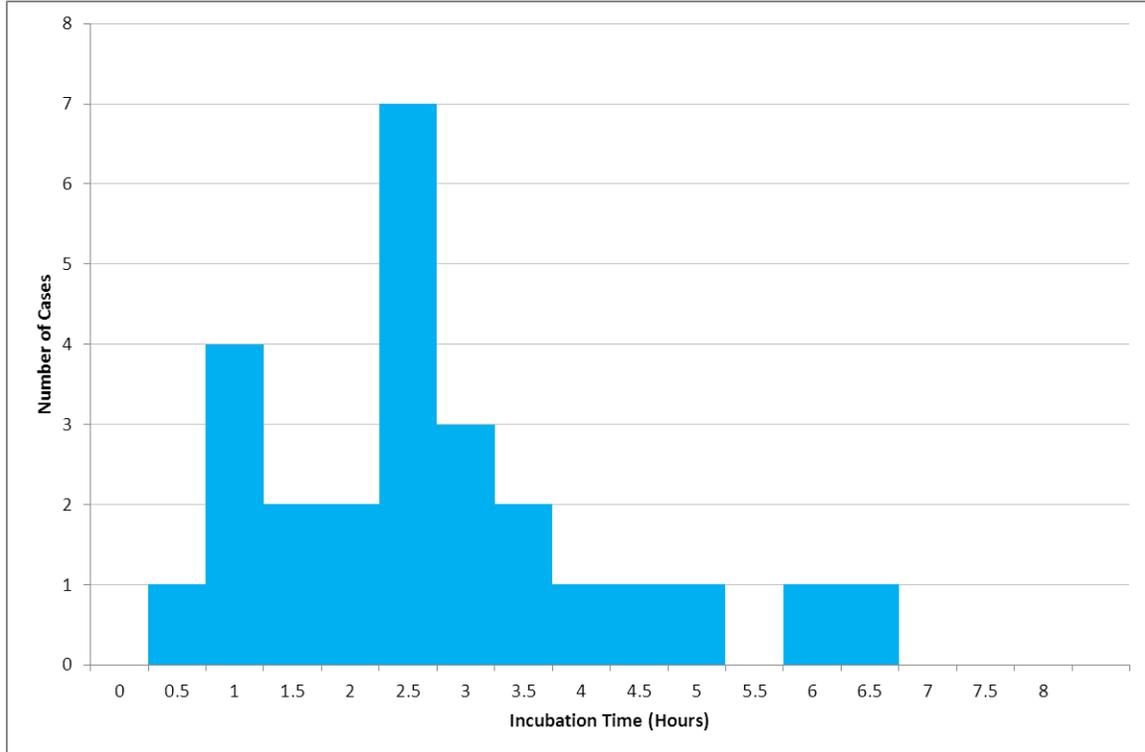
Vomiting and diarrhea were the most commonly reported symptoms (Table 1).

Table 1: Clinical information for cases (n=26)

<i>Symptoms</i>	<i>Cases with Symptoms (%)</i>	
Vomiting	22	(85%)
Diarrhea	20	(77%)
Abdominal Pain	19	(73%)
Nausea	19	(73%)
Chills	6	(23%)
Muscle Aches	6	(23%)
Fever	1	(4%)

The illness incubation time ranged from 0.5 hours to 6.5 hours (median, 2.5 hours) (Figure 1). Nineteen cases had recovered from their illness at the time of their interview. The duration of illness ranged from 12.5 hours to 65 hours (median, 34 hours).

Figure 1: Illness incubation time of gastrointestinal illness cases associated with Carniceria Camecuaro (n=26)



Ten individuals, including three individuals who attended the family event, reported seeking care in a hospital emergency department. None were hospitalized. No other physician visits were reported.

Each food and drink item was analyzed for association with illness. Consumption of pork carnitas was the only statistically significant item. Among all individuals who ate food purchased from Carniceria Camecuaro, those who reported eating the pork carnitas were 20 times more likely to become ill than those that reported not eating the pork carnitas (odds ratio=20, p-value=0.0002, 95% confidence interval=3.4 – 116.5). Among those who attended the family event, those who reported eating the pork carnitas were 63 times more likely to become ill than those that reported not eating the pork carnitas (odds ratio=63, p-value<0.0001, 95% confidence interval=3.2 – 1231.3).

