

MINNESOTA DEPARTMENT OF HEALTH 2002 GASTROENTERITIS OUTBREAK SUMMARY

Foodborne Outbreaks
Waterborne Outbreaks
Non-Foodborne, Non-Waterborne Outbreaks
Foodborne Illness Complaints
Foodborne Disease Outbreak Investigation Guidelines



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**Minnesota Department of Health
2002 Gastroenteritis Outbreak Summary**

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**MINNESOTA DEPARTMENT OF HEALTH
2002 GASTROENTERITIS OUTBREAK SUMMARY**

DEFINITIONS:

CONFIRMED FOODBORNE OUTBREAKS

A confirmed foodborne disease outbreak is defined as an incident in which two or more persons experience a similar illness after ingestion of a common food or meal and epidemiologic evaluation implicates the meal or food as the source of illness. Confirmed outbreaks may or may not be laboratory-confirmed.

Confirmed outbreaks may be classified as:

1. Laboratory-Confirmed Agent: Outbreaks in which laboratory evidence of a specific etiologic agent is obtained.
2. Epidemiologically Defined Agent: Outbreaks in which the clinical and epidemiologic evidence defines a likely agent, but laboratory confirmation is not obtained.
3. Outbreak of Undetermined Etiology: Outbreaks in which laboratory confirmation is not obtained and clinical and epidemiologic evidence cannot define a likely agent.

PROBABLE FOODBORNE OUTBREAKS

A probable foodborne disease outbreak is defined as an incident in which two or more persons experience a similar illness after ingestion of a common food or meal, and a specific food or meal is suspected, but person-to-person transmission or other exposures cannot be ruled out.

CONFIRMED AND PROBABLE WATERBORNE OUTBREAKS

Similar to foodborne outbreaks, except epidemiologic analysis implicates water as the source of illness. Waterborne outbreaks may be associated with drinking water or with recreational water.

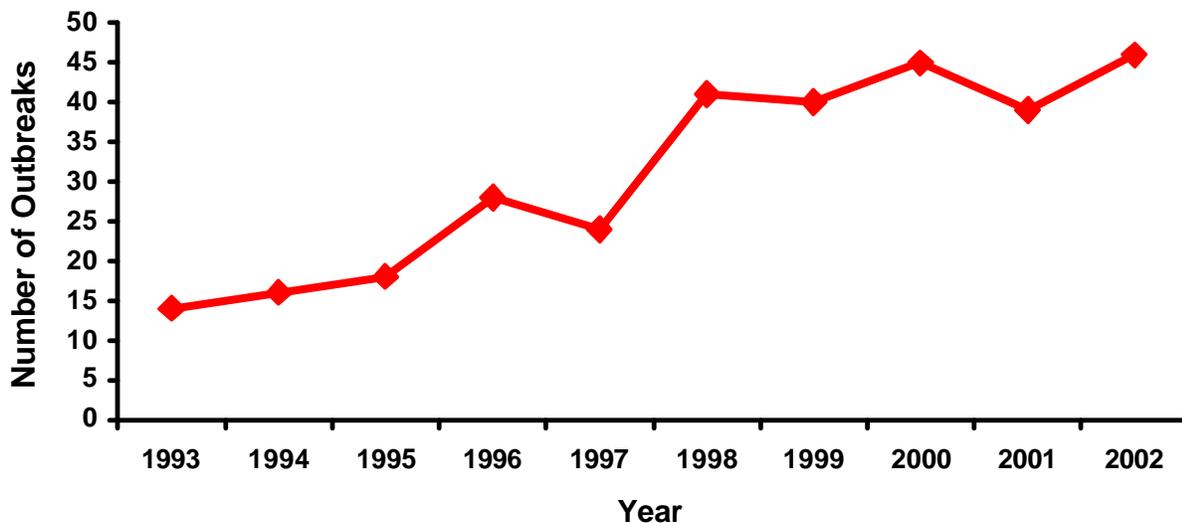
CONFIRMED AND PROBABLE NON-FOODBORNE, NON-WATERBORNE OUTBREAKS

Non-foodborne, non-waterborne outbreaks are defined as two or more cases of illness related by time and place in which an epidemiologic evaluation suggests either person-to-person transmission occurred or a vehicle other than food or water (e.g., animal contact) is identified.

Summary

In 2002, the Minnesota Department of Health (MDH) Acute Disease Investigation and Control Section identified a total of 124 outbreaks of gastroenteritis involving at least 3,823 cases of illness. The 124 outbreaks were classified as follows (see page 1 for definitions): 46 confirmed foodborne outbreaks, 16 probable foodborne outbreaks, five confirmed waterborne outbreaks, and 57 non-foodborne, non-waterborne gastroenteritis outbreaks. During the past 10 years, the median number of confirmed foodborne outbreaks identified per year was 34 (range, 14 to 46). However, during the past 5 years, the median number of confirmed foodborne outbreaks identified per year was 41 (range, 39 to 46).

Number of Confirmed Foodborne Outbreaks Per Year, Minnesota, 1993-2002



One factor that may have contributed to the rising number of identified outbreaks over time is enhanced surveillance for outbreaks. In 1998, the toll-free MDH Foodborne Illness Hotline was implemented. In 2002, 12 (26%) of the 46 confirmed foodborne outbreaks were initially reported to MDH via the hotline.

The median number of cases of illness identified per confirmed foodborne outbreak in 2002 was nine (range, two to 76).

Of the 46 confirmed foodborne outbreaks, 31 (67%) were either laboratory-confirmed (n=25) or epidemiologically defined (n=6) outbreaks of norovirus gastroenteritis (in 2002, the International Committee on Taxonomy of Viruses renamed Norwalk-like virus “norovirus”). Seven (15%) of the confirmed foodborne outbreaks were due to the following bacterial pathogens: *Salmonella* (n=4), *E. coli* O157:H7 (n=2), and *Campylobacter* (n=1). There were seven outbreaks of foodborne intoxications (caused by *Clostridium perfringens*, *Bacillus cereus*, or *Staphylococcus aureus*). One outbreak was caused by astrovirus.

The importance of norovirus as a cause of foodborne disease outbreaks in 2002 continues a pattern that has been observed for over two decades in Minnesota. During 1981-2002, 223 (48%) of 465 confirmed outbreaks of foodborne disease were due to norovirus, while 97 (21%) confirmed foodborne outbreaks were caused by infectious bacterial pathogens such as *Salmonella* and *E. coli* O157. Therefore, over this 22-year period the combined number of foodborne outbreaks due to infectious bacterial agents was less than half the number of foodborne outbreaks due to norovirus. A study by the Centers for Disease Control and Prevention found that norovirus was detected in 93% of outbreaks of nonbacterial gastroenteritis.¹

Many outbreaks of norovirus are due to ill food workers handling ready-to-eat food items such as salads and sandwiches in restaurant or catering settings. In 2002, 27 (87%) of the 31 confirmed foodborne outbreaks of norovirus occurred in restaurants or at catered events. Ill food workers or food workers with ill household members were implicated in 12 (44%) of these 27 outbreaks. Prevention of further disease transmission during these outbreaks is accomplished by emphasizing good handwashing procedures, minimizing bare-hand contact with ready-to-eat food items, and excluding ill employees from work until 72 hours after recovery.

There were four confirmed foodborne outbreaks due to *Salmonella* in 2002; three of the four were associated with restaurants. The causes of restaurant outbreaks of salmonellosis are often complex and can involve consumption of undercooked foods of animal origin, infected foodhandlers, cross-contamination between raw and ready-to-eat foods, and inadequate cooking, hot holding, cooling, and reheating of multiple food items.

All five of the confirmed waterborne outbreaks that occurred in 2002 were associated with recreational swimming. There were three outbreaks of cryptosporidiosis associated with swimming pools; *Cryptosporidium* has a high level of resistance to chlorination. There were also two outbreaks of norovirus gastroenteritis associated with recreational swimming.

There were 57 non-foodborne, non-waterborne outbreaks of gastroenteritis identified in 2002. Three of these outbreaks were associated with exposure to livestock. However, the majority of outbreaks in the non-foodborne, non-waterborne category were associated with person-to-person transmission of enteric pathogens in daycares, schools, nursing homes, and other facilities. The end of the year saw a striking increase in the number of person-to-person outbreaks due to norovirus. This increase in norovirus outbreaks was a trend observed throughout the country that included several high-profile outbreaks on cruise ships.

1. Fankhauser, RL et al. Epidemiologic and molecular trends of "Norwalk-like viruses" associated with outbreaks of gastroenteritis in the United States. J Infect Dis. 2002; 186 (1):1-7.

CONFIRMED FOODBORNE OUTBREAKS

(1)

Foodborne Bacterial Intoxications Associated with a Restaurant

January

Hennepin County

On January 2, 2002 the manager of a restaurant in Brooklyn Center notified the Hennepin County Community Health Department (HCCHD) that a party of four had reported illness after eating hoagies and a sausage, hamburger, and mushroom pizza at the restaurant on January 1. Later that same day, the manager informed HCCHD that an additional party of two reported being ill after eating the same kind of pizza on January 1. Staff from HCCHD interviewed the ill patrons. A case was defined as a person with onset of vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) after eating at the restaurant. The restaurant provided the names of eight additional groups of people who ate at the restaurant on January 1. No stool specimens were collected. Leftover pizza from the party of two was collected and tested at the Minnesota Department of Health (MDH) laboratory.

The restaurant was not inspected after the complaints were received; however, a HCCHD sanitarian assessed the facility in the weeks prior to the complaints and observed that temperature control and foodhandling practices were within acceptable limits. Upon interviewing the manager after the complaints were received, HCCHD learned that all temperatures had been reportedly correct upon the manager's arrival to work, and that the night manager stated that they were correct when he checked them at a later time. The restaurant did not record the temperatures in the cold rail or coolers, but stated that all were below 41°F. According to the manager, there were no ill employees and all employee meals served on January 1 were sandwiches, not pizza. The hamburger and sausage used on the pizza were precooked, and the fresh mushrooms were presliced.

The six people from the original complaints were interviewed. Four of the six met the case definition. Three (75%) had diarrhea and one (25%) had vomiting. The incubation periods ranged from 2.5 hours for those with diarrhea to 5 hours for the one person with vomiting. Duration of illness was less than 12 hours for all cases. Six of eight additional parties were contacted to assess illness. None of the sixteen people interviewed reported illness after eating pizza and hoagies at the restaurant on January 1.

Bacillus cereus and the diarrheal-type toxin were isolated from the leftover pizza by the MDH laboratory.

The clinical characteristics of the illnesses suggest that this was an outbreak of foodborne bacterial intoxication. Pizza was the likely vehicle. The specific etiologic agent was not confirmed. Although *Bacillus cereus* and the diarrheal-type toxin were isolated from food samples, the incubation periods were shorter than those typical for the diarrheal form of *B. cereus*.

(2)

Astrovirus Gastroenteritis Associated with a Restaurant

January

Hennepin County

On January 16, 2002 epidemiologists at the Hennepin County Community Health Department received a call from a group that had attended a holiday party on January 10 at a restaurant in Brooklyn Park. The group reported that 19 of 32 attendees were ill with vomiting or diarrhea. The City of Brooklyn Park Code Enforcement and Public Health Division and the Minnesota Department of Health (MDH) were notified about the report. Hennepin County Environmental Health was also notified because the cake served at the dinner was purchased from a bakery in New Hope. A list of attendees and food items served at the dinner were obtained. A case was defined as a person with vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) after eating at the restaurant. Stool samples were collected and submitted to MDH for bacterial and viral testing.

Members of two additional groups who had eaten at the restaurant on January 9 and 12 were interviewed using a standard questionnaire. Groups who had purchased cakes from the bakery were also interviewed. Environmental assessments and employee interviews were conducted at the restaurant and at the bakery.

Of the 32 persons that attended the holiday party, 30 (94%) were interviewed. Of those, 14 (47%) met the case definition. Fourteen cases (100%) had diarrhea, 11 (79%) had nausea, 10 (71%) had abdominal cramps, six (43%) had vomiting, and six (43%) had fever. The median incubation period was 59.5 hours (range, 33 to 95 hours). Six of the 14 cases were still having intermittent diarrhea at the time of the interviews. For the eight cases that had recovered at the time of their interview, the duration of illness ranged from 48 hours to over 96 hours. Stool samples collected from five ill patrons tested negative for bacterial pathogens and norovirus. Astrovirus was detected in the specimen from one of the ill patrons by polymerase chain reaction. An additional patron had a stool sample sent to a private laboratory; the sample was negative for bacterial pathogens, but no viral testing was conducted.

Two groups who had ordered cakes from the bakery during the suspect time period were contacted; no illness was reported in those who had eaten cake. The environmental assessment at the bakery revealed no violations. All equipment was working, appropriate temperatures were maintained, food items were from approved sources, and gloves were used appropriately. Four bakery employees were interviewed; one employee, who did not handle any food items, had onset of diarrhea during the evening of January 10. The stool sample from this individual was negative for bacterial pathogens and norovirus.

The environmental assessment at the restaurant revealed that handwashing facilities were operational and that all equipment was properly functioning. A food preparation review illustrated several factors that could have contributed to the outbreak, including the potential for cross-contamination during the preparation of the salad, inadequate cooking temperatures, and

improper cooling (Alfredo noodles and sauce were cooled in deep containers in the walk-in cooler and were measured at temperatures of 53°F and 51°F, respectively).

Four restaurant employees were interviewed on-site. They reported that they had not experienced any diarrhea or vomiting, nor had their family or friends. Names and phone numbers of other employees were obtained. Two additional restaurant employees were interviewed and reported no symptoms for themselves or for family members. Messages were left for five other employees, but they did not respond. Restaurant management stated they hadn't had any ill employees and had not received any phone calls reporting illnesses in patrons.

None of the food items served at the holiday party were statistically associated with illness. None of the 15 people interviewed from the two additional groups who had eaten at the restaurant during the same time period reported illness or knowing anyone who had been ill.

This outbreak of gastroenteritis was likely caused by astrovirus. Illness was associated with attendance at a holiday party held at a restaurant. No illnesses meeting the case definition were identified in food workers that were interviewed; however, it is possible that there was an ill food worker that was not identified because several restaurant employees were never interviewed.

(3) Norovirus Gastroenteritis Associated with Coleslaw

January

Ramsey County

On January 14, 2002 the Minnesota Department of Health (MDH) was notified by a state employee of a gastrointestinal illness that occurred following a conference (Event A) held on January 10. On January 16, MDH received a second report of illness from another state employee who had attended the same conference. A deli in St. Paul had provided a continental breakfast and box lunch to conference attendees.

The Event A organizer provided a list of the 107 attendees as well as four individuals who ate leftover box lunches, and interviews were conducted. A case was defined as any person who developed vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) after eating a boxed lunch from Event A. Cases with a recent recovery date were asked to provide a stool sample to MDH for bacterial and viral testing.

Sanitarians from MDH and City of St. Paul were immediately contacted. The sanitarians from St. Paul spoke with the owner and management staff, interviewed employees involved with food preparation, evaluated food preparation and handling procedures, and obtained a list of five other events that the deli had catered on the same day as Event A.

One hundred and four individuals (101 attendees and 3 others) who ate boxed lunches from the conference were interviewed and 33 (32%) met the case definition. Of the 33 cases, 26 (79%) had diarrhea, 24 (73%) had cramps, and 22 (67%) had vomiting. The duration of illness ranged

from 4 to 95 hours (median, 36 hours). The median incubation period, calculated from the reported meal time, was 32 hours (range 22 to 54 hours). All four stool samples obtained from participants tested negative for bacterial pathogens. All four tested positive for norovirus and were indistinguishable by sequencing. Eating coleslaw from the boxed lunches was significantly associated with illness (33 of 33 [100%] cases vs. 51 of 63 [81%] controls; odds ratio, undefined; lower limit of 95% confidence interval, 1.6; $p = 0.007$).

Event organizers from four other events catered by the deli on January 10 were contacted; two reported that attendees had illness following the meal. Individual participants were interviewed from three of the events (Events B, C, and D). Event B received 21 boxed lunches, and 18 individuals were interviewed. Two (11%) individuals met the case definition; both cases reported eating coleslaw (vs. 11 of 16 [69%] controls). Event C received 13 boxed lunches, and 10 individuals were interviewed. None of the individuals met the case definition, and no one had eaten coleslaw. Five of eight (63%) ate the pasta salad and one of eight (13%) ate the sweet and sour slaw. Event D received 33 boxed lunches, and 19 individuals were interviewed. Five individuals (26%) met the case definition, and four of the five (80%) reported eating coleslaw (vs. 11 of 12 [92%] controls).

Six deli employees involved with food preparation were interviewed about their duties and recent or current illness. None of the employees reported any illness in themselves or family members since January 1. The coleslaw (along with pasta salad and sweet and sour slaw) preparation was carried out by three individuals. Shredded cabbage was combined with parsley, green onions, mayonnaise, vinaigrette, and sugar to make the coleslaw. All produce was distributed by the same company (Distributor A).

The Minnesota Department of Agriculture (MDA) was contacted to further investigate the processor/distributor following the environmental health and epidemiology investigations. The MDA inspector spoke with quality assurance staff and conducted an on-site inspection of the processing area. On January 30 the MDA inspector noted no problems with employee hand washing or hygiene at Distributor A. The company had not had any reported illnesses in workers and the company's policy is not to allow direct hand contact with food. All three of the produce items used in the coleslaw (green onions, shredded cabbage, and parsley) were processed at and distributed from the company. The green onion and parsley were received from Mexico and the cabbage was from New York or Texas.

An outbreak of norovirus gastroenteritis occurred among attendees of multiple events catered by a deli on January 10. The vehicle was contaminated coleslaw. The source of contamination was not identified.

(4)

Norovirus Gastroenteritis Associated with Fruit

January

Hennepin County

On January 17, 2002 the City of Edina Health Department notified the Minnesota Department of Health (MDH) of reported gastrointestinal illness among persons who had attended a holiday

party at a country club on January 12. Sanitarians from the City of Edina visited the country club on January 17 to speak with management staff, interview employees, and evaluate food preparation and handling procedures. A list of 47 persons who attended the holiday party was faxed to MDH on January 17, and 40 attendees were interviewed. A case was defined as any person who developed vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) after eating at the country club. Stool samples from two cases were submitted to MDH for bacterial and viral testing.

Of the 40 attendees who were interviewed, 15 (38%) met the case definition. Of the 15 cases, fourteen (93%) had diarrhea, eleven (79%) had cramps, seven (47%) had fever, and five (33%) had vomiting. No one had bloody stools. The median incubation period was 21.5 hours (range, 1.75 to 67.5 hours), and the median duration of illness was 33 hours (range, 16 to 79.5 hours). The only item statistically associated with illness was the fruit (11 of 14 [79%] cases vs. 6 of 21 [29%] controls; odds ratio, 9.2; 95% confidence interval, 1.5 to 64.7; $p = 0.004$). The two stool samples tested negative for *Campylobacter*, *E. coli* O157:H7, *Salmonella*, *Shigella*, *Yersinia*, and *Vibrio*; both stool samples tested positive for norovirus.

The sanitarians identified two ill employees upon conducting interviews; however, both employees reported an illness onset date later than the date of the event in question. The fruit platter was prepared on site and consisted of multiple kinds of cut fruit (pineapple, strawberries, honeydew melon, cantaloupe, watermelon, and grapes). The employees who handled the fruit on January 12 did not report any illness prior to or during the event. No food safety violations were noted. Country club staff reported that they had not received any other complaints of illness from patrons.

This was an outbreak of norovirus gastroenteritis associated with fruit served at a holiday party at a country club. The source of contamination was not identified.

(5)

Foodborne Bacterial Intoxications Associated with a Restaurant

January

Hennepin County

On January 23, 2002 the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint. The initial report was that 10 of 10 people were ill after eating lunch at a restaurant in Rogers on January 21. The ill persons worked together as construction managers. The complaint was forwarded to the Hennepin County Community Health Department (HCCHD) for investigation. HCCHD epidemiologists interviewed the patrons about food consumption and illness history. A case was defined as a person with onset of vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) after eating at the restaurant. No stool samples or food samples were collected.

