

**Outbreak of *Salmonella* Enteritidis Associated with the Acapulco Restaurant in --
Harvey County, June 2008**



Background

On Friday, June 13, 2008, the Harvey County Health Department (HCHD) notified the Office of Surveillance and Epidemiology (OSE) at the Kansas Department of Health and Environment (KDHE) that six cases of *Salmonella* had been reported by the medical center and a physician's office. This represented a significant increase in the number of cases of salmonellosis reported from Harvey County compared with previous years. Staff at HCHD interviewed the patients and discovered that most had eaten at the Acapulco Restaurant in Newton, KS prior to their onset of illness. HCHD in conjunction with KDHE began an outbreak investigation to determine the source of illness and to implement appropriate control and prevention measures.

Methods

Epidemiologic Investigation

Staff from local health departments in counties where case-patients resided conducted preliminary interviews to assess for common exposures among patients.

To determine if illness was associated with a specific food item, a case-control study was conducted among patrons who ate at the Acapulco Restaurant anytime from June 1 to June 10. The cases identified were enrolled in the case control study and were interviewed using a specific questionnaire that focused on ingredients used for the various food items served at the restaurant to identify what may have been associated with illness. Credit card receipts were requested from the owner. Well meal companions and those identified through credit card receipts were interviewed as controls.

A case was defined as a patron who dined at the Acapulco Restaurant anytime from June 1 until June 10 and subsequently became ill with vomiting or diarrhea (3 or more loose stools within a 24-hour period). A control was defined as a patron who dined at the Acapulco restaurant from June 1 to June 10 and did not develop any gastrointestinal symptoms after eating at the restaurant.

Descriptive analyses and univariate conditional logistic regression were performed in SAS 9.1.

Environmental Investigation

Staff from KDHE, Bureau of Consumer Health inspected the restaurant on June 17, 2008. Employee surveys were distributed to all employees to collect information regarding work history, food history, and illness information. A Hazard Analysis Critical Control Point (HACCP) inspection was conducted on July 9 and July 21, 2008. BCH-KDHE and Kansas Department of Agriculture (KDA) conducted a traceback of tomatoes that were delivered to the restaurant during this outbreak.

Laboratory Analysis

Salmonella isolates were submitted to Kansas Health and Environment Labs (KHEL) and to Missouri Department of Health and Senior Services, Public Health Laboratory for serotyping and PFGE analysis. Six isolates were sent to CDC for multiple loci VNTR Analysis (MLVA).

Results

Epidemiologic

Case Finding

A total of 61 individuals were interviewed. Thirty-one individuals reported illness (51%). Thirty case-patients were from five counties in Kansas and one case was a resident of Texas. Of those that reported illness, 26 were laboratory confirmed and 5 had symptoms consistent with salmonellosis, but were not

laboratory confirmed. Diarrhea and abdominal cramps were the most frequently reported symptoms followed by nausea, fever, muscle aches, bloody diarrhea, and headache (Table 1). Twenty-seven reported seeking medical care for their illness and four were hospitalized. Twenty-three of the cases were female (74%).

Table 1: Clinical Information

Symptoms	# with symptom / # of respondents (%)
Diarrhea	31/31 (100%)
Abdominal Cramps	28/30 (93%)
Nausea	25/30 (83%)
Fever	25/30 (83%)
Muscle Aches	19/27 (70%)
Bloody Diarrhea	12/28 (43%)
Headache	13/22 (59%)

Onset dates of illness ranged from June 5 to June 18 (Figure 1). The incubation period ranged from 1 day to 9 days with a median of 4 days. At the time of the interview, nine reported still being ill and time to recovery was reported for 11 individuals with dates that ranged from 1 day to 15 days with a median of 9 days. Dates of exposure to the restaurant ranged from June 2 to June 10 with a majority (68%) patrons reporting illness eating at the restaurant on 6/4/08 to 6/7/08 (Figure 2).

