

Outbreak of *Salmonella infantis* Associated with a Wedding Reception Washaw County, June 2002

I. SUMMARY

An outbreak of *Salmonella infantis* associated with a wedding reception occurred in Washaw County in June 2004. Approximately 300 persons attended the wedding reception. Fifty-one persons were interviewed: 25 were ill and met the case definition; 3 were ill but did not meet the case definition. Ten outbreak-related cases had stool specimens confirmed positive for *Salmonella infantis*. Three of the confirmed cases were hospitalized (12% hospitalization rate), one in serious condition; no one died. A case-control study was conducted and 23 well guests identified during interviews served as controls. Two foods, turkey and potato salad, were determined to be statistically significantly associated with illness.

The common signs and symptoms included: diarrhea (100%), cramps (84%), nausea (52%), fever (52%), chills (44%), and headache (36%). The median date of onset was June 2, 2002 between noon and 6:00 p.m. The mean incubation period was 23 hours, with a range of 6 to 63 hours. The mean duration of illness was five days; and the mean duration of hospitalization was 3 days.

Control measures were implemented at the caterer's facility, the site of the reception, and a local grocery store, including: proper food handling techniques, personal hygiene, and exclusion of persons with gastrointestinal illness from sensitive occupations. All persons contacted were educated about the disease and alerted to contact their physician if they became ill. It was recommended that the caterer stop the catering business until an alternative supply of clean water was established.

II. INTRODUCTION

On Friday, June 7, 2002, the Washaw County Health Department (WCHD) received a call from a person who had attended a wedding reception on June 1, 2002 in Washaw County and became ill soon afterward. The caller indicated other attendees were also ill. WCHD initiated an investigation on June 7, 2002.

This outbreak report is submitted by Florence N. Gale, Administrator, Washaw County Health Department.

III. BACKGROUND

Washaw County is located in the Southwest Region of Missouri and has a population of 97,864. While much of Washaw County is rural, there are several townships in addition to the county seat, Hammerville, which has a population of 46,352. There are many retail establishments in Hammerville. There is also a small industrial park and large grain mill located a few miles to the south. The industrial park is fairly new and has enticed some of the younger generation to stay in the area instead of moving to Smallville, in a neighboring county. Some of the newer retail establishments cater to this younger set and the "face" of Hammerville appears to be in the midst of a makeover.

IV. METHODS

The person who made the initial report to the WCHD provided the names and phone numbers for the other ill persons he knew, as well as for the bride's parents. All of these people were contacted immediately. The WCHD outbreak investigation team was activated.

The WCHD contacted the local hospital and physicians' offices to find out if they had seen any additional cases. The WCHD also consulted with the Southwest Regional Communicable Disease Coordinator of the Missouri Department of Health and Senior Services, who searched DHSS records for similar cases in the surrounding area.

The hospital laboratory director reported that they had recently sent five *Salmonella* isolates from stool cultures to the State Public Health Laboratory (SPHL) for additional testing. On Monday, June 10, 2002, the SPHL reported that the five isolates were all *Salmonella infantis*. One of these patients was the caller who attended the wedding. The others were contacted and all had also attended the wedding.

The bride's mother reported that there were three meals associated with the wedding celebration:

May 31, 2002	Rehearsal Dinner
June 01, 2002	Bridal Brunch (morning)
June 01, 2002	Wedding Reception (7:00 p.m.)

The bridal brunch was held at a private residence, and was attended by 12 women. The rehearsal dinner and the wedding reception were catered by a local catering firm and held at a convention center. The catering firm is operated out of a home with a separate kitchen devoted to the business. About 30 people attended the rehearsal dinner and 300 attended the wedding reception. All of the first five identified cases attended the reception, but only one was at the rehearsal dinner, and none attended the bridal brunch.

The tentative hypothesis used to plan the investigation was: This is an outbreak of *Salmonella infantis* caused by the ingestion of contaminated foods (or beverages) served at the wedding reception on June 1.

Until it could be determined otherwise, however, anyone attending any of the wedding activities was considered to be at risk. The initial case definition included anyone who participated in any activities related to the wedding and subsequently developed signs or symptoms of acute gastroenteritis (diarrhea, nausea, vomiting, fever, abdominal cramping), or who was culture-positive for *Salmonella infantis*.

WCHD staff conducted the investigation with guidance from the Southwest Regional Communicable Disease Coordinator. A list of food and beverages served at the wedding reception was obtained along with a guest list.

Because of limited resources, it was decided to conduct a case-control study, rather than try to interview all attendees. Interview questions were developed and an investigation questionnaire was designed. The questionnaire included demographic information, wedding-related events attended,

onset time, symptoms, testing and treatment information, and a food history for 72 hours prior to the day of onset of illness, or 72 hours prior to June 2 for those who were not ill. A checklist of all menu items served at the wedding reception was included in the food history. A standardized questionnaire format from the International Association of Milk, Food and Environmental Sanitarians (IAMFES) was used, to the extent possible.