Six of the 10 (60%) construction employees who ate at the restaurant were interviewed. All six met the case definition. All reported diarrhea; no one reported vomiting. The median incubation period was 14 hours (range, 7 to 16.5 hours), and the median duration of illness was 19 hours (range, 13.5 to 26 hours). The cases denied any sharing of food in the workplace or any other

meals that were common to all, except for the lunch at the restaurant. Among the food items consumed by the cases at the restaurant were taco salad, chicken dishes, chips, rice, beans, and pop and water with ice. Because no non-ill patrons were interviewed, a case-control study could not be conducted.

HCCHD sanitarians visited the restaurant on January 24 to assess foodhandling practices and employee illnesses. The restaurant owner told the HCCHD environmentalists that no employees had been ill with gastrointestinal symptoms and that no other complaints from patrons had been received. The owner estimated that there had been at least 120 customers in the restaurant on January 21. The restaurant reported serving at least 38 entrees with chicken, most of which also came with rice and beans. One of the owners was a Certified Food Manager, but this individual may not have been on-site at the time of the outbreak. Although the owner stated that all food is served on the day it is cooked, it was discovered that rice and beans were cooked a day ahead and stored in the walk-in cooler. The items in the cooler were kept in pans of various sizes, with depth ranging from 3 inches to 6 inches. A tub of rice, which had been cooked the day before, was found at an internal temperature of 50°F. The sanitarians ordered restaurant management to discard the rice. The hot rice had been put in the cooler the previous night before the restaurant closed. The on-site food thermometer was not calibrated and was not being used. The potential for improper cooling of other potentially hazardous foods, such as chicken, beans, and sauces, were noted. The HCCHD sanitarians made recommendations to restaurant management about proper food cooling procedures and the importance of monitoring the cooling of hot foods with temperature logs. The sanitarians also provided the restaurant with a food thermometer and conducted follow-up inspections.

This was an outbreak of foodborne bacterial intoxications associated with a restaurant. The epidemiologic and clinical characteristics of the illnesses were consistent with intoxications caused by *Clostridium perfringens* or *Bacillus cereus*. Because of the small number of cases and lack of controls, no food vehicle could be determined. It is likely that time-temperature abuse of chicken, rice, beans, sauces, and/or other food items contributed to the outbreak.

(6)

Foodborne Bacterial Intoxications Associated with Chicken

March

Olmsted County

On March 5, 2002 Olmsted County Public Health Services (OCPHS) received the first of five separate complaints of illness from patrons who ate at the same Mexican restaurant in Olmsted County on March 3 and 4. The groups totaled approximately 47 people. The restaurant manager was asked to hold all food prepared on March 3 and 4, and a team from OCPHS, including an epidemiologist, two sanitarians, and an interpreter, visited the site. A list of foodhandlers was compiled, and all available persons were interviewed. Those foodhandlers not available on-site were later interviewed by phone with the assistance of a Spanish-speaking interpreter.

A list of patrons from March 3, 4, and 5 was compiled using checks and credit card receipts as well as information provided by patrons during interviews. Patrons were questioned about their

illness history and food items they had eaten using a standard interview form. A case was defined as a person who had eaten at the restaurant and subsequently experienced vomiting or diarrhea (≥ 3 loose stools in a 24-hour period). Stool specimens from five cases were submitted to the Minnesota Department of Health (MDH) for bacterial and bacterial enterotoxin testing.

Eighty-two patrons of the restaurant were interviewed. Forty-three (52%) met the case definition. The median incubation period was 12 hours (range, 2 to 25 hours). The median duration of illness was 16 hours (range, 1 to 93 hours). Of the 43 cases, 42 (98%) had diarrhea, 30 (70%) had cramps, 22 (51%) had chills, nine (21%) had headache, and eight (19%) had vomiting. Consumption of chicken-containing dishes was significantly associated with illness (28 of 41 [68%] cases vs. 11 of 27 [41%] controls; odds ratio, 3.08; 95% confidence interval, 1.14 to 8.61; $p = 0.03$).

Clostridium perfringens enterotoxin type A was identified in two stool samples; *Staphylococcus aureus* and *S. aureus* enterotoxin A also were identified in one of these samples. *Bacillus cereus* and *B. cereus* diarrheal-type enterotoxin were identified in a third stool sample.

OCPHS assessed food preparation and staff hygiene at the restaurant. Two samples of beans, selected because of probable improper cooling, were collected on March 5 and 6. These food samples were submitted to MDH for bacterial enterotoxin testing. The specimens were received at the lab at room temperature 3 days after shipping, due to a mix-up with the courier. One sample of beans was positive for *B. cereus* diarrheal-type enterotoxin. Critical foodhandling violations identified at the restaurant included significant bare-hand contact with ready-to-eat foods and improper cooling procedures. Beans in the walk-in cooler were 52°F. The storage time could not be verified. Food containers blocked one hand sink, and fingernail brushes and single-use paper towels were not present at the other hand sinks. There was an accumulation of dirt and debris in many areas of the restaurant and on some equipment and food storage containers. Cooling procedures were modified and verified with temperature logs, proper hot-holding and cold-holding temperatures were logged for verification, and cleaning procedures were modified. OCPHS provided training emphasizing the basic concepts of foodborne illness transmission, proper food holding temperatures, and handwashing techniques.

This was an outbreak of foodborne bacterial intoxications associated with a Mexican restaurant. Consumption of chicken was associated with illness. Improper cooling and reheating of foods likely contributed to the outbreak. The symptoms, incubation periods, and illness durations are most consistent with an etiology of *Clostridium perfringens* or the diarrheal-type toxin of *Bacillus cereus*. Enterotoxins of *B. cereus*, *C. perfringens*, and *Staphylococcus aureus* were identified in stool samples submitted by ill patrons. Therefore, multiple etiologies may have been involved.

(7)

***Clostridium perfringens* Intoxications Associated with a Restaurant**

March

Anoka County

On March 12, 2002 a restaurant patron called the Minnesota Department of Health (MDH) foodborne illness hotline to report a suspected foodborne illness that began after he and three other people ate lunch at a restaurant in Coon Rapids on March 10. It was the only meal the four patrons, who all became ill, had in common. A case was defined as any person who ate at the restaurant and subsequently developed vomiting or diarrhea (≥ 3 loose stools in a 24-hour period). MDH staff interviewed the four patrons. Stool kits were provided to two of the recently ill cases. The restaurant was inspected by a sanitarian from the Anoka County Community Health and Environmental Services Department (ACCHES) on March 12.

All four patrons (100%) had diarrhea and abdominal cramps, two (50%) reported fever, one (25%) had vomiting, and no one reported bloody stools. The median incubation period was 12.5 hours (range, 5 to 18 hours) and the median duration of illness was 19 hours (range, 8 to 20 hours). One stool sample was negative for *Campylobacter*, *E. coli* 0157:H7, *Salmonella*, *Shigella*, *Yersinia*, norovirus, and *Staphylococcus aureus* and *Bacillus cereus* toxins. The stool sample tested positive for *Clostridium perfringens* toxin. Two of the four cases reported eating refried beans. The ACCHES sanitarian noted several critical foodhandling violations at the restaurant; violations included the improper cooling and storing of refried beans, no thermometers, and the lack of a certified food manager. The sanitarian did multiple on-site investigations until identified violations were corrected, and reviewed safe foodhandling procedures with the restaurant employees.

The epidemiologic and clinical characteristics of this restaurant-associated outbreak were consistent with *Clostridium perfringens* intoxications. Refried beans that were not properly cooled and stored were a likely vehicle. Additional food vehicles could have contributed to the outbreak, as this establishment had multiple violations.

(8)

Norovirus Gastroenteritis Associated with Submarine Sandwiches

March

Ramsey County

On March 27, 2002 the Minnesota Department of Health (MDH) was notified of an outbreak of gastrointestinal illness among bank employees who ordered a 4-foot long submarine sandwich for a celebration at their workplace that began at noon on March 22. They had no other meals in common, nor were there any other food items at the event. The sandwich came prepared with mixed cold cuts, cheese, lettuce, tomatoes, and pickles. Side items included onions, black olives, green peppers, banana peppers, jalapeno peppers, vinegar, mayonnaise, and oil. On March 28, MDH received a second complaint of gastrointestinal illness from a person who ate a submarine sandwich from the same restaurant for lunch on March 26.

A list of 11 employees who had attended the celebration at the bank was faxed to MDH on March 27, and MDH staff interviewed 10 attendees. A case was defined as any person who developed vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) after eating food from the restaurant. Stool samples from three cases (two bank employees and the other complainant) were submitted to MDH for bacterial and viral testing.

Of the 10 bank employees who were interviewed, seven (70%) met the case definition, and one had mild symptoms but did not meet the case definition. Of the seven cases, all (100%) had cramps, six (86%) had vomiting, six (86%) had diarrhea, and three (43%) had fever. No one had bloody stools. The median incubation period was 29 hours (range, 17 to 60 hours), and the median duration of illness was 43 hours (range, 10.5 to 76 hours). No single submarine sandwich item was statistically associated with illness. The person who made the second complaint reported vomiting, diarrhea, cramps, and fever. His incubation period was 32.5 hours, and his duration of illness was undetermined because he was still ill at the time of the interview. The three stool samples tested negative for *Campylobacter*, *E. coli* O157:H7, *Salmonella*, *Shigella*, *Yersinia*, and astrovirus; all three samples tested positive for norovirus.

A sanitarian from the City of St. Paul visited the restaurant on March 27 to speak with management staff, interview employees, and evaluate food preparation and handling procedures. The sanitarians identified two ill employees upon conducting interviews. The employee who made the submarine sandwich for the bank employees reported a gastrointestinal illness during March 14-19. In addition, the same employee had a child at home with gastroenteritis on March 22. The other ill employee reported an illness onset date of March 23. No food safety violations were noted.

This was an outbreak of norovirus gastroenteritis associated with a restaurant. The vehicle was submarine sandwiches, and the source of contamination was likely an infected food worker.

(9)

Norovirus Gastroenteritis Associated with a Restaurant

March

Anoka County

On March 27, 2002 the Minnesota Department of Health (MDH) was notified through the foodborne illness hotline of gastrointestinal illness among seven individuals (from four separate households) who ate together at a restaurant in Coon Rapids on March 24. The individuals denied any other common exposures. On March 29, MDH received a separate complaint about the same restaurant from two individuals who ate together on March 27.

A sanitarian from the Anoka County Community Health and Environmental Services Department (ACCHEs) went to the restaurant to conduct an inspection on March 27. The restaurant manager reported that the restaurant had not received any other complaints. In addition, the manager reported that none of the employees had missed work due to illness in the few days prior to the complainants' meal dates. Another sanitarian visited the restaurant on March 29 after receiving the second complaint. The corporate sanitarian also inspected the

restaurant and did not identify any problems. A partial list of patrons was obtained from credit card receipts. On April 1, the restaurant informed MDH of an additional complaint regarding three of 12 people who became ill after eating at the restaurant on March 27. MDH epidemiologists interviewed complainants by phone about illness history and food consumption. A case was defined as a person with onset of vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) after eating at the restaurant. Two stool samples were collected from ill patrons from the first complaint group and submitted to MDH for bacterial and viral testing.

Twenty-one patrons were interviewed, and eight (38%) met the case definition. MDH was unable to identify additional parties that became ill after eating at the restaurant during the week of March 24. The third complainant was contacted by an epidemiologist from MDH, but denied making a complaint. Six of seven (86%) cases reported vomiting, four of six (67%) reported diarrhea, and three of six (50%) reported fever. Onsets of illness occurred from March 24 to 29. The median incubation period was 44 hours (range, 7 to 49 hours). The duration of illness for the two cases that had recovered at the time of interview was 4 hours and 15 hours. Both stool samples tested positive for norovirus. Three food items were significantly associated with illness after univariate analysis, including French fries (3 of 8 [38%] cases vs. 0 of 12 [0%] controls; odds ratio [OR], undefined; 95% confidence interval [CI], 1.01 to undefined; $p = 0.049$), cheese bread (4 of 8 [50%] cases vs. 0 of 12 [0%] controls; OR, undefined; 95% CI, 1.8 to undefined; $p = 0.01$), and pop (4 of 6 [67%] cases vs. 1 of 12 [8%] controls; OR, 22.0; 95% CI, 1.4 to 584.7; $p = 0.02$). By multivariate analysis, the only risk factor that was independently associated with illness was drinking pop (OR, 23.4; 95% CI, 1.8 to 303; $p = 0.02$).

At the time of the first restaurant inspection, the ACCHES sanitarian did not identify any problems, noted that the sanitation procedures looked fine, and that the handwashing sink was properly equipped.

This was an outbreak of norovirus gastroenteritis among persons who ate a restaurant. Three independent complaints about the restaurant were reported to MDH. Illness among foodhandlers at the restaurant was not thoroughly assessed, so it is possible that the illnesses were due to consumption of food and/or beverages that were contaminated by an ill foodhandler.

(10)

Norovirus Gastroenteritis Associated with Submarine Sandwiches

March

Scott County

On Friday, March 29, 2002 approximately 50 staff members at a junior high school in Scott County participated in a "Wellness Day" workshop held at the school. On the morning of Monday, April 1, school staff contacted the Minnesota Department of Health (MDH) Acute Disease Investigation and Control Section (ADIC) by phone to report gastrointestinal illnesses in attendees. No students were involved in the workshop and there had been no recent increased absenteeism noted. MDH epidemiologists obtained a list of employees who had attended the event from the school nurse. Attendees were interviewed by about illness history and food consumption. A case was defined as any person with a positive stool specimen or any person

who developed vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) after attending the workshop. Seven stool specimens obtained from ill attendees and their family members, as well as leftover submarine sandwiches, were submitted to MDH for bacterial and viral testing.

On April 1, sanitarians from MDH Environmental Health Services (EHS) visited the restaurant (Store A) where the lunch served at the workshop had been purchased to determine if there were any ill food workers, speak with management staff, and evaluate food preparation and handling procedures. The sanitarians obtained phone numbers of food workers who were not available to be interviewed in person, and EHS and ADIC staff contacted these individuals by phone to interview them about illness history and foodhandling duties.

Forty-seven of the 49 persons who attended the workshop were interviewed. Thirty-one (66%) met the case definition, 13 (28%) reported not being ill, and three (6%) had mild symptoms that did not meet the case definition and were excluded from subsequent analyses. No attendees reported being ill with gastrointestinal symptoms or having ill household members prior to attending the workshop. No other common events/meals involving all the school staff were identified. Onset dates of illness were March 30 and March 31. The median incubation period was 38 hours (range, 15.5 to 57 hours). Twenty-five cases (81%) had diarrhea, 25 (81%) had cramps, 23 (74%) had vomiting, 15 (48%) had fever, and one (3%) had bloody stools. Several cases also reported chills and headaches. At least two cases reported going to a hospital emergency room; no one was hospitalized overnight. Few cases reported feeling recovered yet when they were interviewed on April 1.

According to attendees, bagels, cream cheese, and juice were served on the morning of the workshop. At about 11:00 a.m., foot-long submarine sandwiches that been previously ordered from Store A were picked up by the dean of students. The sandwiches were served around noon. Per the dean of students, all of the subs ordered were on wheat bread and featured slices of American cheese, lettuce, tomatoes, and pickles. Attendees had a choice of ordering roast beef, ham, tuna, turkey, or veggie subs. Onions, peppers, black olives, and packets of oil, mayo, and mustard were reportedly available for attendees to add to their sandwiches. Several bags of different kinds of chips purchased at a grocery store were poured into bowls and served with lunch, as were brownies purchased from a bakery. Canned pop and bottled water also were available.

All 31 cases reported eating subs, compared to 12 of 13 controls. Everyone who ate a sub also reported eating lettuce. The attack rates by kind of sub were as follows: beef, 100% (1 of 1 person who ate that kind of sub became ill); turkey, 87% (13 of 15 ill); ham, 83% (10 of 12 ill), veggie, 80% (4 of 5 ill); and tuna, 27% (3 of 11 ill). By univariate statistical analysis, cases were more likely than controls to have eaten a non-tuna sub (28 of 31 [90%] cases vs. 5 of 13 [38%] controls; odds ratio (OR), 14.9; 95% confidence interval (CI), 2.8 to 84; $p < 0.001$). Cases also were more likely than controls to have eaten tomatoes (29 of 31 [94%] cases vs. 6 of 12 [50%] controls; OR, 14.5; 95% CI, 2.3 to 115.3; $p = 0.003$). None of the other food items (including other sandwich toppings, bagels, cream cheese, chips, brownies, and beverages) were statistically associated with illness.

Tomatoes and non-tuna subs, the two food items significant by univariate analysis, were entered into a stepwise logistic regression model. Both items remained independently associated with illness (tomatoes, OR = 12.4; 95% CI, 1.6 to 96.4; $p = 0.02$; non-tuna sub, OR = 11.3; 95% CI, 1.8 to 72.1; $p = 0.01$).

In addition to the 31 persons who attended the workshop and met the case definition, there were seven household members of attendees who became ill. These individuals had not attended the workshop, but ate leftover subs that were brought home by attendees. The median incubation period of those who ate the leftover subs was 36.5 hours (range, 18 to 58 hours). Onset dates of illness were March 30, March 31, and April 1. Six of the seven had cramps; five had diarrhea, five had vomiting, four had fever, and one had bloody stools. At least one of these persons went to a hospital emergency room. Five had eaten turkey subs, one had a veggie sub, and one had a beef sub. All reported that tomato and lettuce were on their sandwiches.

Of the seven stool specimens submitted to MDH, six were from workshop attendees and one was from an ill household member of an attendee. Three of the seven stool specimens submitted were tested for bacterial pathogens; these stools were negative for *Campylobacter*, *E. coli* O157:H7, *Salmonella*, *Shigella*, and *Yersinia*. All seven stools were negative for astrovirus. All seven stools tested positive for norovirus. Gene sequencing was done on viruses from two different cases, and the sequences were identical. No norovirus was detected in the three leftover sub sandwiches tested; however, standard laboratory methods to detect norovirus in foods other than shellfish are still being developed.

In response to the investigation of the illnesses among the school staff, MDH received reports of illnesses among six other individuals who had eaten at Store A. One person reported vomiting and aches occurring 42 hours after eating at the restaurant on March 28; one person reported onset of vomiting, diarrhea, and fever approximately a day after eating at the restaurant on March 29; and three people who ate together at the restaurant on March 29 reported onset of diarrhea, vomiting, and fever approximately 31 hours after the meal. There was also a report of one person ill with vomiting and diarrhea 39 hours after eating at a nearby restaurant of the same chain, Store B, on March 29.

When sanitarians evaluated Store A on April 1, the restaurant did not report receiving any other complaints, and no cash register receipts were available to identify other potential customers. The manager reported that other than the junior high event, no other large events had been catered on Friday, March 29. The restaurant's policy was that handwashing and wearing gloves were required when handling any food products. The sanitarians observed that workers preparing sandwiches at the service counter were wearing gloves; however, not all employees wore gloves when doing food preparation such as chopping tomatoes and onions. The restaurant's policy was that employees ill with diarrhea or vomiting were not to work; the policy did not require that ill workers be excluded for 72 hours after symptom resolution.

Eighteen food workers from Store A were interviewed. Five (31%) reported recent gastrointestinal illness in themselves or in their household contacts. The earliest onset reported was a worker who had vomiting at 1:00 a.m. on Saturday, March 30. Two other workers reported cramps and vomiting, respectively, beginning on the afternoon of March 30. A fourth worker reported onset of vomiting on March 31, and a fifth worker reported that a household

member had onset of vomiting on March 31. All of these employees had been working on March 29, when the sandwiches for the workshop were prepared.

