Salmonellosis Outbreak Associated with Las Canteras Mexican Restaurant — Norton County, May 2015

Background

On May 18, 2015, routine infectious disease surveillance conducted by the Kansas Department of Health and Environment's Infectious Disease Epidemiology and Response section (KDHE) identified an increase in salmonellosis among residents of Norton County, Kansas. The Norton County Health Department (NCHD) was notified, and an outbreak investigation was initiated that day to determine the cause and scope of the outbreak.

Methods

Epidemiologic Investigation

Persons with laboratory-confirmed *Salmonella* infection were interviewed by NCHD with the standard hypothesis-generating questionnaire, and Las Canteras Mexican Restaurant (203 W. Washington St., Norton, KS) was identified as a common exposure among ill persons. A case-control study was conducted to determine exposures with statistical association with illness.

Patrons of Las Canteras were identified from credit card receipts and interviewed by investigators from NCHD and KDHE. A case was defined as laboratory-confirmed salmonellosis or diarrhea in a person who ate at Las Canteras in Norton between May 2 and May 10, 2015. Three controls per case were chosen from those persons who reported no illness. Statistical analysis was conducted using SAS® 9.4.

Laboratory Analysis

Stool specimens were cultured at the Missouri State Public Health Laboratory. *Salmonella* isolates were serotyped and pulsed-field gel electrophoresis (PFGE) was performed.

Environmental Assessment

The Kansas Department of Agriculture's Food Safety and Lodging program (KDA) conducted an initial inspection of Las Canteras on June 3rd, 2015 and a follow-up inspection on June 14th, 2015. On August 4th, 2015, KDA returned to the facility to perform a Hazards Analysis and Critical Control Point (HACCP) inspection on the preparation of tomatoes.

Results

Epidemiologic Investigation

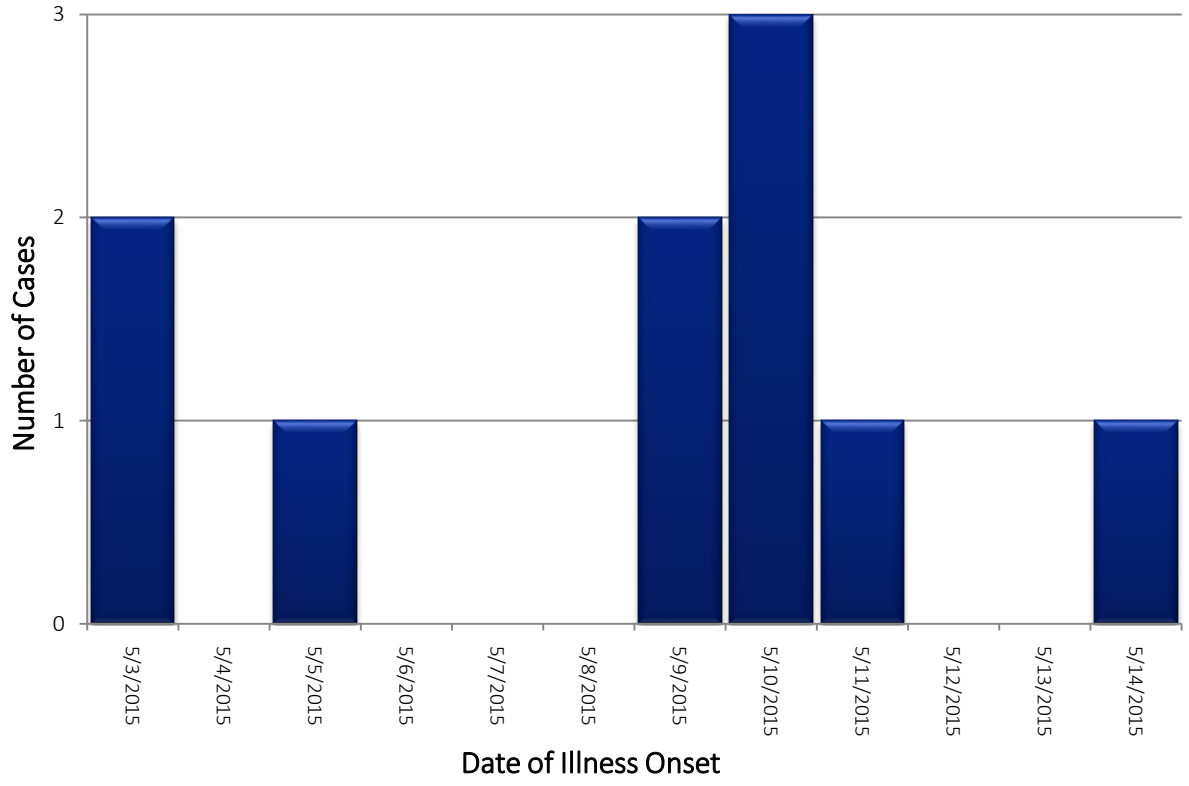
During the outbreak investigation, 38 persons were interviewed. Of these, ten persons experienced gastrointestinal illness and had outbreak cases of salmonellosis. Two cases were excluded from the statistical analysis because although they reported eating at Las Canteras during their incubation period, their exact date of exposure was unknown. Eight cases and 24 controls were included in case-control analysis. Diarrhea was the most commonly reported symptom (Table 1). Onset dates ranged from May 3 to May 14, 2015 (Figure 1).

