

Foodborne Illness Outbreak Associated
with Tequilas Mexican Grill – Sherman
County, Kansas, 2015



Background

On September 30, 2015 at 11:17 am, the Kansas Department of Agriculture (KDA) notified the Kansas Department of Health and Environment's Infectious Disease Epidemiology and Response section in the Bureau of Public Health Informatics (KDHE) of two separate foodborne illness complaints. These complaints stated that six individuals from more than two different households consumed food prepared at Tequilas Mexican Grill (118 E. 17th St, Goodland, KS 67735) the last two weeks of September 2015 and subsequently experienced gastrointestinal illness. KDHE notified the Sherman County Health Department (SCHD) and an outbreak investigation was initiated at 11:35 am to determine the cause, scope of illness and appropriate measures for control and prevention.

Methods

Epidemiologic Investigation

A retrospective case control study was conducted to determine potential associations between illness and food items served at Tequilas Mexican Grill. SCHD conducted preliminary interviews with those who initially reported illnesses; through this process additional ill patrons were identified. The owner provided KDHE with a list of credit card receipts from September 15th through October 1st. KDHE identified 176 individuals who ate food on the same days that persons that experienced gastrointestinal illnesses had eaten. Through public records KDHE was able to obtain phone numbers for 96 (55%) of these persons. An in-depth, food specific, questionnaire was developed for use with phone or in-person interview. KDHE and SCHD initiated interviews with customers to identify cases and controls to obtain a study population.

For this investigation, a case was defined as diarrhea (three or more loose stools in a 24-hour period) in a person up to 24 hours after consuming food prepared at Tequilas Mexican Grill between September 15, 2015 and September 28, 2015. A control was defined as an individual who consumed food during this study period without experiencing any gastrointestinal illness.

A ratio of one case to two controls was obtained. Analysis was performed in SAS[®] 9.3 to determine if any food exposures were significantly associated with gastrointestinal illnesses.

Laboratory Analysis

No stool specimens were able to be collected during this outbreak. Food samples were submitted to a private laboratory for culture testing of *Clostridium perfringens* and *Bacillus cereus*.

Environmental Analysis

KDA inspected Tequilas Mexican Grill on September 21, 2015 to monitor staff hygiene practices, food holding temperatures and procedures for handling ready-to-eat fresh produce. A follow up

inspection was performed by KDA on October 1, 2015. At this time, KDA collected a sample of two food items, refried beans and chicken, found to be outside required holding temperatures for further analysis at Kansas Health Environmental Laboratories (KHEL). A final inspection of Tequilas was performed by KDA on October 12, 2015.

Results

Epidemiologic Investigation

There were 50 individuals interviewed by KDHE and SCHED during this investigation. Cases included individuals from Kansas, Colorado, Missouri and Nebraska. Of those, 16 (32%) persons met the case definition while 34 met the criteria for control.

The median age of persons who were cases was 52 years (range 4 to 67 years) while the median age persons who were controls was 38 years (range 4 to 63 years). Persons who were cases and controls were 50% male (Table 1).

Table 1: Characteristics of study population

	Cases (n=16) No. (%)	Controls (n=34) No. (%)	Total (n=50) No. (%)
Sex			
Female	8 (50%)	17 (50%)	25 (50%)
Male	8 (50%)	17 (50%)	25 (50%)
Age (years)	Cases (n=11*)	Controls (n=28*)	Total (n=39*)
Range	4 – 68	4 - 63	4 - 68
Median	52	38	40

*Age is unknown for 5 cases and 6 controls

All persons who were cases experienced diarrhea, with a majority also reporting stomach cramps and nausea. Other symptoms included headache, vomiting and muscle aches (Table 2). No one reported medical care from a physician or emergency department.

Onset of illness ranged from September 16 to September 28, 2015 (Figure 1). The incubation period ranged from 4 to 25 hours (median: 12 hours) (Figure 2). Duration of illness ranged from 1 to 7 days (median: 2 days); all individuals had recovered by time of interview.

Table 2: Symptoms reported among cases (n=16)

Clinical Information	# Cases with Symptom	# of Cases Reporting	% of Cases with Symptom
Diarrhea	16	16	100%
Stomach Cramps	14	16	88%
Nausea	10	16	63%
Headache	6	15	40%
Vomiting	6	16	38%
Muscle Aches	4	15	27%

Figure 1: Number of Persons Ill by Date: Outbreak Associated with Tequilas Mexican Grill – Sherman County, September 2015 (n=16)