Samples of pork carnitas and jalapeño and tomatillo salsa collected on April 28 tested positive for staphylococcal enterotoxin via ELISA on May 2. All other April 28 food samples tested negative for the enterotoxin on May 2, and all food samples collected April 30 tested negative on May 9. No other tests were conducted on the food samples.

KDHE, SCHA, and KDA visited the restaurant on April 30. All six of the restaurant's employees were present. One employee reported becoming ill approximately five hours after he consumed pork carnitas on the evening of April 28.

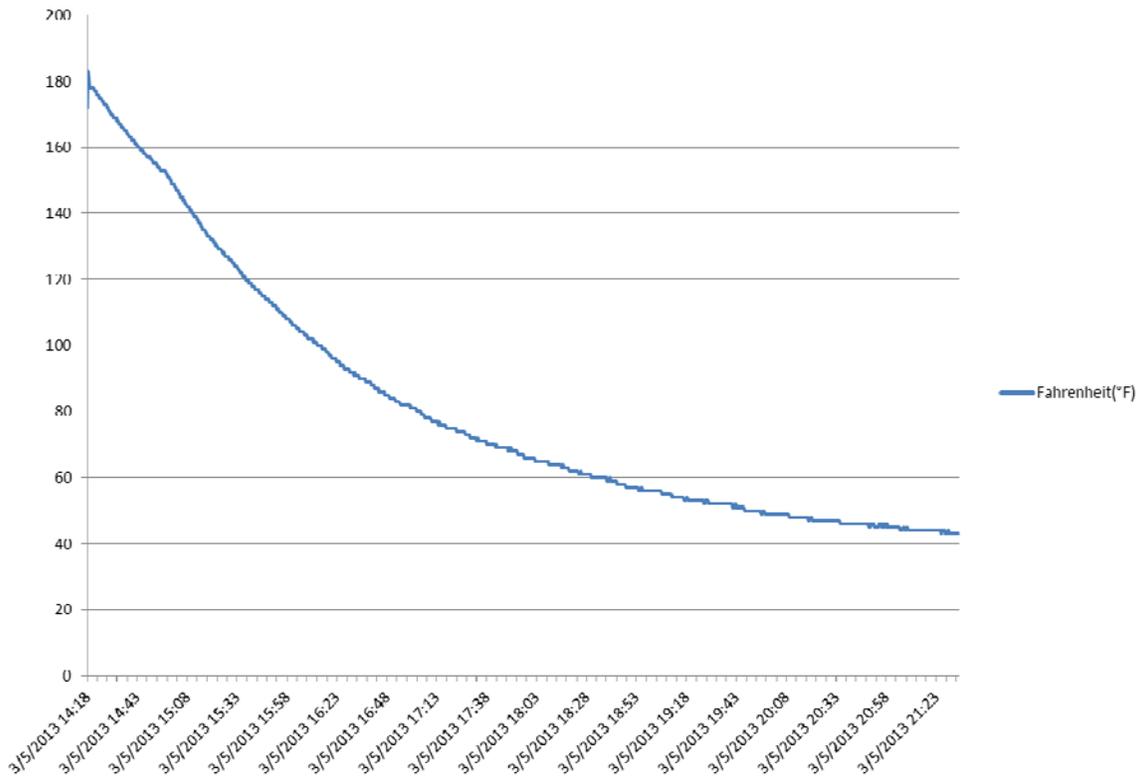
Employees of the establishment reported that the catering order for the family event was taken from a batch of pork carnitas prepared at approximately 10 a.m. on April 28. After cooking, 25 pounds of meat was set aside and reserved from that batch; it was not determined if the meat was kept in the walk-in cooler until it was picked up at approximately 6 p.m.

Leftover cooked pork, beans, rice, and beef were destroyed on April 30. On May 3, all food that had been handled or prepared on site was destroyed.

KDA conducted a mandatory food safety class for the employees on May 1. After laboratory tests confirmed staphylococcal enterotoxin in samples of pork carnitas and jalapeño and tomatillo salsa on May 2, KDA and KDHE staff visited the restaurant on May 3 to conduct a HACCP review on the pork carnitas.