Table 1: Symptoms reported among outbreak cases (n=10)

Symptom	# of Cases with Symptom	% of Cases with Symptom
Diarrhea	10	100%
Abdominal Pain	8	80%
Muscle Aches	7	70%
Nausea	6	60%
Headache	6	60%
Vomiting	4	40%
Bloody stool	2	20%

In bivariate analysis, fresh tomatoes (OR = 11.67, CI = 1.23-110.95, p = 0.037) and ground beef (OR = 7.28, CI = 1.17-45.25, p = 0.038) were statistically associated with illness. For a list of all foods analyzed see the Appendix. These two ingredients remained significant in logistic regression analysis when analyzed independently.

Figure 1: Number of cases by illness onset date (n=10)



Laboratory Analysis

Four ill persons submitted specimens for cultures; all were positive for *Salmonella* Typhimurium with PFGE pattern JPXX01.0256.

Environmental Assessment

The June 3, 2015 inspection of Las Canteras revealed 5 priority violations and 4 priority foundation violations. The priority violations included bugs on food in a reach-in cooler, undetectable levels of sanitizer in the dishwasher, improper cooling times and temperatures, improper cold-holding temperatures, and improper date marking and disposition. The priority foundation violations included built-up food residue on a can opener, containers with toxic materials such as over cleaner and bleach not being appropriately labeled, improper cooling methods, and improper test supplies for sanitizing solutions. Additional failures noted during

the inspection included refrigeration equipment without thermometers, exterior doors to the kitchen not being fully closed to protect against entry of insects and rodents, boxes of food stored directly on the floor, and improper storage of ice scoops.

The June 14, 2015 inspection revealed 3 priority violations and 1 priority foundation violation. Again, the priority violations included undetectable levels of sanitizer in the dishwasher, improper cooling times and temperatures, and improper cold-holding temperatures. The priority foundation violation identified was the use of improper cooling methods, and additional failures included the lack of thermometers in cooling equipment and a malfunctioning refrigerator.

On August 4, 2015, when the inspector returned to Las Canteras to conduct the HACCP inspection, 6 priority violations and 3 priority foundation violations were noted. The priority violations included improper handwashing by food handlers, bare-hand contact with ready-to-eat foods, insects in liquor bottles, improper cooling times and temperatures, improper cold-holding temperatures, and improper chemical storage. Priority foundation violations included unclean food equipment, unlabeled chemicals, and malfunctioning cooling equipment. Again, additional failures were noted.

The purpose of the HACCP inspection was to observe handling of ready-to-eat (RTE) foods, time and temperature controls of various foods during preparation and storage, and hygiene practices. The inspection process involved identifying the Critical Control Points (CCPs) that occur during food preparation and identify areas where loss of control may result in an unacceptable health risk. Preparation of tomatoes used in the preparation of ready-to-eat guacamole dip was the target of this inspection. During observation of the process, the KDA inspector noted improper holding temperatures for the tomatoes.

According to the inspector, the areas of greatest concern for this establishment related to four areas: improper cooling, improper cold holding, handwashing, and bare hand contact with ready-to-eat foods. Related educational printed handouts were provided at each inspection. The owner and manager were strongly recommended to attend a food protection manager certification such as ServSafe, and information was provided on these trainings. KDA presented a Focus on Food Safety class on October 19th at the facility for employees of the company's three restaurants.

Conclusions

This was an outbreak of *Salmonella* Typhimurium associated with eating at Las Canteras Mexican Restaurant in Norton, Kansas in which ten persons who ate at the restaurant became ill. Persons with outbreak cases of salmonellosis ate food from the restaurant between May 2 and May 10, 2015 and became ill between May 3 and May 14, 2015. Persons who reported eating fresh tomatoes or ground beef were statistically more likely to have become ill than those that did not.

Salmonella is estimated to cause more than 1.2 million illnesses each year in the United States, with more than 23,000 hospitalizations and 450 deaths[1]. Those infected with *Salmonella* will usually develop diarrhea, fever, and abdominal cramps 12–72 hours after infection. Illness generally lasts 4 to 7 days, but infants, the elderly, and those with weakened immune systems are more likely than others to develop severe illness[2].

Salmonella serotype Typhimurium is one of the two most common types of Salmonella causing illness in the United States[3]. *Salmonella* Typhimurium is considered to be a broad-host-range serotype, with many hosts including humans, cattle, horses, swine, poultry, rodents, and birds[4]. Outbreaks of illness caused by *Salmonella* Typhimurium have been associated with frozen feeder rodents, live poultry, ground beef, peanut butter, and tomatoes[5].

