

Salmonella Panama Outbreak at a Central Texas Picnic in June 2001

Salmonellosis is the most common bacterial foodborne illness. While just under 2,500 cases are reported each year in Texas, estimates indicate that as few as 1% of clinical cases are reported. On a Sunday morning in June 2001, the Infection Control Coordinator from a central Texas hospital reported to a Texas Department of Health regional office that by midafternoon approximately 30 people with gastrointestinal symptoms had presented to the emergency department of a local hospital. This report describes the TDH investigation that determined the source of illness as food contaminated with Salmonella Panama.

Salmonellosis is an acute bacterial illness that usually presents with sudden onset of headache, abdominal pain, diarrhea, nausea, and sometimes vomiting. Fever is almost always present; septicemia or focal infection may follow. Illness usually lasts for several days. Infected persons can be asymptomatic, even for months. Most ill persons recover without treatment. Fatalities are rare, and occur mainly in very young, very old, or immunocompromised individuals. Most infections result from ingestion of bacteria in food from infected animals or contaminated by feces of an infected animal or person. Meat and poultry are common vehicles, although almost any food item could harbor bacteria as a result of cross-contamination. Temperature abuse during preparation or holding of food allows for multiplication of bacteria to an infectious dose.

The patients presenting at the hospital had complaints of nausea, vomiting, diarrhea, fever up to 104°F, and abdominal cramps. All had eaten a picnic supper the previous evening at a local ranch. The menu included barbecue brisket, barbecue chicken, barbecue sauce, smoked sausage, corn on the cob, beans, potato salad, pasta salad, coleslaw, corn muffins, jalapeno peppers, pickles, onions, watermelon, bread, cup cakes, brownies, iced tea, and water.

Most of the food items had been delivered to the ranch's kitchen in bulk, ready to serve. Only the chicken (frozen), corn (frozen), and beans (dried) had been delivered uncooked. Once these foods were prepared, all the food items were placed in disposable, single-use serving containers. The food was transported to the riverside picnic site about a quarter of a mile away between 4:30 PM and 4:45 PM and served from 5:30 PM to 7:00 PM.