Establishment employees were observed preparing the pork carnitas. After receiving a delivery of refrigerated raw pork, four 12-pound sections of pork butt were cut into smaller chunks estimated to weigh one pound each. The pork was then cooked in lard for three and a half hours, with seasonings added at the two-and-a-half hour mark. The pork reached an internal cook temperature of 210°Fahrenheit (F). After cooking, the one-pound chunks of pork were placed in a deep metal pan and left on the counter. Approximately one hour later, the pan was moved to the walk-in cooler. A data logging thermometer was used to monitor the cooling process (Figure 2). Approximately two hours after it was cooked, the pork cooled to an internal temperature of 135°F. Two hours after the internal temperature reached 135°F, the internal temperature was 75°F. Six hours after cooling to 135°F, the internal temperature of the pork ranged from 43-45°F.

Figure 2: Pork carnitas temperature log, May 3, 2013



The preparation of jalapeño and tomatillo salsa was also observed on May 3. After the jalapeños were boiled, they were blended with the other ingredients and transferred to a large (approximately five-gallon) container. The container was placed in the walk-in cooler. Over six hours later, the temperature of the salsa was 70°F.

The Kansas food code requires cooked food to cool to an internal temperature of 70°F within two hours after any part of the food reaches 135°F, and to cool to 41°F within a total cooling time of six hours. Neither the pork nor the salsa met the cooling parameters.

The serving and reheating process for the pork carnitas was discussed. Employees reported that pork carnitas were usually cooked, placed in a deep metal pan, and then held hot in a steam table or in a hot display case. At the end of the business day, the pan of pork was taken from hot holding and placed on a counter in the kitchen for approximately one hour before being moved into the walk-in cooler. The next day, the pan was taken from the walk-in cooler, water was added directly to the pork, the pan was covered in foil, and the pan was placed on a stovetop for approximately 45 minutes to reheat. The reheated pork carnitas were then added to another pan of freshly prepared pork carnitas made that morning.

During the May 3 HACCP inspection the following was also observed:

- A hose was attached to a faucet. The faucet did not have a backflow prevention device. The three-compartment sink has a leak from the pipe underneath the sink and at the faucet;
- The three-compartment sink was set up with the sanitizer solution in the middle compartment instead of the third compartment;
- Pots and pans were stacked on the shelf across from the three vat sink before the items had completely air-dried;
- The ice scoop was being stored in the ice machine;
- D-con rodent bait was stored on top of the ice machine;
- There was no consumer advisory for the ceviche that is prepared in the establishment;
- Dried food debris was on several chef's knives located in the drawer across from the glass coolers, on both meat slicers, and on the meat saw;
- Several spices and meats were stored in non-food-grade containers;
- There were no covers on the outside trash dumpster.

KDA made the following suggestions to improve the establishment's cooling process and other daily procedures:

- Break up or shred the pork carnitas and place in shallow pans.
- Do not pile pork chunks on top of each other — spread it out in one layer in the pan.
- Place the pans on ice to ensure the pork reaches an internal temperature of 70°F within the first two hours of cooling, and then transfer the pans to the walk-in cooler to ensure that an internal temperature of 41°F is reached within a total cooling time of six hours.
- Place the containers into a bus tub of ice and/or use chill sticks and stir until internal temperature reaches 70°F. The product must cool to 70°F within two hours after any part of the food reaches 135°F. Once the product reaches 70°F, transfer the pans to the walk-in cooler to ensure that the product cools to an internal temperature of 41°F within a total cooling time of six hours.
- Use a calibrated thermometer to monitor product temperatures to make sure proper two-stage cooling is achieved. Record the cooling temperatures on cooling log sheets. (On May 1, KDA observed that the restaurant did not have any thermometers. Thermometers were obtained by the establishment prior to May 3, when KDA assisted in calibrating them.)
- Review the Focus on Food Safety Material located on the KDA website.

On May 6, the cooling of pork carnitas was observed again. The establishment incorporated some of the recommended changes. The establishment reduced the size of the pork chunks, placed the pans of pork on ice, and placed ice bags on top of the pork. Two hours after the internal temperature of the pork carnitas reached 135°F, the internal temperature was 45°F. The internal temperature reached 41°F approximately 21 minutes later.

The restaurant reopened on May 7. On May 17, a follow-up inspection was conducted by KDA. Five priority violations and one priority foundation violation were noted:

- Several pieces of cactus and one poblano pepper were rotten
- Two pans of raw beef and one pan of raw pork were stored above ready-to-eat cheese in the walk-in cooler
- Two pans of raw beef were stored directly above a pan of raw pork in the walk-in cooler
- A can of oven cleaner was located directly next to spice containers
- A can of oven cleaner was located above single serve containers
- Dried food debris was on the onion dicer

Another follow-up inspection was conducted by KDA on May 28. No priority or priority foundation violations were noted.

