

Salmonellosis Outbreak Associated with El Pueblito Mexican Restaurant — Montgomery County, March 2018



Background

On March 29, 2018, at 3:40 p.m., a hospital in Montgomery County, Kansas telephoned the Kansas Department of Health and Environment's Infectious Disease Epidemiology and Response section (KDHE) to report an increase in salmonellosis. Five patients had tested positive for *Salmonella* at the hospital's laboratory on March 28 and 29; the patients' specimens had been collected between March 13 and March 27.

KDHE initiated an outbreak investigation before 5 p.m. on March 29. KDHE's centralized interviewing team is responsible for salmonellosis investigations for Montgomery County residents, and was instructed to prioritize completing KDHE's standard hypothesis-generating questionnaire for each of these patients.

On the following day, March 30, the Montgomery County Health Department (MCDH) was notified of the outbreak. Hospital staff attempted to determine if there was any common exposure among patients that were still hospitalized at the facility, but the patients did not report attending the same event, and no clear connection between the patients was identified.

Methods

Epidemiologic Investigation

Persons with laboratory-confirmed *Salmonella* infection were interviewed by KDHE with the standard hypothesis-generating questionnaire, and El Pueblito Mexican Restaurant (600 Northeast St., Coffeyville, KS) was identified as a common exposure among ill persons. A case-control study was conducted to determine exposures with statistical association with illness. A case was defined as laboratory-confirmed *Salmonella* Enteritidis with PFGE pattern JEGX01.0021 or JEGX01.0023 in a person who reported eating food from El Pueblito within 14 days of illness onset. Controls were well meal-companions of ill persons. Cases and controls were interviewed by KDHE using an outbreak-specific questionnaire that focused on ingredients used for each food item served at the restaurant. Statistical analysis was conducted using SAS® 9.4.

Laboratory Analysis

Salmonella isolates were serotyped, and pulsed-field gel electrophoresis (PFGE) and Whole Genome Sequencing (WGS) were performed by the Kansas Health and Environmental Laboratories (KHEL) and the Oklahoma State Public Health Laboratory. Whole genome Multi-Locus Sequence Typing (wgMLST) analysis was conducted by PulseNet at the Centers for Disease Control and Prevention (CDC).

Environmental Assessment

The Kansas Department of Agriculture's Food Safety and Lodging program (KDA) conducted an inspection of the restaurant on April 6, 2018, and performed environmental sampling on April 17, 2018. Environmental swab samples were sent to the KDA Laboratory for *Salmonella* testing.

Results

Epidemiologic Investigation

Nine *Salmonella* Enteritidis cases matching pattern JEGX01.0021 and one with a closely related pattern, JEGX01.0023, were identified by KDHE. The first case, reported to KDHE on February 27, 2018, was unable to be interviewed. Nine other cases, reported to KDHE between March 29 and April 6, were interviewed with both the standard hypothesis-generating questionnaire as well as the outbreak-specific questionnaire. All nine cases met the outbreak case definition,