Because there was some overlap in employees between the two different locations of the restaurants, employees from Store B were interviewed. Of the five workers interviewed, one reported that she and a household member had experienced vomiting and diarrhea of 1-2 days duration beginning on March 26. This employee did not work at the restaurant while ill. Another worker reported having a child at home who experienced several days of vomiting and diarrhea beginning on March 27. There was no evidence that either of these workers prepared food or worked at Store A.

This was an outbreak of norovirus gastroenteritis associated with submarine sandwiches purchased from a restaurant, Store A, and served at a junior high school staff workshop. Eating a non-tuna sub and eating a sub with tomatoes were both statistically associated with illness. Illness also was reported among people who ate subs left over from the workshop, as well as among other patrons of Store A who were not involved with the workshop. Although no workers at the Store A location of the restaurant reported being ill before the food was prepared for the workshop, the widespread gastrointestinal illness among restaurant employees of the two nearby restaurants from the same chain around the time of the outbreak suggests that the most likely source of viral contamination of the subs was food workers.

(11)

Norovirus Gastroenteritis Associated with a Breakfast Meeting

April

Hennepin County

On April 8, 2002 the Minnesota Department of Health (MDH) notified the Hennepin County Community Health Department (HCCHD) of a business group that reported illness in 14 of 16 attendees of a breakfast meeting at a Minnetonka country club on April 3. HCCHD epidemiologists notified Hennepin County Environmental Health (HCEH) of the outbreak.

An HCCHD epidemiologist obtained a list of the attendees from the group and administered a standard questionnaire to 15 attendees, addressing their illness history and food items eaten at the breakfast. HCEH sanitarians interviewed employees who had eaten leftovers that had been made available to staff. A case was defined as an attendee of the meeting, or a country club employee who ate leftover food and subsequently became ill with vomiting or diarrhea (≥ 3 loose stools in a 24-hour period). A total of 13 employees (including one that had not eaten the food) were interviewed. Four ill persons submitted stool specimens to MDH that were tested for *Campylobacter*, *E. coli* O157:H7, *Salmonella*, *Shigella*, *Yersinia*, and norovirus.

Of the 27 persons interviewed, six (22%) met the case definition, including five attendees and one club employee. Of the six cases, five (83%) reported vomiting, diarrhea, nausea, chills, and body aches, four (67%) reported fatigue, cramps, and headache, three (50%) reported fever, and one (17%) reported blood in the stool. The median incubation period was 41 hours (range 21 to

71 hours). One person from the business group reported vomiting and diarrhea 1 and 2 days prior to the breakfast meeting. No food items were statistically associated with illness.

All four stool samples tested negative for bacterial pathogens. However, three ill attendees and one ill club employee (an office worker who ate the leftovers, but had no foodhandling responsibilities) tested positive for norovirus. Sequencing analysis was performed on viruses from two of the three positive attendees and the club employee; all three sequences were identical.

An HCEH sanitarian conducted an inspection of the club's kitchen facilities, addressing food preparation procedures, hot and cold holding temperatures, serving procedures, handwashing, and employee illness. The restaurant kitchen operates separately from the banquet kitchen with different staff. However, they share the basement dry storage and walk-in cooler/freezer storage areas, and similar food supply sources. The restaurant kitchen served 16 breakfasts on April 3. There were no reported complaints of illness from these patrons (a list of patron names was provided; however, contact numbers were not available, so patrons were not interviewed). The club held an Easter Brunch on March 31 for approximately 700 members. No complaints from this event were reported. The same staff that prepared the buffet for the breakfast meeting prepared a luncheon for 48 people on April 3, and some of the same foods were served. The chairperson and the assistant chairperson of the event were interviewed, and the group reported no illness.

The kitchen staff was well trained and "ServSafe"-certified. Hand sinks were conveniently located. Employees utilized disposable gloves when preparing fruits, vegetables and ready-to-eat foods. None of the food preparation employees or their immediate families reported illness.

An outbreak of norovirus gastroenteritis occurred among attendees of a business breakfast meeting. The clustering of five of six illnesses within a 26-hour period suggests a common source outbreak. No other patrons of the club restaurant and no other banquet groups reported illness. One person from the business group reported vomiting and diarrhea 1 and 2 days prior to the breakfast meeting. A plausible explanation for the outbreak is that this person inadvertently contaminated serving utensils or inadvertently contaminated the food itself through hand contact.

(12)

***Salmonella* Enteritidis Infections Associated with a Restaurant**

April

Dakota County

In April 2002, the Minnesota Department of Health (MDH) Public Health Laboratory received two isolates of *Salmonella* Enteritidis through routine surveillance that were indistinguishable by pulsed-field gel electrophoresis (PFGE) using two different enzymes. This previously rare PFGE subtype of *Salmonella* Enteritidis was designated SE43B18. Routine interviews of the cases by MDH epidemiologists revealed that the two cases had patronized the same Asian buffet restaurant (Restaurant A) in Apple Valley. The restaurant was contacted and an investigation was initiated on April 29.

Three days after the investigation was initiated, an additional case of SE43B18 was identified through routine surveillance and interviewed. This case had not eaten at Restaurant A, but had eaten at another Asian restaurant.

A confirmed case was defined as a person from whom SE43B18 was isolated and who reported eating at Restaurant A during the 7 days before the onset of their symptoms.

On April 29, environmental health specialists from MDH conducted an environmental health evaluation of the restaurant, reviewed food preparation procedures, and observed cleaning of the facility. Sixteen swab samples of food and non-food contact surfaces were obtained for bacterial culture. No reservation lists, credit card receipts or checks were available that could have been used to identify other restaurant patrons.

Restaurant employees were interviewed about recent gastrointestinal illness. All restaurant employees were asked to submit stool specimens for *Salmonella* testing. Employees who reported any gastrointestinal symptoms within the previous month, or who tested positive for *Salmonella* on their first specimen, were excluded from work until two consecutive stool specimens obtained at least 24 hours apart tested negative for *Salmonella*.

A message was posted in PulseNet, a national network of public health laboratories that performs DNA "fingerprinting" on bacteria that may be foodborne, in order to ascertain if other states had seen cases of SE43B18.

The Minnesota Department of Agriculture initiated a traceback investigation of chicken and other products used by the restaurant. The Centers for Disease Control and Prevention (CDC) compared information obtained during the Minnesota investigation to information obtained from other states.

Two confirmed cases were identified. Both cases reported diarrhea, fever and cramps, and one reported bloody stools. The first case ate at Restaurant A on April 2 and had onset of illness on April 6. The second case had a meal date of April 5 and onset of illness on April 9. Durations of illness were 10 and 11 days, respectively. Neither of the two cases was hospitalized. Both cases ate a variety of foods, including sweet and sour chicken, sesame chicken, cashew chicken, crab Rangoon, lo mein, and vegetables.

None of the 10 employees of Restaurant A reported gastrointestinal symptoms in the month prior to the investigation. All 10 employees submitted two stool samples; all of the samples tested negative for *Salmonella*. The 16 environmental samples collected were negative for *Salmonella*. A food preparation review was conducted in order to identify all of the products that were used in the preparation of dishes that were consumed by the cases. Invoices for poultry, egg and other products served on or around the meal dates of the cases were obtained. Restaurant A purchased eggs from one supplier, whose eggs came from only one company. No turkey products were purchased by the restaurant. A variety of chicken products were purchased from two different suppliers. Each supplier received chicken from several poultry companies. These products were compared to the products purchased by the second Asian restaurant where the third case of SE43B18 had eaten a day prior to their onset. The two restaurants purchased chicken products

from five poultry companies across the country. Chicken products from one company were served at both restaurants.

As a result of alerting other state public health laboratories, the Connecticut state public health laboratory reported that SE43B18 was isolated from chicken and turkey purchased at a grocery store as part of a retail meat survey. Thirteen cases of SE43B18 were reported in humans in five other states, but information on the cases was not available to MDH.

All the information available regarding chicken products was forwarded to CDC to evaluate whether the poultry from Connecticut could have come from the same poultry company as the chicken eaten by the Minnesota cases. CDC concluded that the chicken served at the Minnesota restaurants did not come from the same source as the Connecticut retail chicken. Based on this, CDC decided not to involve regulatory agencies for further work on a traceback investigation.

This was an outbreak of *Salmonella* Enteritidis SE43B18 infections identified through routine surveillance; the outbreak was associated with eating at a restaurant in Apple Valley. The specific vehicle and the source of contamination were not identified. However, the absence of ill or infected food workers, the identification of an additional case that did not eat at the restaurant, and the finding of chicken in Connecticut contaminated with the same pathogen indicate that commercially distributed poultry products could have been the vehicle.

(13)

Norovirus Gastroenteritis Associated with Sandwiches

April

Nobles County

On May 1, 2002 a sanitarian from Nobles-Rock County Public Health Services contacted the Minnesota Department of Health (MDH) foodborne illness hotline regarding two complaints received about a restaurant in Worthington. The two complainants had eaten separately at the restaurant around noon on April 26. An investigation was initiated. The sanitarian interviewed both complainants by phone about food consumption and illness history. A case was defined as any person who ate food purchased at the restaurant and subsequently developed vomiting or diarrhea (≥ 3 loose stools in a 24-hour period). Stool kits were provided to both complainants. On May 1 and 2, the sanitarian inspected the restaurant and spoke with management and employees about recent illnesses and foodhandling procedures.

The two complainants both met the case definition. Both cases were female, and their ages were 49 and 51 years, respectively. The first case ate a Parmesan griller turkey sandwich, coleslaw, dipping sauce, French fries, and water. She had onset of vomiting, diarrhea, and cramps 40 hours after the meal. The illness lasted approximately 36 hours. This case ate with one other person, who ate different food items and did not become ill. The second case also ate a Parmesan griller turkey sandwich, turkey salami, cheese, Parmesan bread, coleslaw, French fries, and water. She had onset of vomiting, diarrhea, and cramps 32 hours after the meal. The illness lasted approximately 12 hours. This case ate with another person, who reportedly shared the same food items and also became ill; this person was not interviewed. Neither of the two cases sought medical attention for their symptoms. One of the two cases sent a stool specimen to

MDH Public Health Laboratory for bacterial and viral testing. The sample was negative for *Campylobacter*, *E. coli* O157:H7, *Salmonella*, *Shigella*, *Yersinia*, and astrovirus. The stool was positive for norovirus.

The sanitarian interviewed restaurant employees about recent illness in themselves or their households. One food worker reported experiencing onset of abdominal cramps during a shift on April 23, with vomiting and diarrhea beginning during the early morning on April 24; the cook did not work at the restaurant on April 24 or 25. After feeling recovered on April 25, the cook returned to work on April 26, and prepared the turkey sandwiches consumed by the two cases. Turkey slices for the sandwiches were microwaved and placed on sourdough bread. Sliced cheese, sauerkraut, and dressing were then added to the sandwiches, which were plated with coleslaw and French fries. The coleslaw had been prepared by another food worker who had not been ill. The recently ill food worker was working on the cook line that day and was not wearing gloves. This food worker was allowed to return to work 72 hours after symptoms ceased. Although a stool kit was provided, the food worker did not submit a sample. The restaurant did not report receiving any other complaints, and no other ill patrons were identified. The sanitarian made recommendations to the restaurant concerning proper handwashing procedures and ill employee policies.

This was an outbreak of norovirus gastroenteritis associated with a restaurant. The most likely vehicle was turkey sandwiches prepared by a food worker who had recently been ill with diarrhea and vomiting.

(14)

Suspected Norovirus Gastroenteritis Associated with Sandwiches

May

Hennepin County

On May 3, 2002 the City of Bloomington Environmental Health (CBEH) received complaints of illness involving vomiting and diarrhea from two independent groups of patrons who had eaten at the same restaurant on April 30. Food items consumed included ham, turkey, and roast beef sandwiches. CBEH staff interviewed five patrons from the two groups and restaurant employees about illness symptoms and food history. The restaurant management and CBEH staff were unable to contact other persons who had eaten at the establishment on April 30. A case was defined as person who ate at the restaurant on April 30, with subsequent onset of vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) plus one other symptom. One patron had submitted a stool specimen to a local health care provider for bacterial culture. On May 3, CBEH staff conducted an environmental health investigation at the establishment, focusing on critical food safety issues for the various types of sandwiches.

All five patrons and one restaurant employee met the case definition of illness. Five cases had vomiting, five had diarrhea, four had cramps, and three reported fever. The median incubation period was 36 hours (range, 19 to 54 hours). The median duration of illness was 13 hours (range, 8 to 38 hours). One case had visited a health care provider.

A restaurant employee had been ill with vomiting on April 28. This employee had cared for an 18-month old child who had been ill with vomiting around midnight on April 26. All cases had eaten sliced cold meat sandwiches that were assembled on April 30 by this foodhandler. The foodhandler had eaten at the establishment April 30 through May 2. Food items consumed by the foodhandler included a grilled cheese sandwich, a hamburger, and Coney dogs.

The restaurant owner/manager voluntarily closed the establishment upon notification of illnesses by patrons. The establishment reopened after the remaining ready-to-eat food items previously prepared by food handlers were discarded, food preparation surfaces were cleaned and sanitized, and any ill employees were identified and excluded from the establishment if necessary.

The clinical and epidemiological characteristics of the illnesses were characteristic of norovirus gastroenteritis. The likely vehicle was sandwiches contaminated by an ill foodhandler.

(15)
Suspected Norovirus Gastroenteritis Associated with a Luncheon

May

Anoka County

On May 10, 2002 the Minnesota Department of Health (MDH) was notified of an outbreak of gastrointestinal illness among persons who ate at a staff appreciation lunch at an elementary school in Andover on May 7. Staff members who consumed food at the luncheon were interviewed by MDH epidemiologists about food consumption and illness history. MDH was unable to obtain a list of parents who prepared food for the lunch. A case was defined as a person with onset of vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) after eating the meal. Stool samples were collected from two cases and submitted to MDH for bacterial and viral testing.

Forty-five staff members were interviewed. Of the 29 staff members who ate the meal, 12 (41%) met the case definition. One additional staff member was excluded from the analysis because she became ill prior to the meal date. Eleven (92%) cases reported diarrhea, seven (58%) reported cramps, six (50%) reported vomiting, and two (17%) reported fever. Dates of illness onset were May 7-9. The incubation period ranged from 2 to 51 hours, with a median of 32 hours. Duration of illness was 10 to 83 hours, with a median of 40 hours. Both stool samples tested negative for *Campylobacter*, *E. coli* O157:H7, *Salmonella*, *Shigella*, *Yersinia*, and norovirus.

By univariate analysis, three food items were significantly associated with illness, including condiments (8 of 12 [67%] cases vs. 2 of 15 [13%] controls; odds ratio [OR], 13.0; 95% confidence interval [CI], 1.5 to 152; $p = 0.007$), carrots (4 of 12 [33%] cases vs. 0 of 15 [0%] controls; OR, undefined; 95% CI, 1.3 to undefined), and cucumbers (5 of 12 [42%] cases vs. 0 of 15 [0%] controls; OR, undefined; 95% CI, 2.0 to undefined; $p = 0.01$). By multivariate analysis, condiments were the only food item independently associated with illness (OR, 13.0; 95% CI, 1.9 to 88; $p = 0.009$). Lunch attendees applied condiments such as mayonnaise, mustard, and butter to their own sandwiches.

The clinical and epidemiologic features of this outbreak were compatible with norovirus gastroenteritis. Eating condiments on a sandwich was associated with illness. It is possible that an ill or convalescent staff member may have contaminated the items.

(16)

Norovirus Gastroenteritis Associated with Punch Served at a Baby Shower

May

Anoka County

On May 13, 2002 the Minnesota Department of Health (MDH) was notified by Anoka County Community Health and Environmental Services of an outbreak of gastrointestinal illness among persons who had attended a baby shower at a private residence in Andover on May 11. The hostess faxed the menu and a list of 19 persons who had eaten at the baby shower to MDH on May 14. MDH employees interviewed sixteen persons and questioned the hostess about food preparation and handling procedures. A case was defined as any person who developed vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) after eating food from the gathering. Stool samples from two cases were submitted to MDH for bacterial and viral testing.

Of the 16 persons who were interviewed, nine (56%) met the case definition. Of the nine cases, seven (78%) had diarrhea, six (67%) had vomiting, five (56%) had cramps, one (11%) had fever, and one (11%) had bloody stools. The median incubation period was 41 hours (range, 22 to 56 hours), and the median duration of illness was 18 hours (range, 16 to 29 hours); however, four (44%) of the cases hadn't recovered at the time they were interviewed.

Consumption of punch was statistically associated with illness (8 of 9 [89%] cases vs. 1 of 6 [17%] controls; odds ratio, 40; 95% confidence interval, 1.3 to 6,840; $p = 0.005$). The punch consisted of canned pineapple, frozen strawberries, club soda, frozen orange juice, ice cubes, lemon slices, and pop. It was prepared on site, with the exception of the frozen strawberries, which were pureed at the home of one of the guests prior to the shower. The party attendees, including those involved in preparing the punch, did not report any illness prior to or during the event.

The two stool samples tested negative for *Campylobacter*, *E. coli* O157:H7, *Salmonella*, *Shigella*, and *Yersinia*; both samples tested positive for norovirus.

This was an outbreak of norovirus gastroenteritis associated with punch served at a baby shower at a private home. The source of contamination was not identified.

(17)

Norovirus Gastroenteritis Associated with a Mother's Day Brunch at a Restaurant

May

Olmsted County

On May 16, 2002 Olmsted County Public Health Services (OCPHS) received a complaint of suspected foodborne illness among seven people from two different households who celebrated Mother's Day at a restaurant in Rochester on Sunday, May 12. OCPHS began an investigation

the day the complaint was received. OCPHS staff interviewed patrons about food consumption and illness history. A case was defined as a person with onset of vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) after eating at the restaurant. Stool samples were obtained from four patrons and from a food worker's child and submitted to MDH for bacterial and viral testing.

OCPHS assessed the restaurant on the afternoon of May 16. Kitchen procedures were observed, and possible contributing factors to foodborne illness were noted. A complete menu of foods served at the restaurant was obtained, and several food flows were traced out with the management. A list of restaurant patrons was compiled from credit card receipts and checks, and all restaurant employees were interviewed.

Fifty-one patrons were interviewed. Eighteen (36%) met the case definition. The most common symptoms were abdominal cramps (72%), diarrhea (67%), vomiting (67%), and fever (28%). The median incubation period was 37 hours (range, 20 to 71 hours). The median duration of illness was 37 hours (range, 6 to 70 hours). After interviewing additional patrons, the bakery was ruled out as the source of the illness and the investigation focused on the restaurant.

None of the restaurant's employees reported illness; however, one food worker reported having a child that had been ill with vomiting and diarrhea on May 13 and had been in the restaurant kitchen on Sunday, May 12.

Four patrons and the food worker's child had stool samples positive for norovirus. Four of the samples were sequenced (including the food worker's child) and were found to have indistinguishable sequences.

Items from the "Especialidades" menu, including tortillas, chicken, and fajitas, were statistically associated with illness (16 of 18 [89%] cases vs. 7 of 33 [21%] controls; odds ratio 29.7, 95% confidence interval, 5.5 to 161.1; $p < 0.001$). No food samples from the suspected meal date were available for testing. An environmental assessment revealed several deficiencies including: no person-in-charge, a blocked hand sink with no paper towels, inadequate handwashing when handling ready-to-eat foods, inadequate holding temperatures and lack of temperature verification, and inadequate cooling procedures. Approximately 1 week prior to the outbreak, the restaurant changed ownership and brought on an entirely new staff.

This was an outbreak of norovirus gastroenteritis associated with a restaurant. The most likely source of viral contamination was ill food workers and/or their family members.