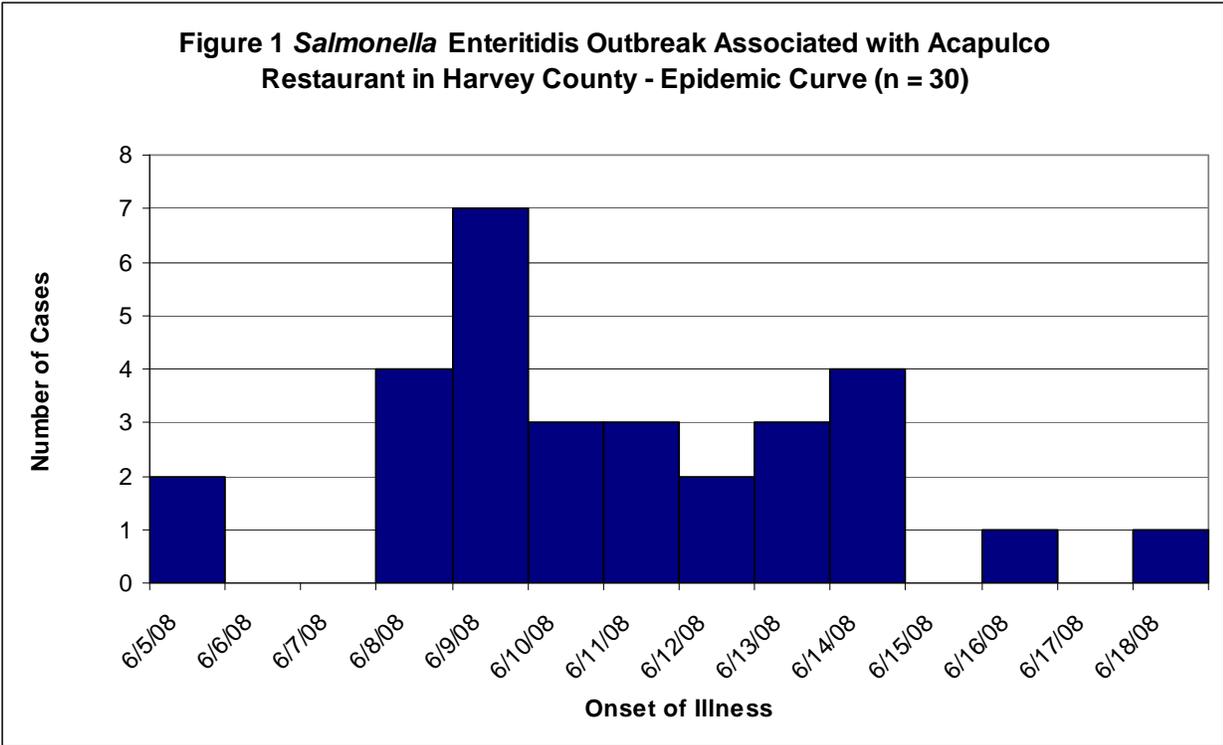
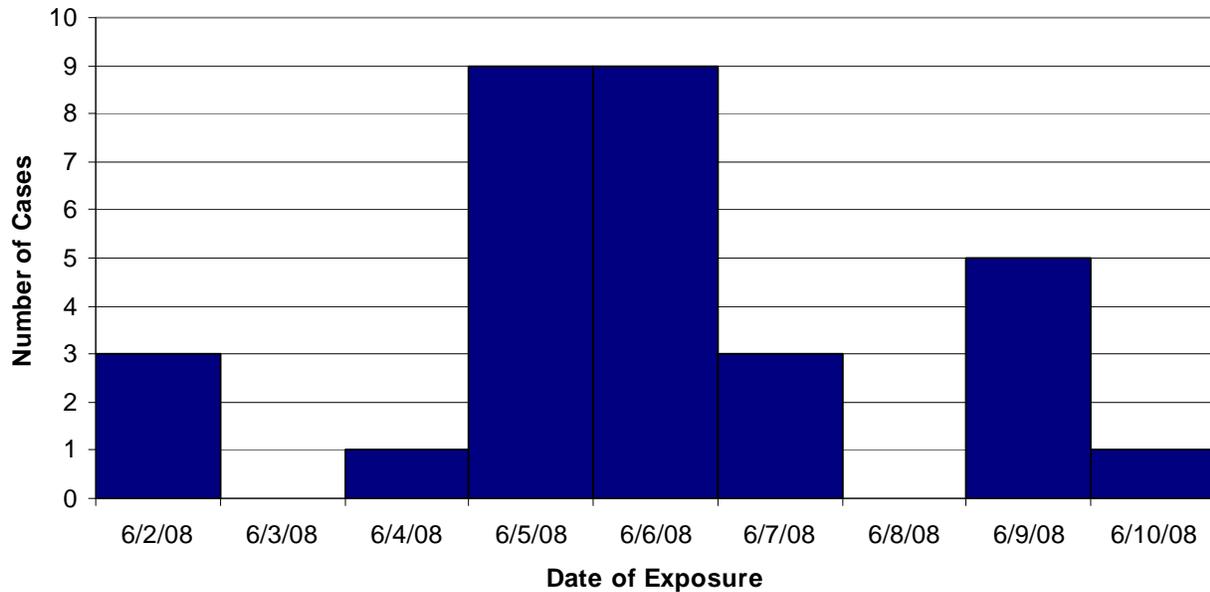