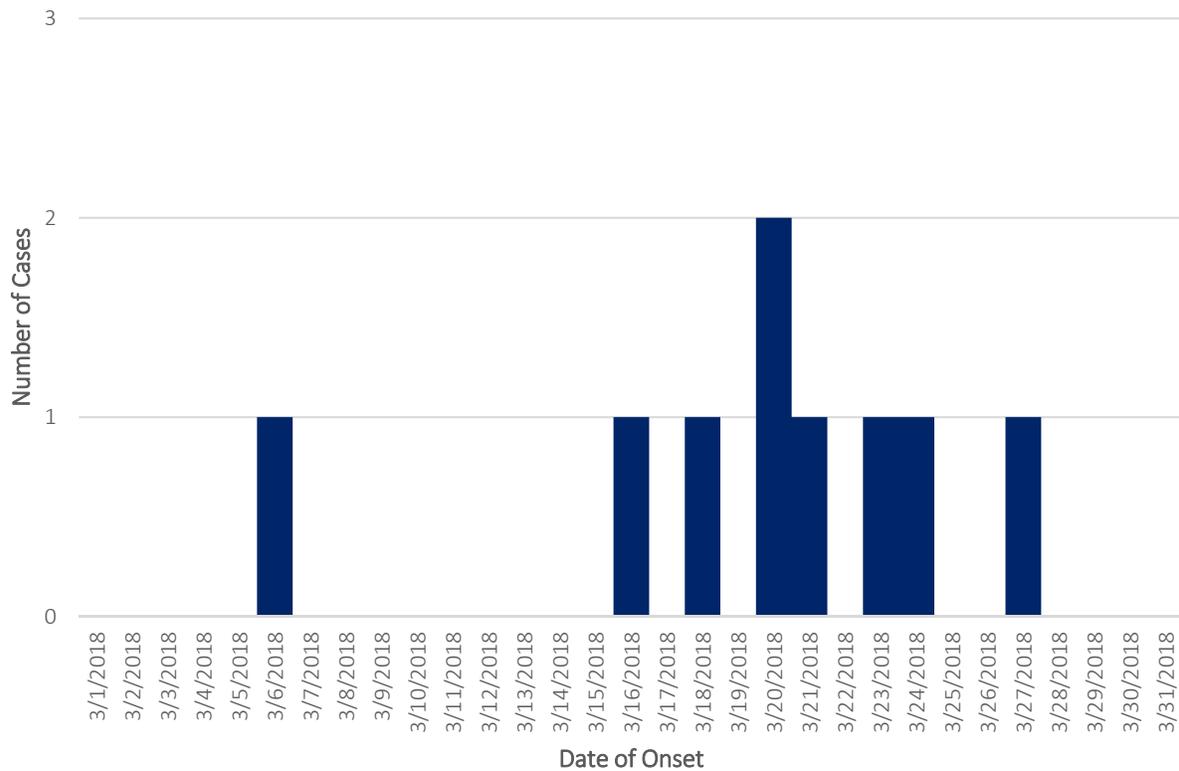
reporting eating food from El Pueblito within 14 days of illness onset. Eight cases resided in Montgomery County, where the restaurant is located. One case resided in Chautauqua County, and reported eating only at El Pueblito while visiting Coffeyville seven days before becoming ill. Diarrhea was the most commonly reported symptom (Table 1).

Table 1: Symptoms reported among outbreak cases (n=9)

Symptom	# of Cases with Symptom	% of Cases with Symptom
Diarrhea	9	100%
Nausea	8	89%
Fever	8	89%
Abdominal Pain	7	78%
Vomiting	6	67%
Bloody stool	4	44%

Onset dates ranged from March 6 to March 27, 2018 (Figure 1). Among the seven cases who reported a specific meal date, the illness incubation period ranged from 3 to 14 days (median, 7 days). All nine cases visited a physician regarding their illness; three were hospitalized. No deaths were reported.

Figure 1: Number of cases by illness onset date (n=9)



KDHE was able to interview 13 controls; the number of controls was insufficient to perform a statistically valid case-control bivariate analysis.

Laboratory Analysis

The nine cases were positive for *Salmonella* Enteritidis; eight isolates matched PFGE pattern JEGX01.0021, and one isolate's PFGE pattern was JEGX01.0023. The difference between the two patterns was one band.

WGS was performed to further characterize Kansas *Salmonella* Enteritidis isolates with PFGE pattern JEGX01.0021 and JEGX01.0023. Eight outbreak cases were included in the WGS analysis—one outbreak case's isolate was not available at the time the WGS analysis was requested. In addition, the JEGX01.0021 isolate from the Montgomery County resident who was unable to be interviewed was included. Two *Salmonella* isolates with PFGE pattern JEGX01.0021 from Kansas residents outside of Montgomery and Chautauqua Counties that

were not part of the outbreak investigation were included in the WGS analysis; both were collected in February 2018, months before the El Pueblito outbreak was identified.

WGS showed that all eight outbreak cases were closely related. The clade differed by 0 to 2 alleles. The non-outbreak isolates were unrelated to the main clade and to each other, differing by over 14 alleles.