(18)

Norovirus Gastroenteritis Associated with Cold Sandwich Items at a Restaurant

May

Morrison County

On Wednesday, May 22, 2002 Morrison County Public Health Service (MCPHS) received a foodborne illness complaint from a group of four women who had eaten lunch together at a restaurant in Little Falls on Monday, May 20. An investigation was initiated in collaboration with the Minnesota Department of Health (MDH). MCPHS obtained a list of other patrons,

including a tour bus group that ate at the restaurant on May 20. The tour bus group had ordered off a separate menu with a choice of cold sandwiches (chicken salad or roast beef) and soup. MDH epidemiologists interviewed complainants and other patrons by phone about illness history and food consumption. A case was defined as any person with a positive stool specimen or any person who developed vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) after eating at the restaurant. Seven stool specimens were submitted to the MDH Public Health Laboratory for bacterial and viral testing; four specimens were from restaurant patrons and three were from restaurant employees. A sanitarian from MCPHS visited the restaurant on May 23 to determine if there were any ill food workers, speak with management staff, and evaluate food preparation and handling procedures.

Thirty-two people who ate at the restaurant on May 20 were interviewed. Twenty-three (72%) were from the tour bus group, and nine (28%) ate independently of the tour bus group. Twenty-seven (84%) patrons met the case definition, four (13%) reported no symptoms, and one (3%) reported gastrointestinal symptoms that did not meet the case definition (this person was excluded from further analyses). The median age of cases was 54 years (range, 17 to 77 years); 70% of cases were female. Onset dates ranged from May 20 to May 23; onsets peaked on May 21. Twenty cases (74%) had diarrhea, 18 (67%) had vomiting, 18 (67%) had cramps, and 6 (22%) reported fever. No one reported bloody stools. One case sought medical attention for the illness; no cases were hospitalized. The median incubation period was 33 hours (range, 8 to 78 hours). The median duration of illness was 38 hours (range, 15 to 138 hours); however, many cases were still ill at the time of interview.

Items statistically associated with illness included cold sandwiches (27 of 27 [100%] cases vs. 2 of 4 [50%] controls; odds ratio [OR], undefined; lower limit of 95% confidence interval [CI], 2.29; $p = 0.01$); lettuce (17 of 24 [71%] cases vs. 0 of 4 [0%] controls; OR, undefined; lower limit of 95% CI, 1.67; $p = 0.02$) and tomatoes (16 of 26 [62%] cases vs. 0 of 4 [0%] controls; OR, undefined; lower limit of 95% CI, 1.16; $p = 0.04$).

When the MCPHS sanitarian evaluated the restaurant on May 23, the restaurant did not report receiving any other complaints, and no cash register receipts were available to identify other potential customers. The “flu” had reportedly been circulating among restaurant staff. One of the cooks had a small child that had diarrhea that may have begun as early as Thursday, May 16. This cook had prepared the sandwiches served for lunch on May 20, and reported onset of vomiting and diarrhea on the evening of May 20. Another cook had onset of vomiting and diarrhea on the evening of May 21. Three other restaurant employees had onsets of vomiting and diarrhea on May 21, May 22, and May 23, respectively.

Measures to stop further disease transmission at the restaurant were recommended by MCPHS and MDH. These measures necessitated voluntary closure of the restaurant for thorough environmental cleaning and disinfection and disposal of all open, ready-to-eat food items. Employees were excluded from work until 72 hours after cessation of symptoms.

All seven stool samples (three from food workers, and four from patrons) tested by MDH were negative for *Campylobacter*, *E. coli* O157:H7, *Salmonella*, *Shigella*, *Yersinia*, and astrovirus.

All seven samples were positive for norovirus. MDH performed genetic sequencing of the norovirus isolated from three food workers and two patrons; viruses from all five people had the same genetic sequence.

This was an outbreak of norovirus gastroenteritis associated with cold sandwich items served at a restaurant in Little Falls. Multiple infected and recently ill food workers were identified at the restaurant. The source of the outbreak was viral contamination of ready-to-eat sandwich ingredients (e.g., lettuce, tomatoes) via bare-hand contact by ill food workers.

(19)

Foodborne Bacterial Intoxications Associated with a Restaurant

May

Scott County

On May 23, 2002 the Minnesota Department of Health (MDH) was notified of gastrointestinal illness in three individuals who ate together at a restaurant in Savage on May 21. Two of the three individuals lived together, but denied any other shared exposures with the third person. A sanitarian from MDH inspected the restaurant on May 23 and interviewed the restaurant manager on Tuesday, May 28. The restaurant manager reported that the restaurant had not received any other complaints. No employee illness records were obtained. The restaurant provided MDH with a partial list of restaurant patrons obtained from credit card receipts. A case was defined as a person with onset of vomiting or diarrhea (≥ 3 loose stools in a 24-hour period). No stool samples were collected from ill patrons.

Twenty-five patrons were interviewed (including the three complainants), but no additional cases were identified. All three complainants met the case definition. The three cases reported diarrhea and cramps as their only symptoms. Onset of illness occurred on May 22. The median incubation period was 11 hours (range, 9 to 15 hours). The duration of illness was 19 hours for the one case who had recovered at the time of interview. The three ill patrons reported sharing a shrimp, beef, and pork fajita with guacamole and sour cream, and chips and salsa. Eating shrimp and pork were significantly associated with illness (3 of 3 [100%] cases vs. 0 of 22 [0%] controls; odds ratio, undefined; 95% confidence interval, lower limit 8.7; $p < 0.001$).

The sanitarian identified multiple problems during the interview and the inspection. During the inspection, the sanitarian observed that cooling was performed in large stockpots and 4- to 6-inch deep pans that would not facilitate proper cooling. The establishment cooled all cooked products at room temperature for 2 hours and then placed the products in the walk-in cooler for further cooling. Critical violations cited included: dishwasher's lack of handwashing, temperature violation for ground beef on the steam table (134°F; range, 129°F to 163°F), temperature violations for raw chicken and raw beef in the cold well prep table cooler (44°F), cross-contamination between raw, potentially hazardous foods and ready-to-eat foods from the use of the same spatula, improper cooling of cooked sauces and meats, and improper thawing of frozen shrimp.

A number of recommendations were issued to the establishment, including charting the time it takes to cool all food items, developing a standard operating procedure for cooking and cooling products such as shredded beef, chicken, and made-from-scratch sauces, and educating the restaurant manager on the policies for cooking, cooling, and hot holding found in the Minnesota Food Code and Minnesota State Statute.

This was an outbreak of foodborne bacterial intoxications among three persons who ate at a restaurant. Based on the environmental health findings and the patrons' incubation periods, symptoms, and meals, *Clostridium perfringens* was the likely etiology. Cooling, thawing and hot-holding procedures were found to be inadequate and most likely contributed to this outbreak. It is possible that the meat or shrimp used for the complainants' fajitas could have been improperly thawed, cooled, or held on the complainants' meal date, thereby causing the outbreak.

(20)

Norovirus Gastroenteritis Associated with Submarine Sandwiches

May

Hennepin County

On May 28, 2002 the Hennepin County Community Health Department (HCCHD) received a complaint of gastrointestinal illness in two people that ate submarine sandwiches from a fast-food restaurant in Plymouth on May 24. The following day, HCCHD received a call from the restaurant reporting a second independent complaint of gastrointestinal illness in a patron who also had eaten at the restaurant on May 24. An investigation was initiated.

A HCCHD epidemiologist interviewed complainants about food consumption and illness history. HCCHD attempted to contact two co-workers of one of the complainants, because they reportedly also were ill after eating at the restaurant. A case was defined as a person with vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) after consuming foods from the restaurant. One stool specimen was submitted to the Minnesota Department of Health for bacterial and viral testing.

Three patrons met the case definition (two of two in the initial complaint and one of one in the second complaint). All three cases reported diarrhea and vomiting. One of the three cases reported fever. Incubation periods were 28, 38, and 40 hours, respectively. One person had an illness duration of 2 days; durations of illness for the other two cases were unknown. The stool specimen obtained was negative for *Campylobacter*, *E. coli* O157:H7, *Salmonella*, *Shigella*, and *Yersinia*, but it was positive for norovirus.

The HCCHD epidemiologist was unable to reach the complainant's co-workers. However, a parent of one of these persons reported that he experienced vomiting approximately 24 hours after eating at the restaurant, and that he had to seek medical care for his gastrointestinal symptoms.

After the initial complaint, a HCCHD environmental health specialist called the facility asking about other complaints or ill food workers. After the second complaint, the HCCHD

environmental health specialist went to the restaurant for an inspection and interviews of restaurant employees. No checks, credit card receipts or party orders from May 25 through May 27 that could have been used to identify other patrons were available. HCCHD environmental health specialists interviewed four restaurant employees who prepared food and sandwiches on May 24. None of the four staff reported gastrointestinal symptoms. One employee reported having a child ill with vomiting on May 21. Other restaurant employees were not interviewed.

This was an outbreak of norovirus gastroenteritis associated with a restaurant. One employee who prepared food on the cases' meal dates reported that they had a child who was ill with vomiting 3 days prior; this employee could have been the source of contamination of the food.

(21)

Suspected Norovirus Gastroenteritis Associated with Cold Turkey Slices

June

Crow Wing County

On June 12, 2002 a person who had attended a wedding reception in Crow Wing County on June 7 called the Minnesota Department of Health (MDH) foodborne illness hotline to report a suspected foodborne illness that began after the event. The reception was catered by Restaurant A in Deerwood. The complainant had also attended a rehearsal dinner on June 6 at Restaurant B in Crow Wing County; however, she reported that most of the ill persons had only attended the wedding reception. The mother of the groom made the complaint as she was vacationing away from home.

On June 14 an MDH sanitarian visited Restaurant A to speak with management staff, get a menu, obtain a list of employees, and evaluate food preparation and handling procedures. On the same day, another MDH sanitarian visited Restaurant B to speak with management staff and get a menu.

A list of persons who attended the wedding reception was faxed to MDH on June 15, 3 days after the complaint was made. The delay was due to the fact that the mother of the groom couldn't get a list of guests until she returned home from her vacation. The list included 98 names of attendees; of those, 57 were interviewed. A case was defined as any person who developed vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) after eating at the wedding reception.

Seventeen people met the case definition. Sixteen cases (94%) had diarrhea, 13 (76%) had vomiting, 11 (65%) had cramps, seven (41%) had fever, and one (6%) had bloody stools. The median incubation period was 37 hours (range, 12 to 45 hours), and the median duration of illness was 59 hours (range, 9 to 130 hours). Only five (21%) of the cases ate at the rehearsal dinner; therefore, the investigation focused on the wedding reception. The food eaten at the reception was prepared at Restaurant A and brought to the reception hall, where it was served buffet style. The menu included bread rolls, deli ham, deli turkey, American cheese slices, Swiss cheese slices, mayonnaise, potato salad, pickles, chips, nuts, mints, cake, raw vegetables, vegetable dip, punch, coffee, beer, champagne, and non-alcoholic wine. The only item statistically associated with illness was the turkey (17 of 17 [100%] cases vs. 30 of 40 [75%])

controls; odds ratio, undefined; $p = 0.02$). The caterer purchased all the food, with the exception of the bread rolls, from a grocer located in Grand Forks, North Dakota.

The sanitarian that visited Restaurant A provided MDH with a list of employees who helped prepare food for the reception. The employee who rolled the turkey slices and placed them on a platter reported that she had experienced nausea and that her husband had been ill with vomiting; however, both persons reported an illness onset date later than the date of the event in question. No other employees reported illness prior to, during, or after the event, but two employees could not be reached. The sanitarian didn't see any employees washing their hands during her visit, and also noted that the handwashing sink in the kitchen was dry. She required that they watch a handwashing video.

This was an outbreak of gastroenteritis associated with eating cold turkey slices served at a catered wedding reception. The epidemiologic characteristics of the outbreak were consistent with an etiology of norovirus. The source of contamination was not confirmed.

(22)

Norovirus Gastroenteritis Associated with a Restaurant

July

Anoka County

On July 16, 2002 the Minnesota Department of Health (MDH) received a report of gastrointestinal illness among a group of people that had eaten at a restaurant in Columbia Heights on July 12. An investigation was initiated. Lists of names and phone numbers of persons in the group, a menu, and an itemized receipt for the meal were obtained. Epidemiologists from MDH interviewed persons from the group by phone about food consumption and illness history. A case was defined as any person who developed vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) after eating at the restaurant. Two stool specimens were obtained for bacterial and viral testing.

All 14 people in the group were interviewed. One person was excluded from the analysis because she had mild gastrointestinal illness that did not meet the case definition. Six of the remaining 13 (46%) party members met the case definition. Five (83%) of the cases reported having diarrhea, four (67%) reported vomiting, four (67%) reported fever, two (33%) reported abdominal cramps, and none reported bloody stools. One person reported visiting an emergency room for their illness. The median incubation period was 37 hours (range, 21 to 48 hours). The median duration of illness was 29 hours (range, 14 to 57 hours). The two stool specimens obtained were negative for *Campylobacter*, *E. coli* O157:H7, *Salmonella*, and *Shigella*. One of the two stools was positive for norovirus.

The party consumed a variety of Mediterranean foods including hummus, Arabic salad, feta cheese served with cucumber and olive oil, grape leaves, shish kabobs, walleye, mashed potatoes with garlic and olive oil, Baba Ganoush (an eggplant dip with garlic, lemon, tahini and olive oil), falafel, cheese sticks, a dessert called Nights of Lebanon, Arabic coffee, American coffee, cola, and tea. Eating feta cheese with cucumbers and olive oil (5 of 6 [83%] cases vs. 1 of 7 [14%]

controls; odds ratio [OR], 25.0; 95% confidence interval [CI], 1.1 to 697; $p = 0.04$) was associated with illness. Eating hummus (3 of 3 [100%] cases vs. 0 of 7 [0%] controls; OR, undefined; 95% CI, 0.82 to undefined; $p = 0.07$), or salad (5 of 6 [83%] cases vs. 2 of 7 [29%] controls; OR, 12.5; 95% CI, 0.78 to 350; $p = 0.08$) approached a statistically significant association with illness.

An Anoka County Community Health and Environmental Services sanitarian inspected the restaurant on July 16 and interviewed restaurant employees about recent gastrointestinal illness and job duties. There were no credit card receipts or reservation lists available that could be used to identify other patrons that ate at the restaurant on the same day as the complainants. Three of five establishment employees were interviewed, and none reported gastrointestinal illness on or prior to the complainants' meal on July 12. One employee was not interviewed because he did not speak English, but according to the owner of the establishment the employee was healthy. Another employee no longer worked at the establishment at the time of the investigation, but was not working on the evening of the complainants' meal. No stools were collected from restaurant employees. Appropriate use of gloves was observed during the investigation. Handwashing procedures were also observed to be appropriate during the investigation.

This was an outbreak of norovirus gastroenteritis associated with eating at a restaurant. The most likely vehicles were feta cheese with cucumbers and olive oil, salad and/or hummus. The source of contamination was not identified.

(23)

***Salmonella* Newport Infections Associated with a Restaurant**

July

Crow Wing County

In early August 2002, the Minnesota Department of Health (MDH) Public Health Laboratory (PHL) received two isolates of *Salmonella* Newport that were indistinguishable by pulsed-field gel electrophoresis (PFGE). The two isolates of *S. Newport* were designated PFGE subtype NEW139. During the same week, MDH received a telephone call from a physician who reported that there was a food service employee who was infected with *Salmonella*. Epidemiologists conducted routine interviews of the three cases. These interviews revealed that the two *S. Newport* cases had eaten at the same restaurant in Crow Wing County, and that the food worker with *Salmonella* was employed at the same restaurant.

Complaints that were received through the foodborne illness hotline were reviewed. One complainant from July 29 reported eating at the restaurant during the week prior to his illness. This patron subsequently tested positive for *S. Newport* NEW139. When epidemiologists called MDH Environmental Health Services (EHS) to discuss the outbreak, it was discovered that the sanitarian had received a report from the restaurant about an additional complainant from the same time period. MDH EHS contacted the restaurant, and an investigation was initiated on August 6.

On August 6, MDH epidemiologists received a list of employees who worked at the restaurant. Employees were interviewed about recent illness, job responsibilities, and food consumption. For employees, a case was defined as a person from whom *S. Newport* was isolated or who had vomiting, diarrhea, or stomach cramps since July 10. Employees who met the case definition were excluded from work until two stool samples, collected at least 24 hours apart, tested negative for *Salmonella*. Employees who had not been ill were required to submit one stool sample to be tested for *Salmonella*, but were allowed to continue working. If the stool sample tested positive for *Salmonella*, employees were excluded from work until two samples, collected at least 24 hours apart, tested negative.

A sanitarian and an epidemiologist from MDH visited the restaurant on August 7 to conduct an outbreak inspection and continue interviewing employees. At the time of the restaurant inspection, chicken taco salad was a suspected vehicle for the outbreak based on information from patron interviews. The restaurant had three cases of chicken breasts that were received and used during the time period in which patron cases ate. Eight chicken breasts from each of the three cases were collected and tested for *Salmonella* at the MDH PHL.

Additional *S. Newport* cases were identified through routine surveillance and were interviewed regarding illness history and exposures, including restaurant meals. Laboratory-confirmed *S. Newport* cases and complainants were asked about other members of their dinner parties who ate at the restaurant. Epidemiologists interviewed these additional patrons of the restaurant. On August 8, MDH received a menu and names of additional patrons from credit card receipts. For patrons, a case was defined as a person from whom *S. Newport* was isolated or who had vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) after eating at the restaurant within the 7 days prior to the onset of symptoms.

Fifty-three patrons were interviewed, and 15 (28%) met the case definition. All 15 cases had diarrhea and abdominal cramps, 10 of 12 (83%) had fever, four of 15 (27%) had vomiting, and one of 14 (7%) reported bloody stools. The cases' meal dates ranged from July 17 to August 3. Onsets of illness occurred from July 18 to July 29. The median incubation period was 54 hours (range, 13 to 185 hours). The median duration of illness was 140 hours (range, 38 to 279 hours). *S. Newport* NEW39 infection was confirmed by stool culture in five (33%) cases. One case was hospitalized. The cases reported eating a variety of menu items, including nachos, mini corndogs, French fries, hamburgers, chicken, beef and chicken taco salads, and walleye sandwiches. In the univariate analysis, eating nachos was significantly associated with illness (3 of 15 [20%] cases vs. 0 of 29 [0%] controls; odds ratio [OR], undefined; $p = 0.03$). One group reported sharing a plate of nachos with someone in their party who was ill with a fever and vomiting the morning of their meal date.

Five of the 15 cases had onset dates that suggested they could possibly be secondary cases to ill family members or household members (even though they all had eaten at the restaurant as well). For this reason, a separate analysis was conducted excluding these five cases. For the remaining cases, the meal dates ranged from July 17 to July 23. Onsets of illness occurred from July 18 to July 25. The median incubation period was 52 hours (range, 13 to 54 hours). The median duration of illness was 119 hours (range, 38 to 279 hours). Three (30%) cases were confirmed

with *S. Newport* NEW139, and one was hospitalized. In the univariate analysis of this group, which excluded the five cases who may have been secondary cases, drinking water was significantly associated with illness (3 of 10 cases vs. 1 of 29 controls; OR, 12.0; 95% confidence interval, 1.03 to 325.4; $p = 0.04$).

All twenty-four employees were interviewed, and nine (38%) met the case definition. Seven (78%) cases reported diarrhea, six (67%) reported cramps, two (22%) reported bloody stools, one (11%) reported vomiting, and one (11%) reported fever. All 24 employees were tested for *Salmonella*. One of the 16 asymptomatic employees tested positive for *S. Newport* and was subsequently excluded from work until two stool samples, collected at least 24 hours apart, tested negative for *Salmonella*. Four of the eight symptomatic employees tested positive for *S. Newport*. In total, five (21%) employees tested positive for *S. Newport* (two for PFGE subtype NEW139, three for subtype NEW139a). Subtype NEW139a is one band different from subtype NEW139. The employees' onset dates ranged from July 24 to August 5.