Figure 2 *Salmonella* Enteritidis Outbreak Associated with Acapulco Restaurant in Harvey County - Dates of Consumption (n=31)



Case Control Study

Twenty-eight individuals met the case definition and were available to be interviewed for the case control study. Thirty individuals met the control definition. The distribution of sex and age for both cases and controls included in the study are shown in Table 2.

Table 2 Characteristics of study population

	Cases (n=28)	Controls (n=30)	Total (n=58)
	No. (%)	No. (%)	No. (%)
Sex			
Female	21 (75)	17(57)	38 (65)
Male	7 (25)	13(43)	20 (34)
Age (yrs)			
Range	8 – 75	2 – 85	2 – 85
Median	42	40	42

Specific ingredients were analyzed for association with illness (Table 3). Of those consuming chicken, guacamole, or pico de gallo were all significantly associated with illness and consuming jalapenos approached statistical significance.

Table 3: Exposure Information

Ingredient	Odds Ratio	95% CI*	P value
Pork	0.45	0.13-1.56	0.21
Beef	1.05	0.37-2.98	0.93
Chicken	3.71	1.15-11.97	0.02
Refried Beans	0.76	0.27-2.15	0.61
Rice	0.86	0.30-2.45	0.78
Lettuce	1.75	0.56-5.47	0.34
Cheese	1.00	0.22-4.49	1.00
Jalapenos	6.00	0.65-55.66	0.08
Tomatoes	1.81	0.58-5.64	0.31
Onion	2.14	0.59-7.68	0.24
Sour Cream	1.41	0.41-4.92	0.59
Guacamole	4.68	1.52-14.40	0.006
Pico de Gallo	5.06	0.94-27.19	0.04
Chile Verde	0.72	0.24-2.23	0.58
Mild Salsa	0.41	0.09-1.82	0.23
Hot Salsa	1.21	0.43-3.45	0.72
Chips	0.46	0.04-5.43	0.54
Flour Tortillas	1.97	0.57-6.83	0.28
Corn Tortillas	1.12	0.39-3.23	0.84