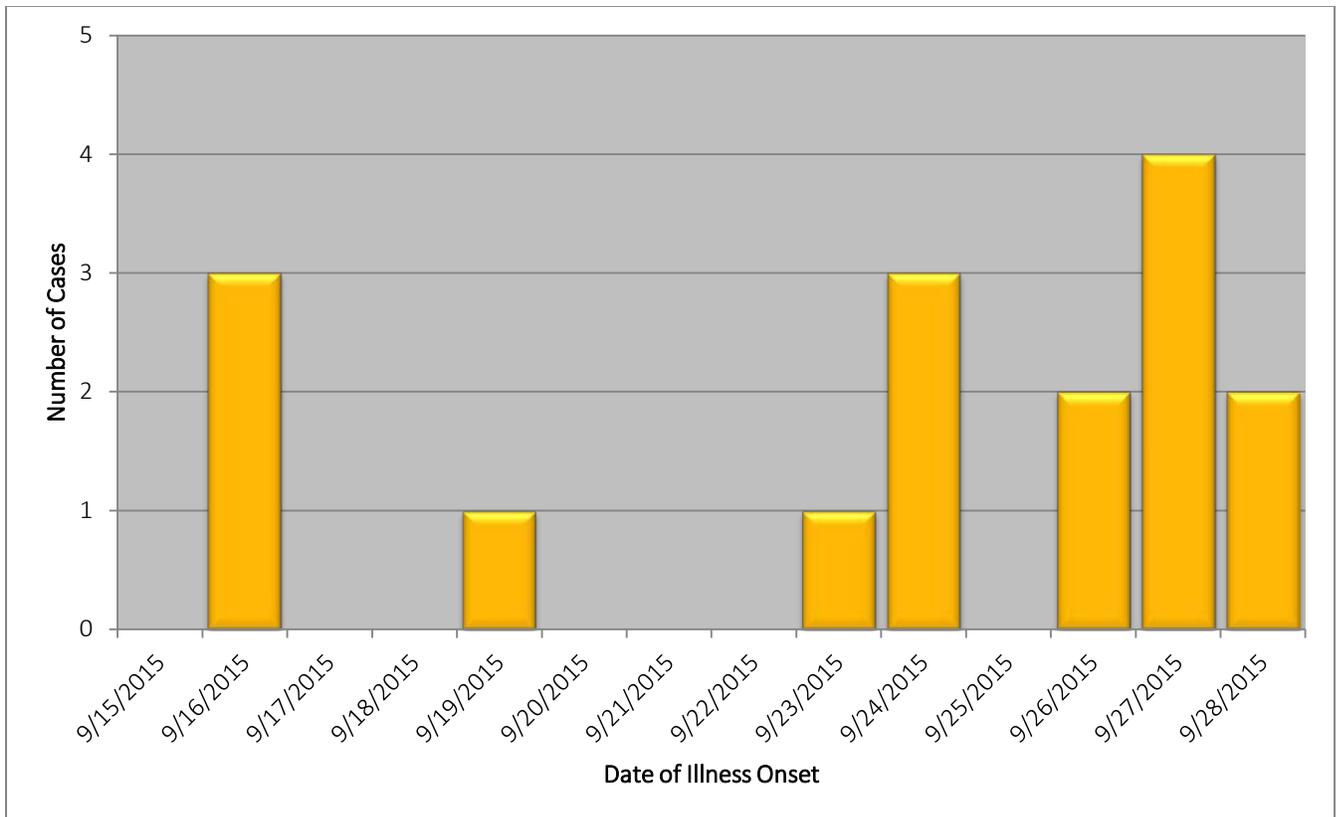
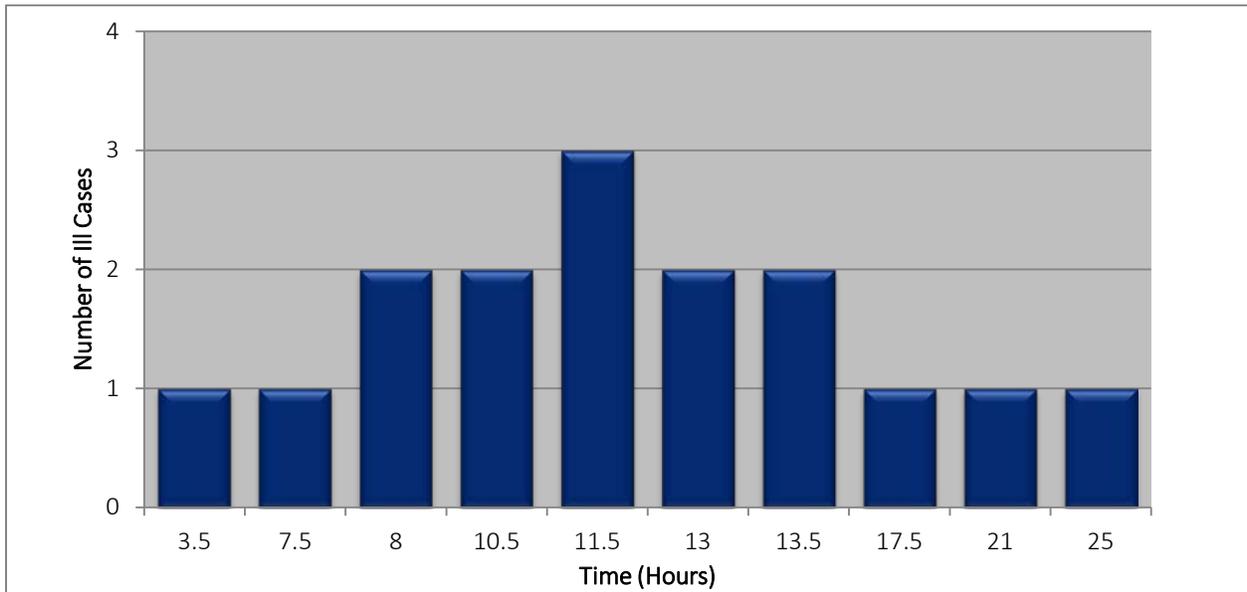