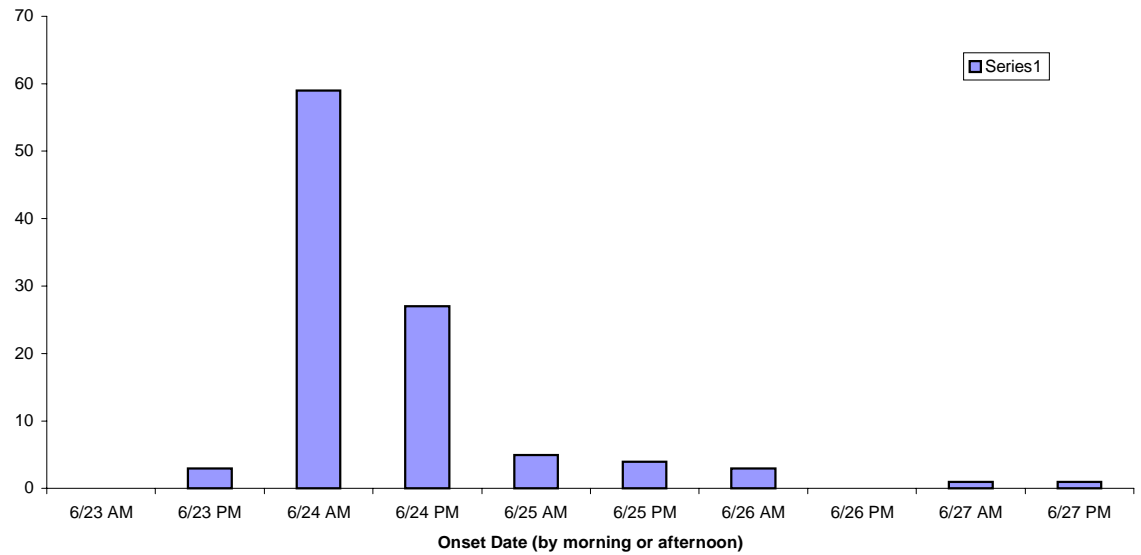
Methods

TDH Public Health Region 8 (PHR 8) staff contacted picnic attendees. According to ranch staff, 322 tickets were sold, but only 277 tickets were collected for meals eaten at the supper. Since children were provided meals without tickets, the exact number of persons who actually ate the meal was not available. Of the total supper attendees (or their proxies) and ranch staff, 237 (86%) were interviewed by telephone; 3-day food and recent illness histories were taken. Stool specimens were obtained from 26 attendees and 11 ranch employees who became ill. The samples were submitted either to the TDH Bureau of Laboratories or to a private laboratory, where they were tested for common enteric bacterial pathogens (eg, *Salmonella*, *Shigella*, *Campylobacter* spp.) and enteric viral pathogens.

On the Monday following the picnic supper, PHR 8 sanitarians inspected the ranch's kitchen and collected the following leftover food items: barbecue brisket, barbecue chicken, smoked sausage, corn-on-the-cob, potato salad, pasta salad, coleslaw, corn muffins, brownies, and water. These food samples were forwarded to the TDH Bureau of Laboratories for enteric pathogen and toxin testing.

About 2 weeks after the initial outbreak report, TDH staff made a follow-up visit to the ranch and performed a partial investigation of the food preparation and service areas. They also interviewed managers, food handlers, and servers from the restaurant to obtain additional information regarding food preparation, storage, and service as well as any illnesses they had experienced before, during, or after the meal.

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Figure 1. Illness Onset (by 12-Hour Intervals) Following Picnic**No. Case-patients****Results and Analysis**

Of the 237 interviewees, 215 reported having eaten the meal; 134 of those who ate the meal reported becoming ill with nausea, vomiting, diarrhea, fever, and/or cramps within 4 days of the picnic. The stool cultures from 1 employee and 24 dinner attendees were positive for *Salmonella enterica* serotype Panama.

Case Definition. A case-patient was one who ate the supper AND either 1) had a stool culture positive for *Salmonella* serotype Panama or 2) reported having any 3 of the most frequently reported symptoms: diarrhea (ie, 3 or more loose stools in a 24 hour period), fever, nausea, abdominal cramps, and vomiting.

About half of the individuals (100 [50.7%]) met the case definition; 2 were camp staff members. The mean age of patients was 34.8 years (median=31.5 years; range=2-75 years); 54% were males, and 46% were females. The vast majority

of case-patients experienced diarrhea, nausea, vomiting, cramps, and fever (Table 1).

The mean incubation time was 17.1 hours (median=16 hours; range=7-96 hours). (Incubation time was known for 103 of the case patients.) The epidemic curve of illness onset (by 12-hour intervals) is shown in Figure 1. The duration of illness was known for 53 of the case patients; among these patients, the mean duration of illness was 4.2 days (median=3 days; range=1-10 days).

The food item most strongly implicated as the cause of illness was the bean dish, with an odds ratio of 27.9 (95% confidence interval: 12.17-65.28). Other food items with statistically significant odds ratios were the barbecue chicken (2.20, 95% CI 1.22-3.95) and the barbecue sauce (1.86, 95% CI 1.02-3.40). The odds ratios for all of the items served at the picnic and culture results are shown in Table 2. *Salmonella enterica* serotype Panama was found in the chicken and the corn-on-the-cob. A variety of other, unidentified fecal coliforms were also found on the corn. The laboratory results for available foods are also shown in Table 2.