* 95% CI = 95% Confidence Interval

In order to determine what food items consumed were truly associated with illness; the ingredients that were significant or were part of a dish that was statistically significant were modeled using logistic regression. In the model, consuming chicken, jalapenos, tomatoes (not in a sauce or dip), or onions were not significantly associated with illness. Guacamole and pico de gallo remained significant (Table 4). The ingredients in pico de gallo included fresh tomatoes, onion, and cilantro. The ingredients in the guacamole included avocado, fresh tomatoes, onions, salt, and garlic powder. The only common ingredients in the guacamole and pico de gallo were tomatoes and onions. Eating any tomatoes, which included fresh tomatoes, guacamole, or pico de gallo and eating any onions, which included fresh onions, mild salsa, hot salsa, guacamole, and pico de gallo were modeled to assess for significance. Only eating any tomatoes was still significantly associated with illness (Table 4).

Table 4: Results of the logistic regression

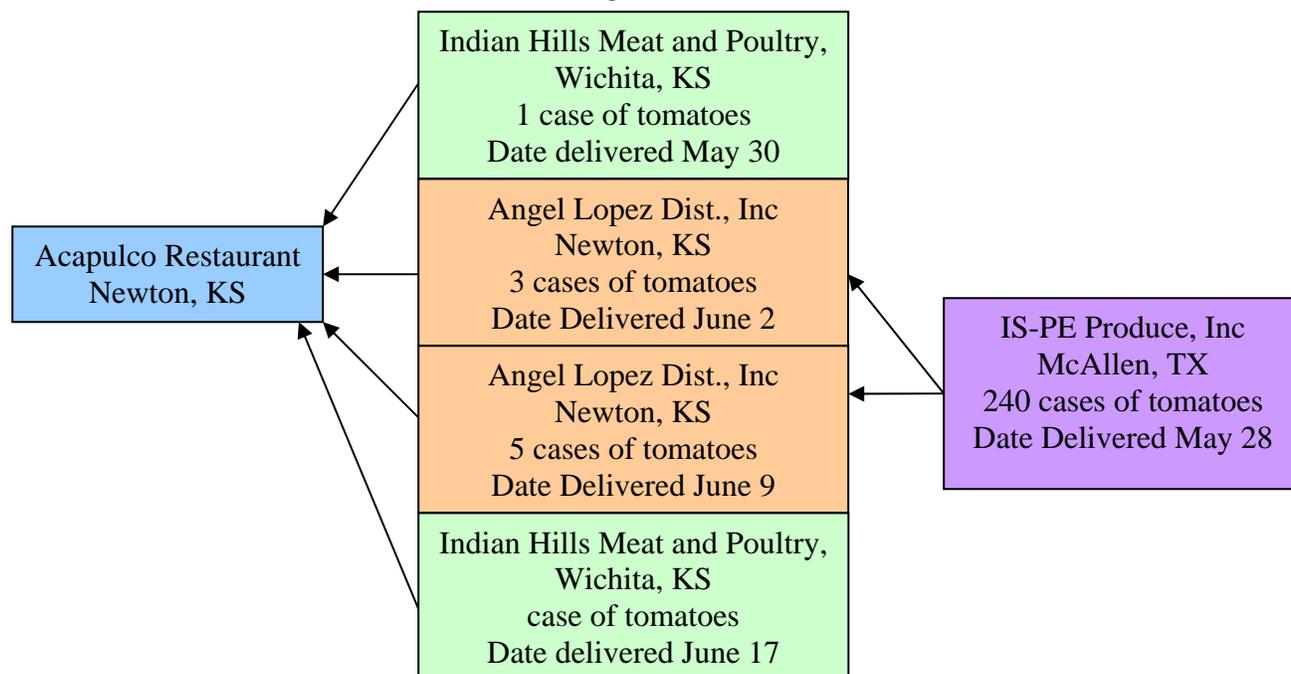
Ingredient	Odds Ratio	95% CI	P value
Guacamole	4.93	1.27-19.13	0.02
Pico de Gallo	8.67	1.38-54.39	0.02
Any Tomato	6.37	1.57-25.80	0.009