In this salmonellosis outbreak, the original source of *Salmonella* into the restaurant is unknown. Ground beef and tomatoes, which were statistically associated with illness in this outbreak, have both been implicated in previous outbreaks of *Salmonella* Typhimurium. Additionally, ill food handlers can contaminate food, leading to outbreaks of salmonellosis[2]. Although the original source of *Salmonella* could not be determined, cross-contamination during food preparation may be responsible for the multiple ingredients that were associated with illness in this outbreak. Improper handwashing by food handlers and bare-hand contact with ready-to-eat foods, identified in the establishment during inspections, can contribute to cross-contamination of multiple ingredients.

To prevent cross-contamination of foods, uncooked meats should be kept separate from produce, cooked foods, and ready-to-eat foods. Hands, cutting boards, counters, knives, and other utensils should be washed thoroughly after touching uncooked foods. Hands should be washed before handling food, and between handling different food items. People who have salmonellosis or any diarrheal illness should not prepare or serve food or drinks for others until their diarrhea has resolved[2].

A limitation of this investigation is that contact information for patrons of the restaurant was only available for persons who used a credit card for payment; patrons who used a different payment method could not be identified or assessed for illness. Additionally, inaccuracies may exist in interviewees' food and symptom histories due to recall bias. This outbreak investigation was aided by the cooperation and quick response of the NCHD and KDHE in interviewing diners and conducting the investigation, and by KDA in inspecting the food establishment.

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[1] Scallan E, Hoekstra RM, Angulo FJ, Tauxe RV, Widdowson MA, Roy SL, et al. Foodborne illness acquired in the United States---major pathogens. Emerg Infect Dis 2011; 17(1): 7-15.

[2] CDC. Salmonella General Information. Accessed 25 November 2015: http://www.cdc.gov/salmonella/general/index.html.

[3] CDC. Salmonella serotype Typhimurium. An Atlas of Salmonella in the United States, 1968 – 2011; 2013. Accessed 25 November 2015: http://www.cdc.gov/salmonella/pdf/typhimurium-508c.pdf

[4] Rabsch W, Andrews HL, Kingsley RA, Prager R, Tschäpe H, Adams LG, Bäumler AJ. *Salmonella enterica* Serotype Typhimurium and Its Host-Adapted Variants. Infect Immun May 2002; 70(5):2249-2255.

[5] CDC. Reports of Selected *Salmonella* Outbreak Investigations. Accessed 25 November 2015: http://www.cdc.gov/salmonella/outbreaks.html.

Appendix: Bivariate Analysis Results

Ingredient	p-value	Odds Ratio	95% CI (lower limit)	95% CI (upper limit)
Tomatoes*	0.04	11.67	1.23	110.95
Beef*	0.04	7.29	1.17	45.25
Green peppers	0.12	4.05	0.75	21.73
Flour tortilla	0.21	5.00	0.53	47.29
Queso	0.22	0.24	0.04	1.43
Sour cream	0.25	2.78	0.53	14.50
Ice	0.33	0.33	0.06	1.99
Corn tortilla	0.38	0.24	0.03	2.26
Pico de gallo	0.40	2.43	0.47	12.54
Lettuce	0.41	3.00	0.50	17.95
Bacon	0.44	3.29	0.18	59.60
Drink	0.44	0.30	0.02	5.52
Salsa (mild)	0.58	0.43	0.06	3.19
Rice	0.64	2.88	0.30	27.97
Beans	0.68	2.14	0.36	12.89
Guacamole	0.68	1.67	0.33	8.37
Chicken	0.69	0.51	0.10	2.62
Onions	0.69	1.67	0.32	8.59
Shrimp	1.00	0.71	0.07	7.52
Jalapenos	1.00	0.54	0.05	5.50
Salsa (hot)	1.00	0.71	0.07	7.52
Hot sauce	1.00	1.00	0.09	11.24
Ranchero sauce	1.00	1.57	0.12	20.06
Chicken nuggets	1.00	1.57	0.12	20.06

*Statistically significant at p = 0.05

Ingredients/menu items analyzed but not listed above because the number of persons reporting exposure was insufficient for reliable statistics to be calculated:

Baked potato, banana chimichanga, BBQ sauce, black olives, broccoli, burger, cabbage, carnitas, ceviche, cheese, cheeseburger, cheesecake, chile relleno, chipotle sauce, chocolate chimichanga, chorizo, churros, cocktail sauce, corn dog, crab, fish, flan, French dressing, French fries, garlic sauce, green onion, ham, hot dog, ice cream, Italian dressing, macaroni and cheese, mushrooms, octopus, pineapple, pork, ranch dressing, salchipulpa, salsa (extra hot), salsa (green), scallops, sopapilla, steak, thousand island dressing, tortilla chips, zucchini