When the sanitarian and epidemiologist from MDH visited the facility on August 7, they recommended that the restaurant close for the lunch hour to determine the extent of illness among employees, evaluate food preparation procedures, and identify potential sources of the outbreak. The employees discontinued working immediately and were interviewed regarding illness history, job responsibilities, and food consumption. Since the restaurant was closed, the MDH investigators could not observe foodhandling and handwashing procedures. Instead, the owners walked through the kitchen and discussed the typical food preparation procedures.

Based on the first interviews with patron cases, the chicken taco salad was a suspect vehicle of *S. Newport* in this outbreak. For this reason, the owners concentrated on the procedures for making the chicken taco salad, which also revealed information on how other salads and sandwiches were prepared. The chicken breasts were received from the food service agency and then stored in a walk-in freezer in the basement. A cook transferred the chicken to a walk-in cooler in the kitchen as needed. The cook, using his bare hands, removed the chicken from the case and placed it on the grill. When the chicken was placed on the grill it was either frozen, partially thawed, or thawed, depending on the length of time it had been in the walk-in cooler. The breasts were cooked for 5 to 10 minutes, but a thermometer was not used to verify the doneness of the chicken. The chicken breasts were cut into pieces on the griddle using a spatula or were cut on the sandwich prep table cutting board. Other menu items such as sandwiches and salads were prepared on the same cutting board. The salad fixings, such as lettuce, cheese and black olives, were pre-cut or pre-shredded and stored in the walk-in cooler. The food worker replenished the supply in the prep unit using bare hands. All the food was prepared and replenished with bare hands.

Employee interviews revealed that employees continued to work at the restaurant while they were ill with vomiting and diarrhea, thereby increasing the likelihood of contaminating the environment and the food. All food preparation was done with bare hands, which increased the likelihood of cross-contamination. Since the temperature of the chicken was not verified with a thermometer, the chicken could have been in various states of doneness when it was placed on the cutting board. Because the food handlers cut the chicken on the same cutting board as that

used for salads and other ready-to-eat foods, there was clear potential for cross-contamination. The MDH sanitarian and epidemiologist discussed disinfection procedures, proper foodhandling procedures, bare-hand contact, exclusion policies for food service employees, and handwashing procedures with the restaurant. The restaurant was instructed to thoroughly clean and disinfect all kitchen surfaces prior to reopening. The owners held an all-staff informational meeting on Friday, August 9 immediately prior to reopening for business.

The chicken samples tested negative for *Salmonella*.

This was an outbreak of *S. Newport* infections among patrons and employees of a restaurant. Interviews with ill patrons and employees of the restaurant indicated that the employees became ill after some of the patrons. However, there were some patrons who became ill after the employees. This suggests that initially, the organism may have been brought into the kitchen by a contaminated food product. That food product could have contaminated the environment and other food items as a result of the employees' food handling procedures and substantial bare-hand contact with food. The contaminated foods and environment would have resulted in ill patrons and employees. Once the employees became ill and continued working, there could have been ongoing transmission from employees to patrons via contamination of the environment and food items. There was no evidence of ongoing transmission after the restaurant was closed and the ill/infected employees were excluded from working in food service until shown to be negative for *Salmonella*. The epidemiological and environmental health findings support that a combination of a contaminated food product, cross-contamination, and infected employees caused the illnesses among patrons and employees.

(24)

Suspected Norovirus Gastroenteritis Associated with a Private Gathering

July

Hennepin County

On July 30, 2002 a Bloomington resident notified the City of Bloomington Environmental Health (CBEH) about a suspected outbreak of illness among persons who had attended a private gathering at a Bloomington residence the evening of July 24. Seven adults attended the event. Food items consumed included commercially prepared potato salad, home-prepared fruit salad and green salad, brats, cake, and beverages. Staff from the CBEH and Minnesota Department of Health (MDH) interviewed event attendees about illness symptoms and food history. The wife of the index case also was interviewed. She did not attend the event, but had helped prepare food for the event. A case was defined as a person who attended the private gathering and subsequently became ill with vomiting or diarrhea (≥ 3 loose stools in a 24-hour period).

Six of the seven (86%) persons who attended the event met the case definition. The median incubation was 27 hours (range, 3 to 33 hours). The median duration of illness was 27 hours (range, 5 to 37 hours). Five of the six cases (83%) had vomiting, five of six (83%) had diarrhea, two of three (67%) had cramps, and one of six (17%) reported fever. No visits to a health care provider were reported.

On July 23, in preparation for an event that they planned to host on the evening of July 24, the index case and his wife had prepared fruit salad and green salad and added sliced hard-boiled eggs to a potato salad purchased at a local grocery store. At approximately 11:00 a.m. on July 24, the wife became ill with vomiting. The couple contacted friends who agreed to host the event, and the wife of the index case stayed home. Three couples and the index case attended the event that evening. The index case became ill with vomiting and diarrhea approximately 5 hours after the event began. The remaining five cases had a median incubation period of 27 hours (range, 25 to 33 hours). All six cases consumed brats, potato salad, and fruit salad. Five cases consumed corn-on-the-cob, and five consumed cake. The grocery store where the potato salad was purchased reported no complaints of illness.

This was an outbreak of suspected norovirus gastroenteritis associated with a private gathering. Food items were likely contaminated by an infected person who prepared salads for the gathering while incubating norovirus.

(25)

Norovirus Gastroenteritis Associated with a Catered Lunch Buffet

August

St. Louis County

On August 27, 2002 the Minnesota Department of Health (MDH) received a complaint through the foodborne illness hotline of a suspected foodborne outbreak among attendees at a golf tournament held in Hibbing on August 24. The complainant indicated that there were two meals associated with the tournament: a lunch buffet catered by Restaurant A at a golf course and a sit-down dinner held at a local club (Club A) that was catered by a chef from another club (Club B) after the tournament ended. MDH informed the St. Louis County Public Health Department (SLCPH) of the possible outbreak on August 27, and an investigation was initiated.

Employees of the golf course provided names and telephone numbers of the tournament participants, as well as preliminary menus for the lunch buffet and sit-down dinner. MDH and SLCPH staff interviewed the tournament attendees. A case was defined as a person with onset of vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) after attending the golf tournament. Stool samples were obtained from five people and sent to MDH for testing. SLCPH staff conducted an environmental assessment of Restaurant A.

Interviews were completed for 78 (81%) of 96 tournament attendees/golf course employees. Of these 78 individuals, 55 (71%) met the case definition. Forty-eight (87%) cases had diarrhea, 41 (75%) had cramps, 36 (65%) had vomiting, and 24 (45%) had fever. The median incubation period was 32 hours (range, 11 to 45 hours). The median duration of illness was 27 hours (range, 3 to 113 hours). Three cases sought medical attention for their illnesses. One attendee died on August 25; it was determined that the deceased attendee's cause of death was due to pre-existing health conditions, and there was no evidence of gastrointestinal illness. All five stools tested were positive for norovirus, including a stool specimen from the food worker who prepared the catered lunch. Three of the positive samples were sequenced, including the one from the food worker; all three samples had identical viral sequences.

After interviewing attendees, it became clear that the catered lunch was the most likely source of infection. The sit-down dinner was ruled out as the cause of illness, because numerous ill attendees ate the catered lunch, but did not eat the sit-down dinner. Therefore, no further follow-up was conducted with Club A or the chef who prepared dinner. Twenty-five of the 29 employees of Restaurant A were interviewed. It was learned that one foodhandler sliced three different meats and one of the three cheeses on August 23. He became ill with vomiting and diarrhea later that evening. He returned to work the morning of August 24 to assemble the trays of meats and cheeses and deliver the food to the golf course. The buffet table was set at 10:30 a.m. on August 24. When the meat and cheese trays arrived, they were too large for the tables, so the Restaurant A employee and several golf course staff transferred the food to smaller trays. The remaining food was stored in the coolers at the golf course and used to replenish trays as they were emptied on the buffet line. Tournament attendees served themselves from the buffet as they came off the golf course. Food items included sandwich fixings (buns, meats, cheeses, condiments), sliced vegetables, dips, potato salad, pasta salad, and beverages. The buffet was available from approximately 10:45 a.m. to 4:30 p.m.

Several food items from the lunch buffet were statistically associated with illness: ham (40 of 53 [75%] cases vs. 8 of 19 [42%] controls; odds ratio, 4.2; 95% confidence interval, 1.2 to 14.9; $p = 0.008$), white cheese (36 of 53 [68%] cases vs. 8 of 20 [40%] controls; odds ratio, 3.2; 95% confidence interval, 1.0 to 10.6; $p = 0.03$), yellow cheese (34 of 52 [65%] cases vs. 5 of 19 [26%] controls; odds ratio, 5.3; 95% confidence interval, 1.5 to 20.3; $p = 0.003$), buns (52 of 55 [95%] cases vs. 14 of 19 [74%] controls; odds ratio, 6.2; 95% confidence interval, 1.0 to 10.6; $p = 0.03$), mayonnaise (20 of 53 [38%] cases vs. 2 of 18 [11%] controls; odds ratio, 4.9; 95% confidence interval, 1.0 to 34.1; $p = 0.04$), and mustard (12 of 53 [23%] cases vs. 0 of 19 [0%] controls; odds ratio, undefined; $p = 0.02$).

This was an outbreak of norovirus gastroenteritis associated with eating at a catered lunch buffet. The most likely source of contamination was an ill foodhandler who sliced and plated deli meats and cheeses.

(26)

Norovirus Gastroenteritis Associated with a Wilderness Camp

August

St. Louis County

On September 6, 2002 a family that had attended a wilderness camp during the week of August 24-31 called the Minnesota Department of Health (MDH) to report gastrointestinal illness among family members and other campers. The camp offered tent camping sites, cabins with and without kitchens, and optional meal plans served buffet-style. This group attended the final session of the summer season.

A roster of 154 campers (from 42 families) and 33 staff members was obtained from the camp director. MDH epidemiologists contacted both groups about their illness history and which meals they had eaten communally in the dining hall. One hundred twenty-five campers from 39 families were interviewed; only eight staff members were interviewed because many of the student-counselors had returned to college and were difficult to reach. A case was defined as a

camper or staff member with vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) during or after the week of August 24-31. Stool samples were collected from four ill campers and sent to MDH for bacterial and viral testing.

One staff member and 11 campers from six families met the case definition. Of the 12 cases, nine (75%) had diarrhea, eight (67%) had vomiting, eight (67%) had cramps, and one (8%) reported fever. Two individuals were treated as outpatients in an emergency room; no one was hospitalized. Dates of illness onset ranged from August 26 to September 3, with one or two cases per day. The median duration of illness was 48 hours (range, 0.5 to 144 hours). All four of the stool samples were negative for bacterial pathogens; one of the four samples tested positive for norovirus.

By univariate analysis most meals served in the dining hall were associated with illness, probably because those people who became ill were among those that signed up for the meal plan. By stepwise logistic regression, one meal was independently associated with illness: lunch on August 27 (8 [30%] of 27 exposed vs. 4 [4%] of 104 unexposed; relative risk, 10.3; 95% confidence interval, 2.8 to 37.7; $p < 0.001$). The cook reported that there were no illnesses that week in kitchen staff members or their families. The menu for lunch on August 27 included BLT sandwiches, a cheese tray, fresh onion rings, canned pears, and taco chips with salsa. There were tongs provided for serving the chips, but the cook observed that campers did not always use the tongs. Silverware was provided from common bins on each table.

This was an outbreak of norovirus gastroenteritis associated with a wilderness camp. Viral transmission likely occurred from ill campers contaminating serving or eating utensils and/or food items. Person-to-person transmission within families also was evident from interviews of cases and from the appearance of the epidemic curve. Handwashing facilities were scarce at the camp, and few of the cabins had indoor bathrooms. In fact, campers were encouraged to use outhouses instead of camp bathrooms with running water. Interventions that the camp planned to implement in the future included discussing handwashing during orientation, hand sanitizers in the outhouses, a handwashing station at the entrance of the dining hall with monitored hand washing for unattended children, rearranging the buffet line to minimize handling of dishes by children, and eliminating self-service of food items.

(27)

Norovirus Gastroenteritis Associated with a Cold Food Platter

August

Nicollet County

On August 30, 2002 the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint from six persons who had developed gastroenteritis after eating at a restaurant in North Mankato on August 26. The six had shared a “summer platter” (consisting of cold chicken, potato salad, cottage cheese, fruit, and toast) and were the only ill members of their party of 20. The six persons denied having any other common exposures. The complainants provided a list of names and telephone numbers of persons in the party. MDH epidemiologists interviewed the six complainants and seven others about their food consumption and illness history. A case was defined as a person who ate at the restaurant on August 26 and subsequently

became ill with vomiting or diarrhea (≥ 3 loose stools in a 24-hour period). Stool samples collected from three of the six individuals reporting illness were submitted to MDH for bacterial and viral testing.

A Brown-Nicollet Environmental Health sanitarian conducted an inspection of the restaurant and interviewed restaurant employees about recent gastrointestinal illness and job duties. Although no one reported illness, stool samples were collected from four employees, including the party's server and the employee who had prepared the cold-food platter.

Only the six original complainants met the case definition. The median incubation period was 34 hours (range, 20 to 58 hours). Six cases (100%) had diarrhea, four (67%) had abdominal cramps, one (17%) reported vomiting, and one (17%) reported fever. The median duration of illness was 30 hours (range, 10 to 48 hours). Eating the "summer platter" was significantly associated with illness. None of the individual food items found on the platter were independently associated with illness because all six cases ate some of each, and these same foods were not eaten by well meal companions.

No bacterial pathogens were identified in the stool samples. Two of the three patron stool samples and two of the four samples from restaurant employees tested positive for norovirus. Gene sequences from all four isolates were identical. The positive employees were a manager and the employee who prepared the fruit, chicken and toast for the platter.

This was an outbreak of norovirus gastroenteritis associated with a restaurant. The cause of the outbreak was likely contamination of ready-to-eat foods prepared by an infected food worker.

(28)

***E. coli* O157:H7 Infections Associated with Retail Ground Beef**

September

Multi-County, Multi-State

On September 10, 2002 a woman called the Minnesota Department of Agriculture (MDA) to report that her daughter had contracted *E. coli* O157:H7 from hamburger. They had made hamburgers while camping on August 31; it was dark and the hamburgers were not properly cooked. The MDA contacted the Minnesota Department of Health (MDH) foodborne illness hotline and picked up the hamburger for testing. The receipt was available; the hamburger was a "case-ready" product (not repackaged by the store).

On September 12, the MDH Public Health Laboratory confirmed *E. coli* O157:H7 infection in the daughter. On September 16, the laboratory designated the *E. coli* O157:H7 isolate from the daughter as pulsed-field gel electrophoresis (PFGE) pattern MN672. The same day, through routine statewide active laboratory-based surveillance, MDH identified four additional persons with infections caused by *E. coli* O157:H7 MN672. MDH also recognized that the isolates matched the PulseNet PFGE pattern associated with an ongoing outbreak in Wisconsin, termed "Cluster Two" by the Wisconsin Division of Public Health.

MDA isolated *E. coli* O157:H7 from the hamburger on September 17. On September 23, MDH identified the PFGE subtype of *E. coli* O157:H7 in the hamburger as the outbreak strain. From this point, the United States Department of Agriculture Food Safety Inspection Service (USDA, FSIS) and the Wisconsin Division of Public Health coordinated an investigation involving multiple states that included a general epidemiological investigation and meat testing and traceback.

In Minnesota, a case was defined as a Minnesota resident with a culture-confirmed infection with *E. coli* O157:H7 MN672 and onset of illness during September 2002 or later. Cases were interviewed using a standard questionnaire about food consumption and other potential exposures occurring in the 7 days prior to the onset of illness.

PFGE testing after digestion with the enzyme *Xba*1 was performed on all *E. coli* O157:H7 isolates received at MDH, and those with the pattern common to this outbreak were designated MN672. All MN672 isolates were also tested by PFGE after digestion with a second enzyme, *Bln*1. All MN672 isolates indistinguishable by PFGE after digestion with *Bln*1 were designated PulseNet pattern EXHA26.0308.

Overall, MDH identified eight Minnesotans (from six different households) with *E. coli* O157:H7 MN672 infections. The isolates from seven of the eight cases were further characterized as PulseNet pattern EXHA26.0308 after digestion with *Bln*1. The PFGE pattern of one *E. coli* O157:H7 isolate was designated PulseNet pattern EXHA26.0514 after digestion with *Bln*1; this isolate differed by one band from the other seven isolates.

Cases resided in Beltrami, Hennepin, Rice and Olmsted counties. The median age of cases was 19 years (range, 2 to 37 years). Onsets of illness ranged from September 1 to September 28. All eight cases reported diarrhea and abdominal cramps, seven (88%) reported blood in the stools, six (75%) reported vomiting, and three (38%) reported fever. The median duration of diarrhea was 5.5 days (range, 3 to >8 days). Two cases (25%) visited an emergency room, and one case (13%) was hospitalized for 3 days. There were no cases of hemolytic uremic syndrome.

All Minnesota cases reported consuming ground beef during the week before onset of illness, but meat samples for testing were only available from the index case. The *E. coli* O157:H7 isolated from this ground beef by MDH was the outbreak strain, PulseNet pattern EXHA26.0308. For all Minnesota cases, the ground beef consumed in the week prior to illness onset was reportedly purchased from a retailer whose ground beef was supplied totally or in part by a common meat processor, "Processor A", of Milwaukee, Wisconsin. No other common exposures were discovered during the interviews.

According to the Centers for Disease Control and Prevention, samples of ground beef recovered from case households in Wisconsin and New York tested positive for the outbreak strain of *E. coli* O157:H7. USDA, FSIS traced these positive ground beef samples, along with the ground beef from Minnesota's index case, to Processor A. The meat packer voluntarily recalled 416,000 pounds of fresh and frozen ground beef products on September 27. These products had been distributed to retail markets in Illinois, Michigan, Minnesota, and Wisconsin, and institutional

foodservice customers nationwide. On October 2, the recall was expanded to encompass approximately 2.8 million pounds of ground beef products distributed to retail markets and institutional foodservice customers nationwide.

This was a multi-state outbreak of *E. coli* O157:H7 infections associated with consumption of contaminated hamburger produced and distributed by a common meat processing plant.

(29)

Foodborne Bacterial Intoxications Associated with a Luncheon

September

Hennepin County

On October 2, 2002 Hennepin County Community Health Department (HCCHD) Epidemiology and Environmental Health received a foodborne illness complaint from the Minnesota Department of Health regarding a workplace luncheon in Minneapolis on September 30. The report that a number of employees had developed diarrhea within hours of eating at the luncheon was originally sent to City of Minneapolis Environmental Health (MEH).

Lists of luncheon attendees and food items served were faxed to HCCHD on October 2. However, due to a misunderstanding of state statutes regarding foodborne outbreak investigations, the workplace requested that they call all the attendees to obtain their permission before they could be contacted. On October 3 the attendees that agreed to be interviewed were contacted and interviewed with a standard questionnaire about food consumption and illness histories.

Thirty-five persons attended the luncheon. Ten attendees declined to be contacted for an interview. Of the remaining 25 persons, 24 were contacted and 19 were interviewed. A case was defined as a luncheon attendee with vomiting or diarrhea (≥ 3 loose stools in a 24-hour period). Eleven (58%) persons met the case definition. Symptom distribution was as follows: diarrhea (100%), cramps (73%), vomiting (9%) and fever (9%). The median incubation period was 8.5 hours (range, 5 to 24 hours) and durations of illness ranged from 11 to 60 hours. One stool sample was submitted to MEH for bacterial toxin testing; it was negative for *Clostridium perfringens* toxin and *Bacillus cereus*.

Consumption of meat and potatoes approached a statistically significant association with illness (11 of 11 [100%] cases vs. 5 of 8 [63%] controls; odds ratio, undefined; $p = 0.06$). None of the other food items were associated with illness.