Environmental Assessment

The April 6, 2018 inspection of El Pueblito revealed 2 priority violations and no priority foundation violations. The priority violations were both related to handwashing. An employee did not wash hands between handling soiled and clean utensils, and an employee did not wash hands between handling raw chicken and plating a burrito. A potential for cross-contamination was also observed at the prep table used to store lettuce, tomatoes, shrimp, and shredded cheese—an employee touched the prep table handle after handling raw meat. No employees reported gastrointestinal illness from March 1 to April 6.

The 16 swabs that were collected from kitchen surfaces on April 17 tested negative for *Salmonella* on April 20.

Conclusions

This was an outbreak of *Salmonella* Enteritidis associated with eating at El Pueblito Mexican Restaurant in Coffeyville, Kansas. Persons with outbreak cases of salmonellosis ate food from the restaurant between March 4 and March 21, 2018 and became ill between March 6 and March 27, 2018. Eight of the cases' isolates were analyzed via WGS, and were determined to be closely related—this implies that they originated from a common source of contamination. No single ingredient or menu item was statistically associated with illness, and environmental sampling at the restaurant did not detect *Salmonella*.

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 deaths¹. 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 illness².

The median incubation period documented during this outbreak was 7 days. The incubation period for salmonellosis is typically listed as ranging from 6-72 hours, with most illnesses occurring within 12-36 hours.^{3,4} However, a study of Minnesota salmonellosis outbreaks showed that incubation periods are often longer, ranging from 12 to 96 hours. The study also documented incubation periods from 7 to 16 days.⁵

The source of *Salmonella* at the restaurant is unknown. Improper handwashing by food handlers and bare-hand contact with ready-to-eat foods, which was noted at the establishment during the environmental inspection, could have caused cross-contamination of multiple ingredients. Additionally, food handlers who are infected can contaminate food, even when they are not symptomatic⁶. Illness also could have been caused by an uncooked food item that was contaminated before it entered the restaurant (such as a produce item), or by a contaminated food item that was not properly cooked (such as chicken).

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 resolved⁷.

This investigation was limited by a small number of controls that were interviewed. Obtaining controls via credit card receipts from the restaurant or via a community telephone survey may have allowed the investigators to pinpoint a food item as the source of illness. Additionally, inaccuracies may exist in interviewees' food and symptom histories due to recall bias, particularly among those who had long incubation periods. One *Salmonella* isolate was not shipped to KHEL in time for its inclusion in the WGS analysis, which would have allowed all outbreak cases to be linked by WGS.

This outbreak investigation was aided by the cooperation and quick response of the local hospital, and by KDA and its laboratory in promptly inspecting the food establishment and performing environmental sampling and testing. The coordination of the Oklahoma Department of Health and its public health laboratory, KHEL, and CDC's PulseNet program allowed KDHE to identify all of the outbreak cases and confirm their relatedness via WGS.

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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.

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² CDC. Salmonella General Information. Accessed July 30, 2018:

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³ Barton Behravesh C and Griffin PM (2015) Salmonellosis. In Heymann DL (ed.). Control of Communicable Diseases Manual, 20th edn. Washington DC: American Public Health Association, pp. 532–538.

⁴ American Academy of Pediatrics (2015) Salmonella infections. In Kimberlin DW (ed.). 2015 Red Book: Report of the Committee of Infectious Diseases, 30th edn. Elk Grove Village, IL; American Academy of Pediatrics, pp. 695–702.

⁵ Eikmeier D, Medus C, Smith K. Incubation period for outbreak-associated, non-typhoidal salmonellosis cases, Minnesota, 2000–2015. *Epidemiology and Infection*
<https://doi.org/10.1017/S0950268818000079>

⁶ Medus C, Smith KE, Bender JB, Besser JM, Hedberg CW. *Salmonella* outbreaks in restaurants in Minnesota, 1995 through 2003: evaluation of the role of infected foodworkers. *J Food Prot* 2006;69:1870–8. <http://jfoodprotection.org/doi/pdf/10.4315/0362-028X-69.8.1870>

⁷ CDC. Salmonella Prevention. Accessed July 30, 2018:
<https://www.cdc.gov/salmonella/general/prevention.html>