Conclusions

Twenty-six cases of gastroenteritis were associated with consuming food purchased at Carniceria Camecuaro on April 28. Although no clinical specimens were collected, the clinical data reported among cases was consistent with staphylococcal food intoxication. Consuming pork carnitas was statistically associated with illness. All but two cases reported consuming pork carnitas; none of the individuals interviewed reported consuming jalapeño and tomatillo salsa. Samples of both pork carnitas and jalapeño and tomatillo salsa tested positive for staphylococcal enterotoxin. Temperature abuse was observed during the preparation of both of those products during the HACCP inspection at the restaurant.

Intoxication by *Staphylococcus aureus* is characterized by an abrupt onset of vomiting or diarrhea, with symptoms occurring within one to eight hours after ingestion of the toxin-contaminated food. The incubation period and severity of symptoms depends on the amount of toxin consumed as well as an individual's susceptibility to the toxin¹. Staphylococcal food intoxication is the most common type of food intoxication. *S. aureus* contamination can occur when someone handles food with bare hands, especially after touching the face or mouth, or has an exposed sore on the hands or arms. Staphylococci may be present in the nasal passages,

throats, and on the hair and skin of healthy individuals. An estimated 20%-40% of adults are colonized with *S. aureus* at any given time².

In order for staphylococcal food poisoning to occur, the following criteria must be present: (1) a food must be contaminated with enterotoxin-producing *S. aureus*; (2) the food must have the necessary requirements for bacterial growth; (3) adequate time and temperature must be present for the bacteria to multiply and produce enterotoxin; and (4) a sufficient amount of enterotoxin must be consumed³. Staphylococci thrive in protein-rich foods with high-salt content and grow in the temperature range of 45°F and 118°F. Heat-resistant enterotoxins are produced between the temperature range of 68°F and 99°F⁴. Foods commonly implicated in foodborne disease outbreaks caused by *S. aureus* include cooked meats, poultry, fish, cream-filled bakery products, and dairy-based products.

In this outbreak, food handlers colonized with *S. aureus* likely contaminated the pork carnitas after it was cooked, and temperature abuse during the cooling or reheating process allowed the production of enterotoxin. During a site visit on April 30, employees were observed for obvious signs of *S. aureus* infection on their hands and arms. No cuts or sores were seen.

The epidemiological investigation was limited by several factors. First, the scope of illness was not fully determined. Additional case finding through credit card receipts was considered, but receipts with customer names were not readily available through the establishment. Inaccuracies may be present in interviewees' food and symptom histories due to recall bias. Information bias may also be present — for households with one or more non-English-speaking member, interviews were completed using the best English-speaking member as a surrogate. Testing clinical specimens for the presence of staphylococcal enterotoxin may have confirmed the cause of illness, but this testing was not available at the state public health laboratory.

The outbreak investigation was aided by quick case investigation and rapid notification among agencies. SCHA quickly contacted all individuals known to be affected. All but one identified household was interviewed, and all but one household was interviewed within three days of the investigation's initiation. The reporting hospital telephoned KDHE to report a possible outbreak within an hour of identifying the second affected household, and KDHE notified KDA and SCHA immediately. The KDA inspector was on-site at the establishment just 70 minutes after initial notification to KDHE.

Despite the fast response from KDA, additional cases became ill after the establishment voluntarily closed. Because the pork carnitas were held at an appropriate temperature at the time the inspector arrived, the meat was not destroyed or embargoed at that time; only the out-of-temperature salsas were discarded. The pork carnitas catering order was sold after the

KDA inspector left the premises, in violation of the voluntary closure agreement which stated the establishment was to stay closed until a re-opening inspection was conducted.

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On: June 21, 2013*

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³ Armstrong GL, Hollingsworth J, Morris, Jr. JG. Bacterial foodborne disease. In: Evans AS, Brachman PS, eds. Bacterial Infections in Humans: Epidemiology and Control. 3rd ed. New York: Kluwer Academic/Plenum Publishers, 1998:109-138.

⁴ CDC. Outbreak of staphylococcal food poisoning associated with precooked ham – Florida, 1997. MMWR 1997;46:1189-1191.