Environment

The food inspection was conducted on June 17, 2008 and four critical violations were noted, (1) Chicken and peppers were above the proper cold hold temperature (47°F), (2) Two products were held over 24 hours with no consume date indicated, (3) one hand washing violation, and (4) a food product not stored in an approved container. All violations were corrected at the time of the inspection. Of the sixteen employees who completed the employee questionnaire, only one employee reported gastrointestinal symptoms with onset of illness on June 13 well after the patrons started becoming ill. A HACCP (hazard

analysis and critical control point) inspection was conducted on July 9, 2008 to examine processes for the preparation of guacamole and pico de gallo. Both were prepared twice a day and at the same time as other kitchen activities include prepping and boiling raw chicken. In addition, bags of raw chicken were brought to the kitchen on a dumb waiter that was also used to transport boxes of tomatoes. To assess for the potential of cross contamination a follow-up inspection was conducted on July 21, 2008. During this inspection the transport and preparation of the chicken was monitored. Chicken was brought up and prepared either weekly or biweekly. Food that was brought up on the dumb waiter was either in a box or placed in a metal pan for transport. Nothing in the processes of transporting food to the kitchen or in the preparation of the pico de gallo and guacamole would indicate the possibility of ongoing cross contamination. Therefore, a traceback to the source of the tomatoes served at the restaurant was conducted by BCH-KDHE and KDA. There were two shipments of tomatoes that were delivered to the restaurant during this outbreak. On June 2, 3 cases and on June 9, five cases of bola tomatoes (red round) were delivered to the restaurant from Angel Lopez dist., Inc., Newton, KS. Prior to and after the outbreak the tomatoes were delivered by Indian Hills Meat and Poultry, Wichita, KS. Angel Lopez Dist., Inc received 240 cases of bola tomatoes on May 28 from IS-PE Produce in McAllen, Tx. This is the only shipment of tomatoes that correspond to the tomatoes received at the Acapulco Restaurant during the outbreak period (Figure 3). Of the 240 cases of tomatoes Angel Lopez Dist. Inc was only able to sell 92 cases (148 cases were discarded due to an FDA consumer alert during the *Salmonella* saintpaul multistate outbreak). Those 92 cases of tomatoes were delivered to 27 different restaurants in Kansas, Missouri, Nebraska, and Oklahoma including the Acapulco Restaurant in Newton, KS.

Figure 3



Laboratory

Salmonella enteritidis was isolated from twenty-five stool specimens and from one urine specimen. Pulse field gel electrophoresis (PFGE) was performed on all 25 isolates. Twenty-two isolates had matching Xbal patterns (JEGX01.0005) and three isolates differed from this primary Xbal pattern by one band (JEGX01.0030). Eighteen of the isolates (15 from the primary pattern JEGX01.0005 and 2 from the secondary pattern JEGX01.0030) were analyzed using Bln 1 and all were indistinguishable Bln1 patterns

(JEGA26.0004). Three isolates that had the JEGX01.0005 Xbal pattern and three isolates that had the JEGX01.0030 Xbal pattern were sent to CDC for MLVA testing. All 6 had indistinguishable MLVA patterns.

