

Salmonellosis Outbreak Associated with
Kansas State Fair Food Vendor – Reno
County, 2016



Background

On September 30, 2016 centralized *Salmonella* investigations conducted by the Kansas Department of Health and Environment's Infectious Disease Epidemiology and Response section (KDHE) identified an increase in salmonellosis among attendees of the Kansas State Fair in Reno County, Kansas. The Reno County Health Department and Kansas Department of Agriculture (KDA) were notified, and an outbreak investigation was initiated on September 30, 2016 to determine the cause and scope of the outbreak.

Methods

Epidemiologic Investigation

Persons with laboratory-confirmed *Salmonella* infection were interviewed with a standard hypothesis-generating questionnaire; a food vendor at the Kansas State Fair was identified as a common exposure among ill persons. A case-control study was conducted to determine exposures with statistical association with illness.

The implicated food vendor, owned by a non-profit organization, was contacted for a list of their membership for case finding and to obtain controls for the study. A case was defined as having illness consistent with salmonellosis in a person that reported eating from the vendor between the dates of September 8 through September 18, 2016. Confirmed cases had *Salmonella* Newport isolates with indistinguishable pulse-field gel electrophoresis (PFGE) patterns, and probable cases were symptomatic with diarrhea (three or more loose stools in a 24 hour periods) or had laboratory evidence of salmonellosis without PFGE. Controls were persons who reported eating food from the vendor who were not symptomatic. Five controls were randomly selected per case. Statistical analysis was conducted using SAS 9.3.

Thirty-eight *Salmonella* Newport cases with indistinguishable PFGE patterns similar to the Kansas cases were identified in other states by utilizing PulseNet, a national laboratory network that catalogs *Salmonella* PFGE patterns. The state health departments where the 38 persons with *Salmonella* infections were contacted to assess for travel to Kansas.

Laboratory Analysis

Seven stool specimens were cultured at state public health laboratories (Kansas Health and Environmental Laboratories and Missouri State Public Health Laboratory); one specimen was

cultured by a private lab. *Salmonella* isolates cultured at the state labs were serotyped and pulsed-field gel electrophoresis (PFGE) was performed.

Environmental Analysis

KDA had conducted an inspection of the vendor prior to the start of the fair on September 9, 2016. KDA’s inspection revealed four violations that were corrected during the inspection.

Results

Ninety-five individuals were interviewed; 7 were confirmed and 3 were probable cases. Ten cases and 50 controls were included in the case-control (1:5) study. Diarrhea was the most commonly reported symptom (Table 1). Onset of salmonellosis illnesses ranged from September 11 to September 16, 2016 (Figure 1).

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

<i>Clinical Information</i>	<i># Cases with Symptom</i>	<i># of Cases Reporting</i>	<i>% of Cases with Symptom</i>
Diarrhea	10	10	100
Abdominal Pain	9	10	90
Myalgia	8	10	80
Fever	8	10	80
Nausea	6	9	67
Bloody Diarrhea	2	8	25
Vomiting	2	10	20

In bivariate analysis, bean burritos (Odds Ratio (OR) = 5.0, 95% Confidence Interval (CI) = 0.91 – 26.9, p = 0.05), pork burritos (OR = 7.4, 95%CI = 1.65 – 33.1, p = 0.01), and queso crunch wrap (OR = 4.8, 95%CI = 1.04-22.0, p=0.06) were statistically associated with illness, Table 2. There was no reported travel to Kansas among the out-of-state *Salmonella* Newport cases with an indistinguishable PFGE pattern.