The TDH sanitarian who inspected the ranch's kitchen 2 days after the picnic found several violations of the Texas Food Establishment Rules. He noted that 1 of the warming ovens kept food at 135°F; a minimum temperature of 140°F is required. He also found a variety of

Table 1. Frequency of Symptoms

Symptom	No.	%
Diarrhea	105	96
Fever	98	90
Nausea	92	84
Abdominal cramps	91	83
Vomiting	66	61
Chills	61	56
Headache	58	53

n = 109

Continued

Table 2. Odds Ratios, Statistical Significance, and Laboratory Results for Food Items Served at the Picnic

Food Item	OR & Significance	Culture Results for <i>S. Panama</i>
Beans	27.9*	n/a
Jalapenos	2.3	n/a
Barbecue chicken	2.2*	(+)
Onions	2.1	(-)
Barbecue sauce	1.9*	n/a
Barbecue brisket	1.6	(-)
Smoked sausage	1.6	(-)
Potato salad	1.6	(-)
Pasta salad	1.6	(-)
Iced tea	1.6	n/a
Punch	1.6	n/a
Coleslaw	1.5	(-)
Corn muffin	1.5	(-)
Corn-on-the-cob	1.3	(+)
Ice	1.2	n/a
Soda	~ 1 ⁺	n/a
Brownies	0.9	(-)
Watermelon	0.8	n/a
Lemonade	0.8	n/a
Water	0.8	(-)
Other food items	0.7	n/a
Cupcakes	0.5	n/a

* Odds ratio statistically significant at the 95% confidence level

+ Exact odds ratio not calculated (One cell contained no entries.)

n/a Not available for testing

hand washing violations and an improperly calibrated thermometer. The TDH staff who visited the kitchen in July also found violations of the rules. These violations included raw meat stored in the same refrigerator and directly on top of milk containers, and an improperly calibrated oven thermometer.

Conclusions

The highly elevated and statistically significant odds ratio for the bean dish, and the statistically significant odds ratio and the finding of *Salmonella* serotype Panama in the chicken indicate that these 2 food items probably caused salmonellosis in attendees of the supper. Because the odds ratio was much higher for the beans than for any other food item, this may have been the only food that contained enough bacteria at the time of serving to cause illness. The chicken was the only meat item served at the supper that was delivered uncooked to the kitchen. Raw chicken is often contaminated with *Salmonella*. During the partial cooling or packaging process,

the cooked beans may have become contaminated (via hands or utensils) with bacteria from the uncooked or partially cooked chicken; subsequent storage below the required temperature easily could have fostered bacterial growth. Alternatively, an infected food handler may have inoculated either both food items or only one food item, and the other food item became inoculated by cross-contamination. The statistically significant odds ratio for the barbecue sauce likely occurred because most people who ate the chicken and the beans also ate the sauce; no *Salmonella* was found in the barbecue sauce. The bacteria in the corn probably did not cause any illness because the odds ratio for this food was low. The bacteria found on the corn likely got there during serving of the food and did not reach levels high enough to cause illness by the time guests ate their food.



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Recommendations for Preventing Foodborne Illness

Keep hands and surfaces clean.

Wash hands with hot, soapy water for at least 20 seconds before handling food and after using the bathroom, changing diapers, and handling pets.

Wash cutting boards, dishes, utensils, and counter tops with hot, soapy water after preparing each food item and before preparing another food item.

Prevent cross-contamination.

Keep raw meat, poultry, and seafood separate from other foods.

Use a different cutting board for meat, poultry, and seafood items, if possible.

Wash hands, cutting boards, dishes, utensils, and counter tops with hot, soapy water after contact with raw meat, poultry, or seafood.

Do not place cooked food on a plate that held raw meat, poultry, or seafood.

Cook food to proper temperatures.

Check internal temperatures of food to make sure they are fully cooked.

Whole cuts of beef: 145°F

Ground beef: 160°F

Whole poultry: 180°F

Poultry breasts and roasts: 170°F

All cuts of pork: 160°F

Do not eat meat that is pink inside unless the internal temperature has been checked.

Fish should be cooked until it is opaque and flakes easily.

Refrigerate food promptly.

Refrigerate or freeze perishable foods, prepared foods, and leftovers within 2 hours of preparation.

Don't defrost food at room temperature—thaw it in the refrigerator, under running water, or in the microwave.

Refrigerator temperature should be no higher than 40°F, and freezer temperature should be no higher than 0°F.

Proper handwashing is the single most effective measure for preventing the spread of foodborne illnesses.