Figure 2: Incubation Time of Illness by Number of Cases: Outbreak Associated with Tequilas Mexican Grill – Sherman County, September 2015 (n=16)



Commonly consumed food items were analyzed for association with gastrointestinal illness. Odds ratio with associated p-value less than 0.05 and confidence interval not including one were considered statistically significant. Enchiladas, shredded cheese, refried beans and raw tomatoes were found to be statistically associated with illness (Table 3). Those who consumed refried beans or shredded cheese during this study period had approximately four times the odds of becoming ill compared to those who did not eat these food items. Additionally, those who consumed tomatoes or enchiladas had approximately 11 times the odds of becoming ill compared to those who did not eat these items.

Table 3: Exposure information

<i>Food</i>	<i>Odds Ratio</i>	<i>P-Value</i>	<i>95% Confidence Interval</i>
Burrito	2.80	0.13	0.73 – 11.00
Enchilada	11.00	0.02	1.10 – 108.00
Fajita	0.69	0.76	0.07 – 7.20
Hamburger	11.90	0.04	0.54 – 263.00
Nachos	2.20	0.58	0.13 – 38.00
Quesadilla	1.30	0.72	0.28 – 6.50
Taco	0.27	0.23	0.01 – 5.60
Chimichanga	0.16	0.11	0.01 – 3.10

Beef	2.10	0.24	0.62 – 6.90
Chicken	0.33	0.12	0.08 – 1.40
Sour Cream	1.30	0.70	0.38 – 4.20
Guacamole	1.40	0.53	0.05 – 42.00
Pico de Gallo	2.40	0.16	0.70 – 8.20
Shredded Cheese	4.90	0.02	1.30 – 18.00
Chips	0.94	0.96	0.08 – 11.00
Salsa	1.50	0.76	0.14 – 15.00
Rice	1.10	0.95	0.29 – 3.80
Lettuce	1.70	0.41	0.49 – 5.60
Tomatoes	10.00	<0.001	2.40 – 45.00
Refried Beans	3.80	0.04	1.02 – 14.00
Corn Tortillas	1.90	0.38	0.44 – 8.50
Flour Tortillas	1.60	0.43	0.49 – 5.40

Laboratory Analysis

No laboratory analysis could be performed due to lack of available stool specimens. However, on October 29th, the previously collected refried beans and chicken food samples were submitted to a private laboratory for culture testing of *Clostridium perfringens* and *Bacillus cereus*. Both chicken and refried beans tested positive for presence of *Bacillus cereus* at 130 and 260 colony forming units per gram, respectively.

Environmental Results

The initial inspection noted numerous food safety violations including possible cross contamination events and out of specification holding temperatures. The follow up inspection on October 1st revealed that holding temperatures for food items remained an issue. The final inspection by KDA revealed no violations and no additional follow up was required.

Conclusions/Discussion

This outbreak of suspected *Bacillus cereus* intoxication was associated with consumption of food prepared by Tequilas Mexican Grill in Goodland, Kansas between September 15 and September 28, 2015. Patrons became ill between 3.5 and 25 hours after ingestion. The symptoms, incubation period and duration of illness reported are consistent with *Bacillus cereus* intoxication. *Bacillus cereus* was detected in two food items collected from the restaurant but in lower levels than is thought to cause illness. However, refried beans and enchiladas (containing chicken) were significantly associated with illness. Tomatoes and

shredded cheese were also statistically associated with illness but were not tested. Tequilas Mexican Grill had violations including cross contamination between raw chicken and ready-to-eat foods such as lettuce and tomatoes, and improper holding temperatures for prepared food. These conditions could have led to the growth of *Bacillus cereus* in foods served leading to this outbreak.

Bacillus cereus is a Gram-positive rod bacterium able to produce spores and survive in aerobic and anaerobic environments.¹ Symptoms include diarrhea and abdominal cramps and typically occur 6 to 15 hours after consumption of contaminated food and persist for 24 hours. Additionally, nausea without vomiting is another hallmark of this type food poisoning.¹ Frequent sources of contamination include foods (particularly rice, sauces and soups) that have remained at room temperature for too long.² This outbreak was most likely caused by *Bacillus cereus* intoxication from foods that were not held at proper temperatures which could have allowed for growth of this microorganism causing an outbreak of gastrointestinal illnesses among patrons.

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¹<http://www.fda.gov/food/foodborneillnesscontaminants/causesofillnessbadbugbook/ucm070492.htm>

²<http://www.foodsafety.gov/poisoning/causes/bacteriaviruses/bcereus/>