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

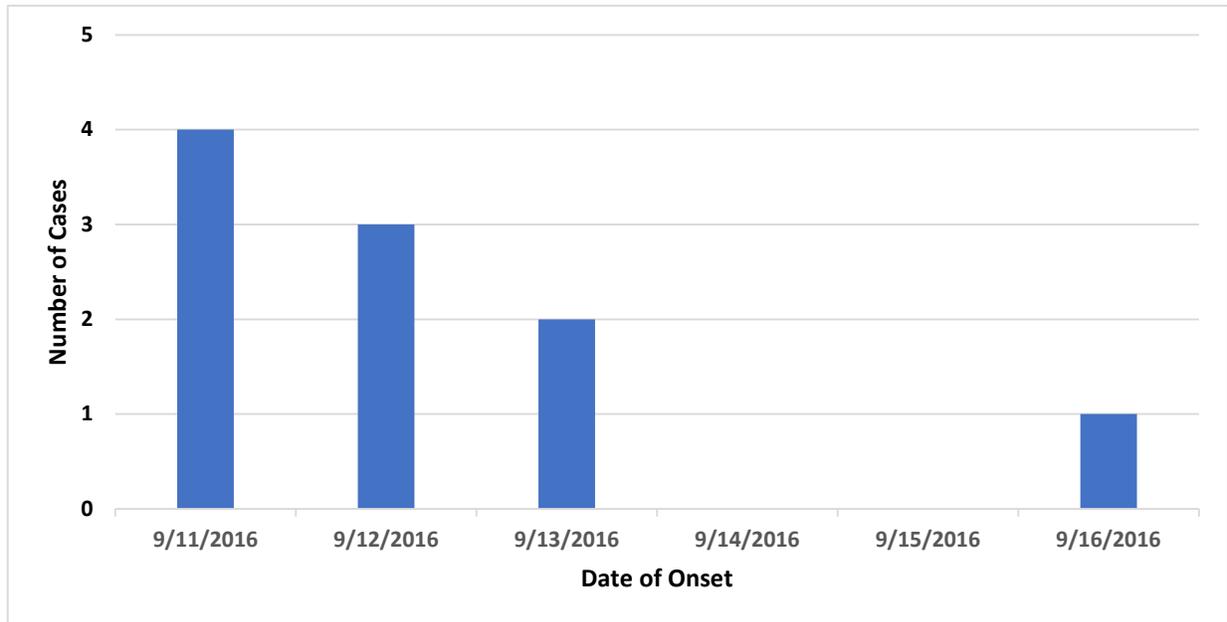


Table 2: Foods Associated with Illnesses

Menu Item	Odds Ratio (OR)	95% Confidence Interval
Bean Burritos	5.0	0.91-26.8
Pork Burritos	7.4	1.65-33.2
Queso Crunch Wrap	4.8	1.04-22.0

Laboratory Analysis

There were eight specimens that were positive for *Salmonella* Newport. Seven of the eight isolates had PFGE completed; each specimen had indistinguishable PFGE pattern (JJPX01.0030).

Traceback Assessment

Tomatoes, lettuce, and tortillas were found to be the common ingredients among the bean and pork burritos. KDA and the U.S. Food and Drug Administration (FDA) conducted a traceback on November 21, 2016 in an attempt to locate the producers. The investigation established the lettuce and tortillas each came from a mass producer; the tomatoes were from two smaller

producers. One tomato producer was located in Kansas; the other producer was located in Missouri. Completion of traceback did not reveal other sources for potential contamination.

Conclusions

This was an outbreak of *Salmonella* Newport infections associated with eating at a vendor at the Kansas State Fair in Hutchinson, KS. Persons that became ill ate food served by the vendor from September 9 through September 16, 2016. The outbreak was identified by KDHE through centralized investigations of reported *Salmonella* cases.

In this outbreak, the original source and vehicle of transmission of *Salmonella* is unknown. Bean burritos, pork burritos, and queso crunch wrap were statistically associated with illness. Common ingredients found among burritos were tomatoes, tortillas, and lettuce. From traceback analysis both the lettuce and tortillas were sent to multiple states. The tomatoes were grown locally and not distributed widely. There was no reported travel to Kansas among the out-of-state *Salmonella* Newport cases with PFGE pattern (JJPX01.0030).

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. 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 illness².

The investigation was limited due to possible recall bias because some persons were interviewed a month or more after their attendance at the fair. The investigation was aided by the KDA, and FDA.

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¹ Andrews WH, Jacobson A, and Hammack T. Bacteriological Analytical Manual, 9th Edition. Chapter 5. May 2014. Accessed on Sept. 15, 2014 at:

<http://www.fda.gov/Food/FoodScienceResearch/LaboratoryMethods/ucm2006949.htm>

² 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. Accessed on Sept. 15, 2014:

http://wwwnc.cdc.gov/eid/article/17/1/p1-1101_article