Samples of the following food items were submitted to the MEH lab: refried beans, meat and potatoes, cheddar cheese, rice, lettuce, cilantro, chips, red salsa, and tortilla. One sample of refried beans had a *B. cereus* count of 3,500,000 per gram and a *C. perfringens* count of 270,000 per gram. The meat and potato samples were not tested for *B. cereus*; one sample of meat and potatoes had a *C. perfringens* count of 18,000 per gram. Samples of tortillas, chips, and rice (two samples) had plate counts of *B. cereus* of <100 .

MEH took no further action because the luncheon was a private party. Attempts were made to contact the luncheon attendee who prepared the food in order to discuss preparation and heating and cooling techniques; however, this person could not be reached.

This was an outbreak of foodborne bacterial intoxications caused either by *Bacillus cereus* or *Clostridium perfringens*. The statistical analysis suggested that the meat and potato dish was the vehicle. Laboratory testing for *B. cereus* was not conducted on the meat and potatoes sample. Testing revealed high counts of *B. cereus* in beans. The relatively low counts of *C. perfringens* isolated from the meat and potato dish suggest that the agent was more likely *B. cereus*. It may have been possible to obtain more stool specimens if there had not been a delay in obtaining permission to talk to attendees. In addition, the statistical analysis could have had more power to detect statistically significant associations with food items if more attendees had been interviewed.

(30)

***Salmonella* Enteritidis Infections Associated with Fried Rice**

October

Olmsted County

On October 16, 2002 an epidemiologist from Olmsted County Public Health Services (OCPHS) notified the Minnesota Department of Health (MDH) of four *Salmonella* infections among a family of 10 and a guest who had attended an open-house event with food on October 5 at the family's residence. On October 15, OCPHS staff visited the family's residence in response to reports from a school nurse and a clinic of illness among the family members. Several children from the family had been absent from school with enteric illness, and the parents had been hospitalized with salmonellosis. After the home visit, OCPHS was notified by a clinic of a *Salmonella* infection in a person who had visited the family's residence on October 5, attending the open-house event. MDH and OCPHS staff conducted a conference call on October 16 and initiated an outbreak investigation.

OCPHS staff contacted the host family and obtained a menu and a list of persons who had attended the open-house event. MDH and OCPHS staff interviewed the attendees about illness history and food consumption using a standard questionnaire. A case was defined as a person who attended the open-house event and subsequently became ill with vomiting or diarrhea (≥ 3 loose stools in a 24-hour period). Two attendees reporting mild illness symptoms were excluded from data analyses.

Salmonella isolates sent by clinics to the MDH Public Health Laboratory were serotyped and then subtyped by pulsed-field gel electrophoresis (PFGE). Stool specimens were also collected from two other attendees and cultured for *Campylobacter*, *E. coli* O157:H7, *Salmonella*, *Shigella*, and *Yersinia*.

Eighteen (32%) of 56 attendees interviewed met the case definition. The median age was 20 years (range, 5 to 72 years). The median incubation was 47 hours (range, 6 to 119 hours). The median duration of illness was 101 hours (range, 12 to 269 hours). All 18 cases had diarrhea, 15

(83%) of 18 had cramps, 14 (78%) of 18 had fever, four (24%) of 17 had vomiting, and one (9%) of 11 reported bloody stools. Two cases were hospitalized, for 1 night and 3 nights, respectively.

Salmonella Enteritidis was isolated from stool samples from three of 13 ill guests and two of five ill family members. All isolates were subtype SE1B1, indistinguishable by PFGE.

Consumption of fried rice (rice, egg, hot pepper, fish sauce, garlic, and MSG) was associated with illness by univariate analysis (14 of 17 [82%] cases vs. 4 of 26 [15%] controls; odds ratio, 25.7; 95% confidence interval, 4.0 to 205; $p < 0.001$). Other food items consumed during the event included two types of spring rolls, two types of noodle dishes, sticky rice, maya, soup, cake, cookies, various fruits, water, ice, and soda. One case did not attend the open-house event on October 5, but did consume leftover fried rice and rice noodles the following day.

Approximately five persons assisted with food preparation beginning the evening before the event. Several attendees stated during interviews that large quantities of food had been placed on tables or counters for long periods of time during the event and that refrigeration capacity was not adequate.

This was an outbreak of *Salmonella* Enteritidis SE1B1 infections associated with fried rice (with egg) served at a private gathering. It is plausible that contaminated, undercooked eggs were the source of the infections. Undercooked eggs are a well-established vehicle for *Salmonella* Enteritidis infections. Several attendees noted during interviews that food items served during the event were not kept at proper temperatures, allowing for subsequent bacterial proliferation.

(31)

Norovirus Gastroenteritis Associated with a Wedding Reception

October

Hennepin County

On October 10, 2002 the Minnesota Department of Health (MDH) received a report regarding a wedding reception held at an event center in Brooklyn Park on October 5. It was reported that 30 of the 200 guests had become ill with vomiting and diarrhea. The groom's dinner had been held at a restaurant in Maple Grove on October 4. MDH contacted Hennepin County Community Health Department (HCCHD) Epidemiology and Environmental Health to inform them of the complaint. The City of Brooklyn Park's Code Enforcement and Public Health Division (BP) was contacted, and reported that they had received a report from the event center on October 8. The event center had contacted the groom to obtain feedback about the event. The groom had indicated that he and several other people who had eaten at the reception on October 5 had been ill with vomiting and diarrhea. An outbreak investigation was initiated.

On October 10, HCCHD sanitarians inspected the restaurant where the groom's dinner was held, spoke with the manager, and interviewed food service employees. No foodhandling violations, ill employees, or complaints were identified. Early in the interview process, it was found that many ill people had attended the wedding reception but not the groom's dinner, and that there were no ill persons who reported attendance at the groom's dinner but not the reception. Therefore, the subsequent investigation focused on the wedding reception held at the event

center in Brooklyn Park. On October 8, BP obtained lists of items served at the reception, food service employees, and contact names for other events held the weekend of the wedding reception. On October 10 and 11, BP returned to the event center to gather additional information, interview employees, observe food preparation, and discuss foodhandling procedures with staff and management. Names and phone numbers of employees not present during the on-site interview were obtained. Calls were made to contact persons from four other events held at the facility that weekend. On October 14, BP contacted the Minnesota Department of Agriculture (MDA) because the wedding cake had been made at a facility inspected by the MDA. MDA inspected the facility and interviewed the facility operator on October 15.

From October 10 to October 15, HCCHD epidemiologists obtained lists of names and numbers of wedding attendees. Attendees were interviewed by phone with a standard questionnaire about symptom history and food consumption at the groom's dinner and wedding reception. A case was defined as a person with onset of vomiting or diarrhea (≥ 3 loose stools in 24 hours) since October 5. Stool samples were obtained from three of the ill reception attendees and from one ill family member who was likely a secondary case. The stools were submitted to MDH for bacterial and viral testing.

Of the 78 reception attendees that were interviewed, 34 (43%) met the case definition. Of the 34 people who reported illness, 21 (62%) had only attended the wedding reception and not the groom's dinner. Thirty-two cases (94%) had diarrhea, 29 (85%) had nausea, 20 (59%) had vomiting, 14 (41%) had chills, and 11 (32%) had cramps. No cases reported bloody stools. The median incubation period for primary cases was 40 hours (range, 9 to 54 hours), and the median duration of illness was 39 hours (range, 8 to 96 hours). One wedding reception guest had onset of gastrointestinal illness on October 2, 3 days before the reception. This person was not included in statistical analyses of case exposures. The other ill persons had onsets from October 6 to October 14, with onsets peaking on October 7. Four persons developed illness after contact with other ill persons and most likely represented secondary or tertiary transmission.

All four stool samples tested negative for *Campylobacter*, *E. coli* O157:H7, *Salmonella*, *Shigella*, and *Yersinia*. All four stools tested positive for norovirus. Viruses from three of the four positive cases were sequenced; the sequences of all three were identical.

No food item showed a statistically significant association with illness. However, there was potential for guests to handle food items on the appetizer buffet that included assorted vegetables with dip and cheese cubes and crackers. Items served at the sit-down dinner included Caesar salad, chicken, potatoes, vegetables, bread, and butter, as well as coffee, water, soda, and other beverages.

Sanitarians from BP did not find any significant foodhandling violations at the event center. No employees had reported illness, management was unaware of any ill employees, and no other illness complaints had been received. The four kitchen employees who had prepared the food for the reception said that they had not experienced any diarrhea or vomiting in the week before the wedding reception and neither had their family members or friends. One food service employee

reported onset of illness with fever, headache, and abdominal cramps on October 6, the day after the wedding reception. This employee reported not being involved in food preparation or handling for the wedding reception, little direct contact with the attendees, and no consumption of any of the food from the reception. Of the 16 temporary employees involved in food service for the wedding reception, nine (56%) were interviewed, and no illnesses were identified. Of the four other events held that weekend, a contact person from one group was reached and reported no illness among that group; contact persons from the other four events were not reached. The facility that made the wedding cake was inspected by MDA, and reported that they had produced several cakes with common ingredients that were served at four separate parties held at the event center the weekend of October 5 and 6. The cakes had been delivered by refrigerated truck the day of the events. No illnesses were reported from the groups served the other cakes. Three of the four people who prepared the cakes were interviewed; none had symptoms of diarrhea or vomiting on that day or during the previous week.

This was an outbreak of norovirus gastroenteritis associated with a wedding reception. The vehicle and source of contamination were not identified.

(32)

Campylobacteriosis Associated with a Restaurant

October

Ramsey County

On October 21, 2002 the Minnesota Department of Health (MDH) received a complaint of gastrointestinal illness among a group of people from five different households that ate at a restaurant in St. Paul on October 13. Three of seven people with no other common exposures became ill after having lunch at the restaurant. Two of the three ill persons had sought medical care and were told that their stools specimens tested positive for *Campylobacter*. The third person was planning to submit a specimen at her health care provider's office the day of the complaint. The *Campylobacter* isolates from the two persons diagnosed prior to the complaint were received for confirmation at the MDH Public Health Laboratory (PHL) on the same day as the complaint.

Lists of names and phone numbers of persons in the party were obtained. Epidemiologists from MDH interviewed persons from the party by phone about food consumption and illness history. A case was defined as any person from whom *Campylobacter* was isolated and who reported eating at the restaurant prior to the onset of their symptoms. The PHL conducted pulsed-field gel electrophoresis (PFGE) on all positive *Campylobacter* isolates associated with this outbreak.

All *Campylobacter* cases are routinely interviewed about exposures and food consumption at home and at restaurants as part of surveillance activities. Epidemiologists reviewed information gathered during surveillance interviews in order to identify other potential cases associated with eating at the restaurant.

A City of Saint Paul Office of License, Inspections and Environmental Protection sanitarian inspected the restaurant on October 23, observed food preparation practices, and inquired about

recent gastrointestinal illness among restaurant employees and about employee job duties. MDH epidemiologists accompanied the sanitarian during the inspection. There were no credit card receipts or reservation lists available that could be used to identify patrons that ate at the restaurant on the same day as the complainants.

All seven persons in the party were interviewed. Three were ill and submitted stool specimens that were positive for *Campylobacter jejuni*. An additional case was identified during routine surveillance activities, for a total of four cases. Four (100%) of the cases reported having diarrhea and fever, three (75%) reported abdominal cramps, one (25%) reported bloody stools, and none reported vomiting. All four cases sought medical care, including one person who visited an emergency room. The median incubation period was 45 hours (range, 44 to 78 hours). The median duration of illness was 6 days (range, 6 to 7 days). All four *Campylobacter jejuni* isolates were indistinguishable by PFGE (subtype designated CMP157).

All cases had lunch at the restaurant on October 12. Because of the small number of people interviewed, statistical analysis was not helpful in identifying the vehicle. However, all four cases and only one of the four controls ate salads. The salads eaten by the four cases and the one control had the same ingredients, except that two of the cases had chicken as a salad ingredient, one had beef and one had mock duck; the control had mock duck. Three of the cases mentioned that they had fish sauce (one case omitted sauce type information) vs. one of the four controls.

Of the restaurant's employees, only the owner spoke English. According to the owner, none of the employees reported recent gastrointestinal illness. One employee was observed preparing all the foods at the time of the inspection. Although the employee was wearing gloves, the employee handled raw chicken, scratched her arm and subsequently handled ready-to-eat foods without changing gloves or washing hands. A handwashing training video was provided to the restaurant.

This was an outbreak of campylobacteriosis associated with eating at a restaurant. A specific vehicle was not confirmed, but poor hand-hygiene and inappropriate food preparation techniques provided opportunities for cross-contamination between raw poultry or meat juices and ready-to-eat foods such as salads.

(33)

Norovirus Gastroenteritis Associated with Homemade Candy

October

Fillmore County

On Friday, October 25, 2002 the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint from a local community college. The initial report was that 15 of approximately 40 people were ill with gastrointestinal symptoms after a bus trip to southern Minnesota on October 18. The tour bus had made numerous stops including a food court, an Amish community in Fillmore County, and a casino. Also on October 25, the MDH foodborne illness hotline received another complaint from ill persons who reported in their 4-day food history that on October 19 they had toured the same Amish community mentioned in the earlier

complaint. An outbreak investigation was initiated with the MDH Southeastern District field epidemiologist and the Minnesota Department of Agriculture (MDA) Dairy and Food Inspection Division. Subsequently, two additional unrelated parties contacted the hotline and reported illness after visiting the Amish community.

Names and telephone numbers of people who had recently toured the Amish community were obtained from hotline callers, tour groups, and tour operators. MDH epidemiologists interviewed persons by phone about food consumption and illness history. A case was defined as a person with onset of vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) after visiting the Amish community or after consuming food that was purchased in the Amish community. Stool samples were collected from seven ill persons and submitted to the MDH Public Health Laboratory for bacterial and viral testing.

An MDA investigative team conducted an individual meeting with each of the four tour operators in the county and obtained names of and directions to any stops on their tours that sold any type of food. This list was checked against a list of known licensed businesses; unlicensed vendors were visited and MDA issued orders to discontinue sale of food.

Interviews were completed for 119 persons who had either visited the Amish community or consumed food that was purchased in the Amish community. Of these 119 persons, 50 (42%) met the case definition, 63 (53%) reported no symptoms, and six (5%) reported mild symptoms that did not meet the case definition. These persons were excluded from further analyses, as were two persons who were likely secondary cases because they were exposed to another ill case at least 2 days before their onset. The remaining 48 cases were associated with five different groups that visited the Amish community. Dates of visits ranged from October 14 to October 26. Illness onset dates ranged from October 16 to October 26. Forty-five (94%) cases had diarrhea, 30 (64%) had cramps, 27 (56%) had vomiting, and 12 (25%) reported fever. No one reported bloody stools. One case was hospitalized briefly. The median incubation period was 41 hours (range, 21 hours to 7 days), and the median duration of illness was 40 hours (range, 10 hours to 10 days).

All seven stools tested positive for norovirus and negative for bacterial pathogens. Persons with positive stool samples were from three different groups. Genetic sequencing was conducted on viruses from two different cases, and the viral sequences matched. These two cases were from unrelated groups whose visits to the Amish community took place 7 days apart.

Tours to the Amish community included stops at private homes that offered items for sale, including some homes that sold food items such as jams, pastries, breads, and candy. Eating homemade candy purchased from one local farm, Farm A, was associated with illness (40 of 48 [83%] cases vs. 40 of 63 [63%] controls; odds ratio, 2.9; 95% confidence interval, 1.2 to 7.5; $p = 0.02$). Seven (15%) of the cases had not visited the Amish community, but had eaten candy from Farm A that household members had brought home from their visits. The candy sold included a variety of chocolate, caramel, maple, and nut items. Upon questioning by the MDA food inspector, the owner of Farm A reported that multiple members of his family had experienced gastrointestinal illness recently.

MDA noted that some of the unlicensed food vendors advertised by signs at the end of their driveways, and some advertised on fliers distributed by the tour operators. Following the individual meetings with the four tour operators, a letter of warning was mailed (certified mail, return receipt requested) to each of the tour operators. Tour operators agreed to discontinue promoting unlicensed vendors on their tours. Individual meetings were held with each of the unlicensed vendors, and orders were issued to immediately discontinue food sales. Following the individual meetings, a warning letter (certified mail, return receipt requested) was mailed to each unlicensed vendor. Two of the unlicensed food vendors refused or declined to pick up the certified letters, so a subsequent visit was made to hand-deliver the letter to each of these households. Follow-up visits by MDA confirmed that Farm A was no longer selling unlicensed food items.

This was an outbreak of norovirus gastroenteritis associated with homemade candy purchased during tours of an Amish community. The most likely source of viral contamination of the candy was ill persons who prepared and packaged the candy for sale. This outbreak demonstrated the utility of a statewide foodborne illness hotline in detecting outbreaks from apparently unrelated complaints. The standard collection of a 4-day food history was key to the identification of a common food source and to the detection and control of the outbreak. This outbreak also highlighted the challenges of investigating illnesses and encouraging food safety in unlicensed settings.

(34)

Suspected Norovirus Gastroenteritis Associated with a Wedding Reception

October

Hennepin County

On October 31, 2002 the Minneapolis Division of Environmental Health (MEH) received a report of gastrointestinal illness among at least 15 of 278 guests at a wedding reception. The reception was held at a hotel in Minneapolis on October 26, and a groom's dinner had been held at a restaurant in Champlin on October 25. MEH contacted the Hennepin County Community Health Department (HCCHD) to inform them of the foodborne illness complaint because both facilities were in Hennepin County. The Minnesota Department of Health (MDH) was also contacted. On October 31, MEH sanitarians went to the hotel and spoke with the executive chef and the sous chef, interviewed employees who had prepared the food for the reception, and inspected the facility. The hotel management provided a detailed list of food items and the names of several other parties who had eaten there on October 26.

On November 1, HCCHD requested and received a guest list from the groom's family. Guests were interviewed with a standard questionnaire about attendance and food consumption at the reception, attendance and food consumption at the groom's dinner, and illness history. Early in the interview process, it was found that most people had attended the reception only and not the groom's dinner. Of the 22 ill persons interviewed, only five (23%) had attended both events and 17 (77%) had attended the wedding reception only and were not present at the groom's dinner. Based on that information, the decision was made not to interview wait staff at the restaurant where the groom's dinner had been held. Stool samples were obtained from four of the reception attendees and submitted to MDH for bacterial and viral testing.

A case was defined as a wedding guest with onset of vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) since October 26. Of the 89 reception attendees that were interviewed, 22 (25%) met the case definition. Twenty-two (100%) cases had diarrhea, 15 (68%) had cramps, 12 (55%) had nausea, nine (41%) had chills, six (27%) had vomiting, and six (27%) had fever. The median incubation period was 27 hours (range, 7 to 47 hours) and the median duration of illness was 44 hours (range, 7 to 114 hours). Two food items were significantly associated with illness: salad (22 of 22 [100%] cases vs. 47 of 67 [70%] controls; odds ratio [OR], undefined; $p = 0.002$) and chicken (21 of 22 [95%] cases vs. 50 of 67 [75%] controls; OR, 7.1; $p = 0.04$).

The hotel was first notified of this incident on October 28, but did not notify MEH until October 31. The executive chef was reminded by MEH that under the state food code, the regulatory agency must be notified immediately upon receipt of a foodborne illness complaint. On October 31, the hotel was inspected by MEH and two violations were noted: the main dishwashing machine was not reaching proper temperature and that the slicer needed to be disassembled more thoroughly for cleaning. In addition, during a follow up visit on November 1, inspectors observed that gloves were not worn while prepping lettuce and tomatoes. Of the 31 food service employees that worked the evening of the reception, 27 were interviewed. One employee reported being ill with diarrhea since July 1 and submitted a stool sample to MDH for testing. No other employees reported illness. It was estimated that approximately 80 hotel employees ate leftover food items (including the salad and chicken from this reception) the evening of October 26 and the following day. None of the employees reported subsequent illness.