Discussion

This was an outbreak of *Salmonella* enteritidis associated with a Mexican restaurant. The epidemiologic and clinical data collected during the outbreak suggest a continual source outbreak. Statistical analysis revealed that eating pico de gallo or guacamole was significantly associated with illness. Analyzing the common ingredients of pico de gallo and guacamole, only the consumption of tomatoes was significantly associated with illness. We were unable to determine when the tomatoes could have become contaminated. During the initial HACCP inspection the processes for making the guacamole and pico de gallo were reviewed. In the follow-up inspection the processes for transporting and preparing chicken was assessed. During all three inspections at the restaurant the potential for cross contamination was never documented. It seems unlikely that cross contamination could have occurred on such a frequent or regular basis. To assess for the potential for produce that was contaminated prior to delivery to the restaurant a traceback of the tomatoes used and served during the outbreak was conducted. During this outbreak, the Acapulco Restaurant received two shipments of tomatoes from Angel Lopez Dist. which were distributed by IS-PE in McAllen, Texas. Both prior to and after the outbreak the restaurant received their tomatoes from a different distributor, Indian Hills Meat and Poultry, that bought their tomatoes from Mau-Fresh in Nogales, AZ. The facility in McAllen, Texas is a huge distribution center with many distribution companies operating in the same warehouse. Another company located in this warehouse was determined to be the source of jalapeno peppers that were implicated in the *Salmonella* saintpaul outbreak, which was occurring at the same time as this outbreak of *Salmonella* enteritidis. It is not inconceivable that the tomatoes served at the restaurant from June 2 – June 10 could have been contaminated in the field or at the distribution center. This outbreak was not ongoing and the last exposure occurred on June 10, 2008. This is only a few days following an announcement by FDA alerting consumers not to consume roma and red round tomatoes. This announcement could have hastened the end of this outbreak. Following this investigation, an outbreak of *Salmonella* enteritidis in New Mexico was reported. The patients also reported eating at a Mexican restaurant. In this outbreak, the PFGE patterns of the isolates from New Mexico matched both Xbal patterns (JEGX01.0030 and JEGX01.0005) and matched Bln1 pattern (JEGA26.0004) the same patterns found in the *Salmonella* enteritidis outbreak reported in Kansas. In addition, MLVA results for the New Mexico isolates were indistinguishable to the isolates from Kansas. However, no common link between the two outbreaks could be determined.

Contaminated produce eaten raw is an increasingly recognized vehicle for transmission of *Salmonella*ⁱ. Each year, approximately 36,000 laboratory-confirmed cases of *Salmonella* infection are reported in the United Statesⁱⁱ and in Kansas approximately 400 laboratory-confirmed cases of *Salmonella* are reported each year. *Salmonella* enteritidis is a very common serotype. However, in Kansas the outbreak strains of *Salmonella* enteritidis identified in this outbreak are not common. In 2007 of the 46 cases of *Salmonella* enteritidis reported only 4 (8.7%) matched one of the outbreak strains. Although when the tomatoes became contaminated, at the restaurant, during distribution, or in the field could not be definitively determined. Given the length of the exposure period during this outbreak, the frequency of the preparation of the guacamole and pico de gallo, and the lack of evidence of cross contamination in the restaurant it seems likely that contamination of the tomatoes occurred prior to delivery to the restaurant.

Reported by: Sheri Anderson (Kansas Department of Health and Environment)

Investigation by:

Harvey County Health Department

316 Oak Street

Newton, KS 67114

<http://www.harveycounty.com/health/health.html>

Sedgwick County Health Department

1900 East 9th Street

Wichita, KS 67214

<http://www.sedgwickcounty.org/healthdept/index.asp>

Kansas Department of Health and Environment

Bureau of Consumer Health

Food Safety and Consumer Protection

1000 SW Jackson Suite 330

Topeka, KS 66612

http://www.kdheks.gov/fpcs/food_protection.html

Kansas Department of Health & Environment

Office of Surveillance and Epidemiology

1000 SW Jackson St., Suite 210

Topeka, Kansas 66612

www.kdheks.gov/epi

ⁱ Sivapalasingam S, Friedman CR, Cohen L, Tauxe RV. Fresh produce: a growing cause of outbreaks of foodborne illness in the United States, 1973--1997. *J Food Prot* 2004;67:2342--53.

ⁱⁱ CDC. PHLIS surveillance data: *Salmonella* annual summary, 2005. Atlanta, GA: US Department of Health and Human Services, CDC; 2007. Available at <http://www.cdc.gov/ncidod/dbmd/phlisdata/salmonella.htm>.