The case-control study began on June 12, 2002. A total of 28 ill persons were interviewed, along with a comparison group of 23 well persons. These were people who had also attended the wedding reception and were identified during interviews with the ill persons.

Ill persons were asked to submit a stool specimen to the WCHD in a standard State Public Health Laboratory (SPHL) Enteric Specimen collection kit containing Cary-Blair media. The SPHL performed cultures and serotyped the isolates using standard procedures for enteric organisms. A total of 15 stool specimens were collected and analyzed.

An environmental investigation was conducted by the environmental public health specialist serving Washaw County, using guidelines in the 1999 state food code, and included: evaluating suppliers' products, inspecting and reviewing the catering operation and their food storage and handling procedures, interviewing the catering facility staff, and determining whether any of the food handlers at the various facilities had gastrointestinal illnesses.

RESULTS

Case finding activities identified 28 ill persons associated with the wedding reception. No other cases of *Salmonella* Infantis had been reported in the Southwest Region in all of 2002.

The following case definition was used to analyze the data: An outbreak-related case is anyone who attended or who was otherwise associated with the wedding reception and subsequently developed diarrhea, or two of the following symptoms: cramps, nausea, fever, chills, or headache, or who was culture positive for *Salmonella infantis*. There were 25 ill persons who met this case definition.

The most common signs and symptoms reported by the cases were diarrhea (100%), cramps (84%), nausea (52%), fever (52%), chills (44%), and headache (36%). There were 24 cases who reported onset times. The mean incubation period was 23 hours; the range was 6 to 63 hours (see histogram).

Ten stool specimens from persons related to the outbreak were confirmed positive for *Salmonella infantis*. The earliest specimen was collected on 6/4/02 and the last one on 7/2/02. No other enteric pathogens were isolated.

Fifty-one persons were interviewed for the case-control study, all of whom ate at the reception. This included the 25 ill persons who met the case definition (cases) and 23 well controls. Three other ill people who were interviewed did not meet the case definition and so were excluded from the analysis. All persons interviewed were over 18 years old. The mean age of the cases was 36 and the mean age of the controls was 29.

The reception menu consisted of: turkey, ham, roast beef, potato salad, pasta salad, raw vegetables and dip, raw fruit and sauce, chips, bread, condiments, a variety of cakes, iced tea, soda and beer. Epi Info software was used to analyze the data. Two-by-two tables were constructed for each menu item served at the wedding reception. Two foods were found to be statistically significantly associated with illness: the turkey and the potato salad.

Food Item	Odds Ratio	95% Confidence Interval	Uncorrected “p” Value
Turkey	5.45	1.19 – 26.99	0.01
Potato Salad	5.2	1.22 – 23.52	0.01

No food remained for testing. On June 10, 2002, the convention center in which the reception was held was inspected and revealed the following:

- The tables used for serving food had no cold holding capacity.
- Serving tables were not provided with sneeze shields.
- The kitchen area was adequately equipped and clean.

The inspection and evaluation of the caterer’s facility on June 10 revealed the following:

- Food handling equipment appeared to be in good working order.
- The operation did not have a three-vat sink for proper dishwashing.
- All foods served at the wedding reception were to be served cold.
- The caterer received uncooked boneless turkey breasts at approximately 10:00 p.m., Wednesday, May 29. They were delivered frozen by the bride’s family from Smallville, individually vacuum packaged. The caterer immediately placed the breasts in a tub of water. The caterer could not remember if the breasts were placed in refrigeration or left on the counter at room temperature to thaw. The thawed breasts were cooked in the original vacuum packaging Thursday afternoon, May 30, to a temperature of 170°F using a meat thermometer to check cooking temperature. They were removed from the electric roaster oven and cooled at room temperature for 1½ to 2 hours. The breasts were then placed in refrigeration. They were sliced at the caterer’s on a commercial meat slicer Friday afternoon, May 31. Old food debris was found on the slicer on June 10, the day of inspection.
- The potato salad was prepared on Thursday, May 30, at the caterer’s with the following ingredients: potatoes, Miracle Whip salad dressing, mustard, commercially prepared pickle relish, celery, sugar, salt and pepper.
- The pasta salad was prepared at the caterer’s on Thursday, May 30, with the following ingredients: commercially prepackaged noodles, oil, vinegar and mustard.
- Pre-cooked boneless hams were served, which were shaved and packaged at two large grocery stores in a nearby town. Unannounced visits to both stores on June 11, 2002 revealed that the hams were sliced in the meat cutting departments. Only a single meat slicer was present in each meat department. During the day, raw and cooked products were being sliced. The meat slicers were not thoroughly cleaned and sanitized between the slicing of raw and cooked products. Raw beef particles were present on both slicers at the time of inspection. The ambient air temperatures in the meat cutting rooms were in the mid to upper 70s.