Stool samples from four wedding reception attendees (collected 1 to 5 days after recovery) and one hotel food worker tested negative for *Campylobacter*, *E. coli* O157:H7, enterotoxigenic *E. coli*, *Salmonella*, *Shigella*, and *Yersinia*. All five samples also tested negative for norovirus and astrovirus.

This was an outbreak of gastroenteritis associated with a wedding reception. The characteristics of the illnesses were compatible with norovirus gastroenteritis. MDH is pursuing further testing for norovirus through the Centers for Disease Control and Prevention (CDC) as MDH's lab may not detect 100% of norovirus infections. Consumption of the salad and chicken were significantly associated with illness. The source of contamination was not identified.

(35)

***Salmonella* Typhimurium Infections Associated with a Restaurant**

November

Hennepin County

On November 27, 2002 the Minnesota Department of Health (MDH) Public Health Laboratory identified four isolates of *Salmonella* Typhimurium that were indistinguishable by pulsed-field gel electrophoresis (PFGE). This PFGE subtype was designated TM122. Routine interviews of three of the cases by MDH epidemiologists revealed that they had all recently patronized the same restaurant in Minneapolis. An investigation was initiated on the evening of November 27.

City of Minneapolis Division of Environmental Health and Food Safety (MEH) sanitarians conducted an environmental assessment of the restaurant on the evening of November 27. The restaurant closed the night of the initial environmental assessment and remained closed over the weekend for cleaning, disinfection, and disposal of food items, and until illness among workers could be assessed. Sanitarians and an MDH epidemiologist visited the restaurant over the Thanksgiving holiday weekend in order to interview workers and monitor cleaning progress. The bar was allowed to stay open for beverage and pre-packaged food service on the night of November 27, closed on November 28 (Thanksgiving), and reopened on November 29. MEH issued emergency closure orders to the restaurant on December 2. On December 5, a formal hearing was held to discuss the conditions for reopening the restaurant. The restaurant reopened on December 6. Sanitarians visited the restaurant again on December 6 and December 9. While the restaurant was closed, MEH provided food safety training to all restaurant employees.

Restaurant employees were interviewed about recent gastrointestinal illness. All restaurant employees were asked to submit stool specimens for *Salmonella* testing. Employees who reported any gastrointestinal symptoms within the previous month, or who tested positive for *Salmonella* on their first specimen, were excluded from work until two consecutive stool specimens obtained at least 24 hours apart tested negative for *Salmonella*.

During the investigation, the restaurant received several complaints from patrons. The restaurant forwarded names and phone numbers of complainants to sanitarians and MDH epidemiologists for follow-up. Epidemiologists interviewed complainants by phone about food consumption and illness history.

All *S. Typhimurium* cases reported to MDH are routinely interviewed about exposures and food consumption at home and at restaurants as part of surveillance activities. An MDH epidemiologist reviewed information gathered during routine interviews in order to identify other potential cases associated with eating at the restaurant. Confirmed cases were defined as persons from whom *S. Typhimurium* TM122 was isolated and who reported eating at the restaurant prior to symptom onset, or who worked at the restaurant. Probable cases were defined as persons who had diarrhea (≥ 3 loose stools in a 24-hour period) and fever and ate at the restaurant prior to symptom onset, or who had diarrhea and ate at the restaurant with a confirmed case.

Twenty-nine cases were identified from routine surveillance and complaints, including 24 confirmed and five probable cases. Nineteen cases (14 confirmed and five probable) were patrons of the restaurant. Ten cases (all confirmed) were restaurant employees. Thirty-four employees tested negative for *S. Typhimurium*. Four of the ten (40%) restaurant employee cases reported no gastrointestinal symptoms during the month prior to the investigation.

Among the 25 symptomatic cases (19 patrons and 6 employees), all had diarrhea, 24 (96%) had abdominal cramps, 14 (56%) had fever, nine (36%) had bloody stools, and eight (32%) had vomiting. The median duration of illness was 154 hours (range, 112 to 159 hours). Seventeen (68%) cases visited a health care provider. Three (12%) were hospitalized for 1 to 5 days for their illness. Meal dates among patron cases ranged from November 13 to November 26. The median incubation period for patrons was 81 hours (range, 37 to 285 hours). The earliest

reported dates of onset of illness were October 20 for an employee, and November 15 for a patron. Cases had eaten a variety of foods including chicken quesadillas, bean burrito, nachos, salsa, guacamole, burger, turkey and bacon sandwich, tuna melt, chicken fingers, eggs, and garlic mashed potatoes.

The initial environmental assessment of the restaurant revealed seven critical and nine non-critical violations of the Minnesota Food Code. Food contact surfaces were inadequately sanitized. Cutting boards were worn and grooved. The tub food in plastic containers was located adjacent to the prep sink, which was being used to hold and rinse soiled dishes. The sanitizing solution intended for cleaning surfaces in the kitchen contained a large amount of debris and dirt, rendering it ineffective. Residue had built up on the floors, walls, ceiling, equipment, and inside coolers as well as in other areas of the establishment.

Poor handwashing by food workers was observed. The hand sink was located in the bar, outside of the kitchen. During the environmental assessment the cook used the food prep sink rather than the hand sink to wash hands.

Potentially hazardous foods were held at improper temperatures or cooled improperly. Foods, such as tofu and vegetables, were held in plastic containers inside a large tub filled with water and a small amount of ice. The temperature of the tofu was 53°F. The cold rails in the kitchen were also holding food at improper temperatures, including bacon at 56°F, bean dip at 57°F, and turkey at 55°F. Chicken at 76°F (cooling 1 – 1.5 hours), beans at 44 to 46°F, and tuna salad at 41°F were found in the bottom chambers of the cold rails. The walk-in cooler was holding mashed potatoes at 59°F, roasted potatoes at 59°F, mushrooms at 59°F, raw turkey 51°F, and rice at 59°F. No food thermometers were in use at the time of the environmental assessment.

Employee interviews revealed that several employees had experienced recent gastrointestinal illness. One of the employees reported having a *Salmonella* infection in October. Follow-up with her health care provider revealed that she was mistaken, and she had not been diagnosed as having a *Salmonella* infection at that time. The employee reported her infection to the manager, but the employee illness log indicated that the employee had reported a food-related viral infection. The restaurant did not call the sanitarian to report the employee illness. An employee also reported witnessing the manager take a complaint of illness from a patron in October, but the sanitarian was not informed of the complaint.

As a result of the environmental assessment findings, the restaurant discarded all foods from the walk-in cooler. The entire restaurant was thoroughly cleaned, including walls, equipment and utensils. The cutting boards were replaced, the walk-in cooler was serviced, the menu was revised, and all employees received training on food safety and handwashing. Conditions for reopening the restaurant included the development of a system for monitoring cleaning, handwashing, and temperatures, and plans for remodeling the kitchen. A new prep room with a prep sink, hand sink, work table, and 3-compartment sink was constructed in the basement after the restaurant reopened.

This was an outbreak of *S. Typhimurium* TM122 infections associated with eating at a restaurant in Minneapolis. The outbreak was identified during routine surveillance activities at MDH. Transmission to patrons occurred over a 2-week period. Multiple foods acted as vehicles for patrons. Numerous deficiencies in food holding, food preparation, and sanitation procedures were identified. These deficiencies likely contributed to the survival and proliferation of *Salmonella* in foods and/or environmental surfaces in the kitchen, ultimately leading to contamination of ready-to-eat foods or foods after they were cooked. Infected food workers could also have played an important role in transmission of *Salmonella* to patrons. The initial vehicle that introduced *Salmonella* into the restaurant's kitchen was not identified.

(36)

Norovirus Gastroenteritis Associated with Salad Served at a Restaurant

November

Ramsey County

On November 20, 2002 the Minnesota Department of Health (MDH) foodborne illness hotline received nine separate complaints of gastrointestinal illness from patrons who ate at the same restaurant in Roseville on November 16. Complaints from 19 individual parties totaling 90 people were eventually received by the hotline; and all reported eating at the restaurant on November 16 between 4:30 and 10:30 p.m.

On November 20, a sanitarian and an epidemiologist from St. Paul-Ramsey County Department of Public Health (SPRDPH) and an epidemiologist from MDH conducted an inspection of the restaurant and interviewed all available employees about recent gastrointestinal illness and job duties. Those foodhandlers not available were interviewed later by telephone with assistance from a Spanish-speaking interpreter.

Lists of names and telephone numbers of persons in the complainants' parties were obtained, and these individuals were interviewed about their illness history and food items they had eaten, using a standard questionnaire. In addition, a list of patrons from November 16 (divided from noon to 4:30 p.m. and from 4:30 p.m. to 11 p.m.) was compiled using credit card receipts. Seven parties from the afternoon and eight parties from the evening were interviewed. A case was defined as a person who ate at the restaurant on November 16 and subsequently became ill with vomiting or diarrhea (≥ 3 loose stools in a 24-hour period). Stool specimens from eight ill patrons and one ill employee were submitted to MDH for bacterial and viral testing.

None of 40 individuals from seven parties identified from credit card receipts for meals served between noon and 4:30 p.m. reported illness; these parties were excluded from further analysis. All eight parties (totaling 19 patrons) identified from credit card receipts for meals served after 4:30 pm reported illness in at least some individuals of the party (11 of 19 reported illness). Two employees who ate food prepared after 4:30 p.m. on November 16 reported onsets of illness on November 18; no other employees reported prior or current gastrointestinal illness.

Overall, 74 (68%) of 109 patrons interviewed, who were served after 4:30 p.m., met the case definition. Eight additional individuals reported illness, but did not meet the case definition. Fifty-nine percent of cases were female. The median incubation period was 31 hours (range, 8 to

67 hours). Onsets of illness (for 74 patrons and two employees) were clustered on November 17 (31 cases), 18 (42 cases) and 19 (three cases). Sixty-seven cases (88%) had diarrhea, 62 (82%) had vomiting, 54 (71%) had abdominal cramps, and 27 of 62 (44%) reported fever. The median duration of illness was 39 hours (range, 3.5 to 113 hours). Eight patrons visited their healthcare provider, five patrons visited an emergency room, and one patron was hospitalized for 10 days.

All eight stool samples submitted by ill patrons, as well as the only stool sample submitted by a restaurant employee, were positive for norovirus by RT-PCR. Viral sequences were identical. No bacterial pathogens were identified in the samples.

According to restaurant management, more than 450 meals were served between 4:30 p.m. and closing time on November 16. An estimated 68% of the patrons served during this time became infected with norovirus, resulting in an estimated 300 clinical norovirus infections. These estimates were based on interviews of complainants' parties and on interviews of a random sample of parties identified through credit card receipts, all reporting illness.

Consumption of salad was significantly associated with illness (74 of 76 [97%] cases vs. 17 of 27 [63%] controls; odds ratio, 20.9; 95% confidence interval, 4.0 to 213; $p < 0.001$). No single salad ingredient was independently associated with illness. No other foods were associated with illness.

The restaurant prepared salad each afternoon around 4:00 p.m. from bulk Romaine lettuce and prepackaged mixed salad, and then stored the salad in bins in the cooler. Salad prep staff portioned it into family-style bowls and wait staff added dressing and croutons just before serving. Any leftover salad was discarded. Multiple restaurant inspections failed to identify the source of the contamination of the salad ingredients or the finished salad. An explanation offered by the restaurant was a possible cross-contamination event in which cold water running into a divided sink holding thawing seafood may have overflowed and contaminated the Romaine lettuce.

This was a point-source outbreak of norovirus gastroenteritis affecting an estimated 300 patrons of a restaurant. The vehicle was salad; the source of the contamination was not identified. Interventions implemented by the restaurant included designating separate sinks to be used for produce only, bagging all raw proteins in chill bags before thawing under cold running water, and reviewing all thawing procedures.

(37)

Norovirus Gastroenteritis Associated with a Restaurant

November

Rice County

On November 18, 2002 the Minnesota Department of Health (MDH) received a complaint of gastrointestinal illness among a group of 11 people that ate lunch at a restaurant in Faribault on November 16. Names and phone numbers of persons in the group were obtained. Epidemiologists from MDH interviewed persons from the group by phone about food

consumption and illness history. A case was defined as any person who developed vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) after eating at the restaurant. One stool specimen was obtained for bacterial and viral testing.

Illness histories were obtained for all 11 people in the group. Food consumption histories were obtained for seven of the 11 persons. Four of the 11 (36%) party members met the case definition. All four cases had abdominal cramps, three (75%) had diarrhea, three (75%) had vomiting, one (25%) had fever, and no one reported bloody stools. The median incubation period was 36 hours (range, 28 to 44 hours). All four cases were still ill at the time of the complaint. The stool specimen obtained was negative for *Salmonella*, *Shigella*, *Campylobacter*, *E. coli* O157:H7, and *Yersinia*, but it was positive for norovirus.

The cases consumed a variety of foods including turkey roast sandwich with cheese, onions, peppers, and mushrooms; lettuce salad with tomato, onions, and ranch dressing; cheese broccoli soup; crackers; French toast; bacon; patty melt with onions; French fries; coffee; water; and ice.

An MDH Environmental Health specialist conducted an investigation of the restaurant on November 19. Lists of names and phone numbers of restaurant employees were obtained. Epidemiologists from MDH interviewed a subset of employees over the phone about work duties and recent gastrointestinal illness, focusing primarily on employees who had worked on November 15 and 16. Employees who reported gastrointestinal symptoms were excluded from work for 72 hours after symptoms resolved. Two stool specimens were obtained from ill employees for bacterial and viral testing. Thirty-four of approximately 65 restaurant employees were interviewed. One reported experiencing cramps but no diarrhea or vomiting. Of the remaining 33, five (15%) reported gastrointestinal illness with onset dates ranging from October 29 through November 18. At least two of the five ill employees reported working while ill. The two stool specimens submitted for testing by employees were negative for *Campylobacter*, *E. coli* O157:H7, *Salmonella*, *Shigella*, and *Yersinia*, but both samples were positive for norovirus. The viral sequence from one of the employees' specimen and the patron's specimen were identical. The virus from the other employee's specimen was not sequenced.

The restaurant kept a log of ill calls by employees. According to the information in the illness log, no employees called in sick with gastrointestinal symptoms in the 30 days prior to the investigation. The restaurant's policy on illness and emergencies only addressed speaking directly with a supervisor at least 2 hours before the beginning of a shift. There was no written restaurant policy on not working when experiencing gastrointestinal symptoms.

Since only half of the restaurant employees were interviewed by MDH, the restaurant manager was instructed to talk with employees and assess whether they had symptoms of either vomiting or diarrhea within the previous 72-hour period. Any employee who had experienced these symptoms was to immediately leave the store until they had no symptoms for 3 days. After sending home any ill employees, restaurant management was instructed to dispose of ready-to-eat foods and properly wash storage containers prior to refilling them with fresh products from unopened food containers.

Information was left with the restaurant manager highlighting the importance of temperature control of potentially hazardous food products and employee personal hygiene/handwashing. A handwashing training video was also given to the restaurant manager. Management was instructed to share this information with all employees and to ensure that all employees were performing proper handwashing at the appropriate times.

This was an outbreak of norovirus gastroenteritis associated with eating at a restaurant in Faribault. Multiple foods prepared or served by ill foodhandlers served as vehicles for infection.

(38)

Norovirus Gastroenteritis Associated with Wedding Receptions

November

Ramsey County

On November 20, 2002 the Minnesota Department of Health (MDH) was notified via the foodborne illness hotline of a suspected outbreak of gastroenteritis among persons who had attended a wedding reception at a St. Paul club on November 16. Upon interviewing the complainant, MDH initiated an outbreak investigation in collaboration with the St. Paul-Ramsey County Department of Public Health and the City of St. Paul License, Inspections, and Environmental Protection department. MDH epidemiologists subsequently learned of gastrointestinal illnesses associated with a separate wedding reception held at the same club on the same date.

MDH staff obtained names of attendees from contact persons for both wedding receptions (Groups A and B). Club management provided event menus, a list of employee names, and contacts for five other events held at the establishment from November 15 to November 20. Patrons from Groups A and B, and club employees, were interviewed about illness history, food consumption, and job duties (where applicable) using standard questionnaires. A case of illness was defined as a person who had attended a wedding reception at the club on November 16 with subsequent onset of vomiting or diarrhea (≥ 3 loose stools in a 24-hour period). Stool samples were collected from seven patrons (five from Group A, 1 to 3 days after recovery; two from Group B, 12 days after recovery) and submitted to the MDH Public Health Laboratory for bacterial and viral testing.

One hundred forty-one (50%) of 280 patrons from Group A were interviewed, and 40 (28%) met the case definition. Fifty-three (67%) of 79 patrons from Group B were interviewed, and eight (15%) met the case definition. Twenty-four patrons were excluded from analyses. The patrons excluded from analysis included 11 from Group A and five from Group B who indicated mild symptoms that did not meet the case definition, as well as five patrons from Group A and three from Group B met the case definition but were potential secondary cases. Therefore, a total of 40 cases were included in the data analysis. All seven stool specimens (five from Group A and two from Group B) were negative for *Campylobacter*, *E. coli* O157:H7, *Salmonella*, *Shigella*, and *Yersinia*. All five stool specimens from Group A tested positive for norovirus. Both stool specimens from Group B tested negative for norovirus. This was not unexpected, given the length of time that had elapsed between recovery and specimen collection.

For Group A, the median incubation period was 37 hours (range, 7 to 75 hours) and the median duration of illness was 41 hours (range, 6 to 88 hours). Thirty-three (94%) of 35 cases had diarrhea, 25 (74%) of 34 had cramps, 22 (63%) of 35 had vomiting, 15 (44%) of 34 had fever, and no one reported bloody stools. One case was hospitalized for 1 day.

For Group B, the median incubation period was 29 hours (range, 7 to 43 hours) and the median duration of illness was 42 hours (range, 10 to 121 hours). Three (60%) of five cases had diarrhea, three (75%) of four had cramps, two (40%) of five had vomiting, two (50%) of four reported fever, and no one reported bloody stools.

Overall (combining both groups), punch (21 of 38 [55%] cases vs. 32 of 126 [25%] controls; odds ratio [OR], 3.6; 95% confidence interval [CI], 1.6 to 8.3; $p = 0.001$), bread (39 of 39 [100%] cases vs. 103 of 128 [80%] controls; OR, undefined; 95% CI, undefined; $p = 0.006$), and chicken as an ingredient (35 of 40 [88%] cases vs. 86 of 127 [68%] controls; OR, 3.3; 95% CI, 1.1 to 10.6; $p = 0.02$), were associated with illness by univariate analysis. These items were among those common to both groups. However, chicken was not associated with illness for either group separately. Multivariate logistic regression was not conducted due to a zero cell count.

Illness among Group A patrons was associated with punch (18 of 34 [53%] cases vs. 13 of 86 [15%] controls; OR, 6.3; 95% CI, 2.3 to 17.3; $p < 0.001$), bread (34 of 34 [100%] cases vs. 69 of 88 [78%] controls; OR, undefined; 95% CI, 2.1 to undefined; $p = 0.008$), and salad (34 of 35 [97%] cases vs. 66 of 88 [75%] controls; OR, 11.3; 95% CI, 1.5 to 239; $p = 0.01$). No food items were statistically associated with illness for Group B patrons.

City of St. Paul sanitarians interviewed 20 (74%) of 27 employees of the club where the receptions were held. One banquet service employee reported that her child had diarrhea beginning on November 14. Another banquet service employee reported onset of diarrhea on November 18. Of the seven employees not interviewed, one declined and the others could not be contacted. Twelve of the 20 employees interviewed consumed leftover food items served to both reception groups, including chicken and salad. One employee consumed juice. Consumption of bread was not reported. Eleven of the 12 employees reported no subsequent onset of illness. One employee reported subsequent onset of diarrhea; this employee consumed leftover chicken that a co-worker had obtained.