- Pre-cooked Hormel brand roast beef was sliced and packaged at a grocery in a small town in the southern part of the county. The roast beef was picked up the morning of the dinner and delivered in coolers to the convention center where the dinner was served. A visit to the grocery on June 11, 2002, revealed the following: The meat slicer was used only for precooked prepackaged deli meats. The meat slicer was clean. The walk-in meat cooler used for storage was 40°F and also clean.

On June 10, 2002, a sample of the water supply at the catering establishment was obtained and analyzed based on Department of Health and Senior Services standards for drinking water. The water was determined to be unsatisfactory, with bacteria too numerous to count with coliforms. It was also noted that the well that supplies the water was located within 50 feet of a hog lot.

ANALYSIS

Ten of the 25 cases, from throughout the period of the outbreak, were laboratory confirmed for *Salmonella infantis* and the others had compatible signs and symptoms. Almost certainly all of the cases had the same disease: salmonellosis due to infection with *Salmonella infantis*. The distribution of the cases is consistent with a common exposure at the wedding reception. The usual incubation period of salmonellosis is 12 to 36 hours, and the minimum and maximum are 6 and 72 hours. The wedding reception started at 7:00 p.m. The time frames of the cases' onsets of illness all fit within the expected incubation period if the exposure occurred at the wedding reception (see histogram).

Two foods served at the wedding reception were significantly associated with illness—the turkey and the potato salad. No other organisms were identified and other than the wedding reception, no other opportunity existed for common exposure. In addition, the environmental assessment found several deficiencies that could have allowed contamination and replication of the pathogen in the implicated foods.

Enough information was obtained to test and evaluate the initial hypothesis and to accept it: This is an outbreak of *Salmonella infantis* caused by the ingestion of contaminated foods (or beverages) served at the wedding reception on June 1.

One person with a stool specimen positive for *Salmonella infantis* did not meet the case definition and was excluded from the analysis. She was the mother of the bride (who did not handle the food). Her symptoms started on 5/31/02 (the day before the wedding) and therefore she did not meet the definition. It is possible that she had “nervous diarrhea” before the wedding, and her *Salmonella* infection actually began later. Sadly, the bride and groom were also reported to be ill. They were not included in the study because they had left on their honeymoon anyway.

CONTROL MEASURES

The environmental public health specialist assured that all food handlers were educated about the importance of proper food handling techniques, including: hand washing before, during and after food preparation; proper refrigeration of uncooked and cooked foods; thorough cooking of all foodstuffs derived from animal sources; avoiding recontamination within the kitchen after cooking is completed; and maintaining a sanitary kitchen.

The interviewers educated all persons (ill and well) about *Salmonella* and proper hand washing and hygiene measures. All well persons were alerted to contact their physicians if they became ill.

Wedding reception guests and their family members with gastrointestinal illness were excluded from food handling positions and from care of hospitalized patients, the elderly, and children (including working in child care centers) until their illness was over.

The caterer was informed that her water supply was contaminated and asked to stop the catering business until an alternative supply of clean water was established. Follow up visits were made by WCHD to confirm compliance.

Control measures were considered to be effective because more than two incubation periods passed without any new cases identified.

RECOMMENDATIONS

In order to prevent future outbreaks, WCHD has implemented new inspection guidelines for catering facilities, including a timetable for inspections. Previously, catering facilities had not been inspected on a regular basis.

A closer relationship was established with several of the local physicians and the hospital during this outbreak. Three of the physicians and the hospital have agreed to participate in the WCHD active surveillance system. They have also developed a better understanding of the importance of reporting unusual occurrences of illness to the WCHD.

The WCHD will be reviewing their emergency preparedness protocol. They are looking to the future and want to partner with neighboring counties so that all may be better prepared for possible future emergency or outbreak situations.

OTHER OUTCOMES

One of the hospitalized persons continues to excrete the *Salmonella infantis* organism and has been excluded from working in the childcare center where she was previously employed. This has caused financial problems for her family.

Word travels fast in Washaw County and the caterer's business has dropped sharply after the outbreak. So much so, that she is considering another line of employment.

In addition to the immediate health effects and economic impacts, this outbreak of *Salmonella infantis* will have a lasting impact because it happened at a wedding reception. Many of the wedding party were ill, including both the bride and groom who were sick on their honeymoon. They will have lasting memories and the stories of this day will always be interesting!