Contact persons from the five other events with food held at the club from November 15 to November 20 reported no illnesses among their groups.

A banquet employee prepared the punch for both reception groups on November 14 in three 3-gallon portions. This employee became ill on November 18 with diarrhea but had not consumed punch. Punch for the Group A reception was set up in two locations for self-service. The banquet employee who reported prior onset of diarrheal illness in a household contact had set out approximately 25 glasses individually at one of the self-service punch stations; this employee also helped serve plated salads to Group A patrons. Members of a family that had reported gastrointestinal illness in household contacts prior to attending the Group A reception had

consumed the self-service punch. Banquet employees served punch to the Group B patrons. The banquet employees worked in teams to set up and serve baskets of bread to both reception groups. One employee informed a sanitarian that a food sink used to clean romaine lettuce for salads served to both groups might have been improperly cleaned and sanitized beforehand. The sink was used to thaw frozen shrimp for a different event prior to cleaning the lettuce. Romaine lettuce was cleaned in the sink for both groups at the same time.

This was an outbreak of norovirus gastroenteritis among persons attending concurrent wedding receptions. Consumption of punch, bread, and salad were statistically associated with illness. The source(s) of contamination was not confirmed but likely included infected workers and/or patrons attending the events.

(39)

Norovirus Gastroenteritis Associated with a Buffet-Style Restaurant

November

Anoka County

On November 21, 2002 the Minnesota Department of Health (MDH) received a complaint that a group of five people became ill after eating lunch together at a restaurant in Coon Rapids on November 17. The five people were from three different households, and they denied any other common food exposures. An outbreak investigation was initiated in collaboration with the Anoka County Community Health and Environmental Services Department (ACCHES). MDH epidemiologists interviewed the five people by phone about food consumption and illness history. A case was defined as a person with onset of vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) after eating at the restaurant. Stool samples were collected from three ill persons and sent to the MDH Public Health Laboratory for bacterial and viral testing. On November 21, an ACCHES sanitarian did an on-site evaluation of the restaurant.

Of the five persons interviewed, all five met the case definition. All five had diarrhea and cramps, four (80%) had vomiting, one (20%) had fever, and no one reported bloody stools. No cases visited a health care provider for their illness. The median incubation period was 38 hours (range, 28 hours to 51 hours). Only one case had recovered at the time of interview, and was ill for 38 hours. All three stools tested were negative for *Campylobacter*, *E. coli* O157:H7, *Salmonella*, *Shigella*, and *Yersinia*. All three stools were positive for norovirus. Genetic sequencing was performed on viruses from two cases that lived in different households; the two viral sequences were identical.

Cases reported eating a variety of items from the restaurant's buffet. At the restaurant, the ACCHES sanitarian noted some cold, potentially hazardous food items that were being held in prep trays at improper temperatures. The restaurant was also cited for failing to notify ACCHES after they received this complaint. Restaurant employees were not individually interviewed about possible illness due to language barriers.

This was an outbreak of norovirus gastroenteritis associated with a restaurant. The source and the food vehicle of the outbreak were not determined. It is possible that an item on the buffet was contaminated either by an unidentified ill food worker or by an ill restaurant patron.

(40)

***Clostridium perfringens* Intoxications Associated with Chicken**

November

Olmsted County

On November 25, 2002 Olmsted County Public Health Services (OCPHS) received a complaint from a group of three people who became ill after eating at a restaurant in Rochester on November 24. This party reported no other common exposures. An additional complaint was received from a patron who had eaten at the same restaurant on November 23. An investigation was initiated immediately. OCPHS staff obtained credit card receipts and interviewed patrons about food consumption and illness history. A case was defined as a person with onset of vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) after eating at the restaurant. Stool samples were obtained from three ill patrons and submitted to the Minnesota Department of Health for testing. On November 25, a team from OCPHS, including an epidemiologist, three sanitarians, and a Spanish-speaking interpreter went to the restaurant to interview employees about food preparation practices and illness history.

Forty-one patrons were interviewed. Nine (22%) met the case definition. The most commonly reported symptoms were diarrhea (100%) and abdominal cramps (78%). Several cases also reported sweats/chills (44%), nausea (33%), and headache (33%). The median incubation period was 12 hours (range, 1 to 14 hours). The median duration of illness was 10 hours (range, 2 to 25 hours).

Food items containing chicken were statistically associated with illness (9 of 9 [100%] cases, vs. 12 of 25 [48%] controls; odds ratio undefined, $p = 0.006$). *Clostridium perfringens* enterotoxin type A was detected in three stool samples; one stool also contained *Staphylococcus aureus* and *S. aureus* enterotoxin A.

Preliminary questioning of employees on November 25 indicated that the chicken was boiled and then cooled completely before being shredded. However, further questioning revealed that the standard procedure was to partially cool the boiled chicken by direct contact with ice. After the chicken was cool enough to handle, it was to be shredded and portioned into pans that were then placed in the walk-in cooler to finish cooling. Cooled, shredded chicken was then combined with other ingredients, heated on the stove, and transferred to the steam table.

After discussing the preparation of the chicken with the employees, OCPHS sanitarians decided to visit the restaurant at a later date to observe the cooling procedures. During that subsequent visit on November 26, sanitarians found chicken stored in 6-inch pans (chicken was 5-inches deep) in the walk-in cooler. The temperature of that chicken was 37°F at the time of the assessment; however, food workers were unable to provide evidence that the chicken was adequately cooled within 6 hours, suggesting a possible means for improper cooling. After

further interviews with employees, OCPHS sanitarians learned that on November 24, the quantity of chicken prepared was larger than usual, and may have been left at room temperature for an extended period of time because staff was not available to finish preparation.

This was an outbreak of *Clostridium perfringens* intoxications associated with eating at a restaurant. Foods containing chicken were statistically associated with illness. The environmental health investigation identified a probable mechanism for improper cooling of chicken and amplification of *C. perfringens*.

(41)

Norovirus Gastroenteritis Associated with a Restaurant

November

Hennepin County

On November 25, 2002 the Minnesota Department of Health (MDH) received an illness complaint regarding takeout food that had been ordered from a restaurant in Plymouth on November 22. It was reported that six of the nine people from four households who shared the takeout meal in a private home became ill with vomiting and diarrhea. MDH forwarded the report to Hennepin County Community Health Department (HCCHD) Epidemiology and Environmental Health for investigation. HCCHD spoke with the assistant manager of the restaurant on November 25 and inspected the facility on November 27 as part of the foodborne outbreak investigation. The family of four adults that operates the restaurant was interviewed at that time. There were no other employees.

The HCCHD epidemiologist interviewed all nine people who shared the takeout meal about food consumption and illness history with a standard questionnaire. A case was defined as a person with vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) after consuming food from the restaurant. Stool samples were obtained from two of the ill people who consumed this meal and submitted to MDH for bacterial and viral testing.

Of the nine people who ate the meal, six (67%) met the case definition. Five (83%) persons had diarrhea, five (83%) had nausea, five (83%) had vomiting, five (83%) had chills, and three (50%) reported fever. The median incubation period was 20 hours (range, 8 to 33 hours) and the median duration of illness was 15 hours (range, 4 to 50 hours). The two stool samples submitted by ill cases tested positive for norovirus at MDH. The stool samples were negative for bacterial pathogens.

There were not enough data to detect a statistically significant difference in food items consumed by the ill compared to those who were not ill. The complainants reported that the food was served "buffet style" and that most people ate the majority of the dishes offered. There was no single dish that all six of the ill people consumed except for the rice, but two of the three non-ill persons ate rice as well.

The restaurant reported no patron complaints (they had not been contacted by the complainant in this investigation) and no employee illnesses in the previous 2 weeks. The manager stressed that

all four employees are family members so he would know if they were sick. HCCHD sanitarians interviewed all the employees during the inspection of the facility. None of the four family members that operated the restaurant and lived in the same household reported illness in the week preceding the patron complaint. No critical violations were cited at the time of the inspection. According to the manager, the menu items mentioned in the complaint were popular items and made frequently. All takeout orders were reportedly made to order and packaged in the kitchen. Egg rolls, sesame shrimp and chicken were breaded and deep fried, then cooled on metal sheet pans. The chicken and broccoli and the Kung Pao chicken were both stir-fry dishes that were made fresh to order. The sweet and sour soup was made fresh daily and held in a steam table. The manager estimated that about 350 meals were sold on November 22.

This was an outbreak of norovirus gastroenteritis associated with take-out food from a restaurant. Due to the limited amount of data, no single food or drink item could be identified as the source of the illnesses.

(42)

Norovirus Gastroenteritis Associated with a Restaurant

November

Scott County

On December 3, 2002 the Minnesota Department of Health (MDH) was notified through the foodborne illness hotline of gastrointestinal illness among four of 10 persons who ate together on November 28 (Thanksgiving Day) at a restaurant in Prior Lake. The four ill persons were from three separate households and denied any other common exposures.

On December 3, MDH Environmental Health Services (EHS) staff contacted the restaurant by telephone and requested a buffet menu and lists of employees and patrons from November 28. On December 4, a sanitarian from MDH EHS visited the establishment and interviewed five employees and again requested the lists of employees and patrons. MDH did not receive a complete list from the owner of employees and patrons who were present at the restaurant on November 28 until the afternoon of December 5.

On December 5, epidemiologists began interviewing patrons who ate at the restaurant on November 28. Patrons were interviewed about recent illness and food consumption, and were asked whether any other members of their party were ill. Patron contacts were asked to give the names and telephone numbers of everyone who ate in their party. Alternatively, they were asked to have any ill members of their party contact MDH epidemiologists to be interviewed. A case was defined as a person who had vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) after eating at the restaurant on November 28. Stool kits were delivered to five individual patrons living in four households.

One hundred four patrons were interviewed, and 28 (27%) met the case definition. These 104 patrons represented 55 parties consisting of approximately 332 patrons. The 28 cases dined with 17 different parties. One patron reported gastrointestinal illness during the week prior to November 28, but could not recall her onset date of illness. This patron was excluded from the analysis. Twenty-four (86%) cases had diarrhea, 18 of 27 (67%) had vomiting, 16 of 25 (64%)

had abdominal cramps, and 13 of 24 (54%) had fever. The cases' meal times ranged from 9:30 a.m. to 3:30 p.m.; meal time was not significantly associated with illness. Onsets of illness occurred from November 28 to December 1. The median incubation period was 33 hours (range, 2 to 79 hours). The median duration of illness was 37 hours (range, 1 to 120 hours). Stool specimens from two individuals living in the same household were returned to MDH for bacterial and viral testing. The stool specimens tested positive for norovirus.

The Thanksgiving Day buffet consisted of breakfast items such as waffles, eggs, potatoes, rolls, and fruit, and dinner items such as ham, pork, turkey, beef, vegetables, potatoes, salads, pastries, and desserts. Several of these menu items were significantly associated with illness in the univariate analysis, including eating breakfast (27 of 27 [100%] cases vs. 53 of 66 [80%] controls; odds ratio [OR], undefined; 95% confidence interval [CI] lower limit, 1.8; $p = 0.008$), bacon (14 of 25 [56%] cases vs. 22 of 66 [33%] controls; OR, 2.6; 95% CI, 0.9 to 7.3; $p = 0.048$), potatoes O'Brien (10 of 27 [37%] cases vs. 9 of 66 [14%] controls; OR, 3.7; 95% CI, 1.2 to 12.3; $p = 0.01$), eating strawberries in the fruit cup (13 of 27 [48%] cases vs. 15 of 63 [24%] controls; OR, 3.0; 95% CI, 1.03 to 8.7; $p = 0.02$), and drinking a beverage from the bar other than water, coffee, or tea (11 of 25 [44%] cases vs. 12 of 65 [18%] controls; OR, 5.0; 95% CI, 1.7 to 16.2; $p = 0.003$).

Two of these items remained independently associated with illness after conducting a multivariate analysis, including potatoes O'Brien (OR, 6.0; 95% CI, 1.8-20.2; $p = 0.004$) and drinking a beverage from the bar (any beverage other than water, coffee, or tea) (OR, 4.4; 95% CI, 1.3-14.2; $p = 0.01$).

Sanitarians from EHS interviewed restaurant employees about recent illness in themselves or other household members, and about job responsibilities. Thirty-five of 58 (60%) employees were interviewed, and of those, no one reported meeting the case definition for illness. One employee reported abdominal cramps sometime between November 21 and November 28. This employee's father had been ill with vomiting prior to the employee's onset of abdominal cramps.

This was an outbreak of norovirus gastroenteritis among persons who ate at a Thanksgiving Day buffet at a restaurant. Eating potatoes O'Brien and drinking a beverage from the bar were significantly associated with illness. The source of contamination was not determined; possible sources included infected employees and/or patrons.

(43)

***E. coli* O157:H7 Infections Associated with a Chain Mexican Restaurant**

December

Multi-County, Multi-State

On December 17, 18, and 19, 2002, the Minnesota Department of Health (MDH) Public Health Laboratory identified three isolates of *E. coli* O157:H7 with an indistinguishable pulsed-field gel electrophoresis (PFGE) subtype pattern, designated MN702. The isolates were submitted through routine statewide active laboratory-based surveillance. On December 19, through

PulseNet, the Illinois Department of Health reported four *E. coli* O157:H7 cases and the Wisconsin Department of Health reported two *E. coli* O157:H7 cases with the same PFGE pattern. This PFGE pattern had not previously been recognized in the U.S. Initial case interviews in all the states suggested a possible common exposure to a chain Mexican restaurant (chain A). A multi-state investigation, including a general epidemiological investigation and a case-control study, was coordinated by the Centers for Disease Control and Prevention (CDC). The United States Department of Agriculture and the Food and Drug Administration conducted meat and produce traceback and testing.

PFGE Subtyping

PFGE testing after digestion with the enzyme *Xba*1 was performed on all *E. coli* O157:H7 isolates received at MDH, and those with the pattern common to this outbreak were designated MN702. All MN702 isolates were also tested by PFGE after digestion with a second enzyme, *Bln*1. All MN702 isolates indistinguishable by PFGE after digestion with *Bln*1 were designated PulseNet pattern EXHX01.1408.

General Epidemiologic Investigation

The first Minnesota case reported eating at two different locations of chain A on November 26 and 27, and the second Minnesota case reported a December 1 meal date. The third case reported eating frequently at chain A, but could not identify a specific restaurant or date. Onsets of illness for Minnesota cases were December 1, 3, and 4. Two cases were 10 years old and one case was 68 years old. Cases resided in Hennepin, Freeborn, and Ramsey Counties. All three cases reported diarrhea with blood and abdominal cramps, two (67%) reported fever, and one (33%) reported vomiting. The duration of diarrhea was 3 days (one case) and 6 days (two cases). One case (33%) was hospitalized for 1 day.

Case-Control Study

A case-control study was initiated in Minnesota on December 19 to determine risk factors for infection with *E. coli* O157:H7 MN702. A case was defined as a Minnesota resident with a culture-confirmed infection with *E. coli* O157:H7 MN702 and onset of illness during December 2002 or later. Two age-matched controls were selected for each case by sequential digit dialing using the case's telephone number. Cases and controls were interviewed using a standard questionnaire about food consumption and other potential exposures occurring in the 7 days prior to the case's onset of illness. Because initial case interviews in all the states suggested a possible common exposure to a chain Mexican restaurant (chain A), the interview included a question naming 10 chain restaurants including the Mexican restaurant.

In Minnesota, two of three cases reported eating at least once at three different restaurants of chain A within 7 days of illness onset, compared to zero of six controls, and compared to two of 146 *E. coli* O157:H7 cases among Minnesota residents from 2002. No other foods or other potential exposures on the questionnaires were associated with illness. These results were added to the multi-state database and analyzed by CDC. The chain Mexican restaurant was the only exposure associated with illness among 23 cases in Minnesota, Wisconsin, South Dakota and Illinois. In addition, MDH epidemiologists interviewed all the Minnesota cases' well meal companions for a multi-state case control study analyzed at CDC. According to CDC, this study revealed that lettuce consumption was associated with illness. Taco meat was not ruled out as a

possible source of the contamination, but was not statistically significantly associated with illness.

Environmental Health Investigation and Meat and Produce Testing

Sanitarians from the Hennepin County Community Health Department inspected the restaurant in Hennepin County, and MDH sanitarians inspected the restaurants in Freeborn and Steele Counties where two Minnesota cases reported eating during the 7 days prior to their onsets of illness. There were no critical food-handling violations identified in any restaurant, nor were any ill food handlers identified after extensive interviewing with the aid of a Spanish-speaking MDH epidemiologist.

The United States Department of Agriculture, Food Safety Inspection Service tested eight of 15 available samples of taco meat held from a production lot that would have been served during the last week of November 2002. No pathogens were identified. The Food and Drug Administration began an investigation and traceback of lettuce products on January 31, 2003; the results of this investigation were inconclusive.

This was a multi-state outbreak of *E. coli* O157:H7 infections associated with eating at a Mexican restaurant chain. The CDC determined that contaminated lettuce was the most likely vehicle of infection. The source of the contamination of the lettuce was not identified.

(44)

Norovirus Gastroenteritis Associated with a Luncheon

December

Olmsted County

On December 23, 2002 Olmsted County Public Health Services (OCPHS) received a complaint of gastrointestinal illness in a group of 18 people who had held a luncheon meeting at a hotel in Rochester on December 18. Based on this preliminary information, an investigation was initiated. A list of names and phone numbers of meeting attendees was obtained from the original complainant. Attendees were called and interviewed using a standard interview form. A case was defined as a person who experienced vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) after eating at the luncheon. Stool samples were not requested because all of the interviewees lived outside Olmsted County.

Thirteen people from the group were interviewed. One person who was not from the group but who ate the lunch also was interviewed. Thirteen (93%) of the 14 patrons met the case definition. Twelve (92%) of the cases had chills or sweats, 11 (85%) had diarrhea, 11 (85%) had cramps, 11 (85%) had nausea, nine (69%) had vomiting, eight (62%) had severe weakness, and eight (62%) had headache. The median incubation period was 32 hours (range, 6 to 39 hours). The median duration of illness was 63 hours (range, 32 to 99 hours).

No particular food item could be implicated because the same small menu had been served to everyone, and there was a lack of diners who had not been ill.

OCPHS contacted the food service manager to ascertain if the establishment had received any other illness complaints and if he was aware of any ill employees. When initially contacted, the manager stated that no other complaints had been received, but that two employees had been ill. He was not immediately aware of the nature of their illnesses. He discovered soon afterward that the illnesses were gastrointestinal, and relayed this information to OCPHS. A list of other events at the facility for the week prior to the investigation, a list of employees and their phone numbers, and the cook staff's work schedule for the same period were obtained. OCPHS sanitarians visited the establishment on the same day. During the visit, employees from both the hotel kitchen and an adjacent bar were interviewed, and stool specimens were requested from employees who had been ill. A total of nine employees from the hotel and adjacent bar were interviewed; four of them reported being ill with vomiting and diarrhea from December 17 to 21. The employee with the earliest illness date reported that his two young children had been ill with vomiting and diarrhea on December 16. Two of these employees reported working while ill with gastrointestinal symptoms, and one reported working soon after recovery. Stool samples from each of these employees were submitted to the Minnesota Department of Health for testing. The two stool specimens obtained were negative for *Campylobacter*, *E. coli* O157:H7, *Salmonella*, *Shigella*, and *Yersinia*. Both specimens tested positive for norovirus.

An assessment of food preparation and staff hygiene was conducted using the principles of Hazard Analysis Critical Control Points and Active Managerial Control. Special attention was paid to bare-hand contact with ready-to-eat foods and handwashing procedures. Employees reported extensive bare-hand contact with food during preparation, including foods that were on the suspect meal menu. The chef had started work at this facility 2 weeks earlier. He stated that he hadn't had a chance to implement his policies and procedures, including those for handwashing.

As a result of the investigation, the hotel kitchen closed for 3 days to clean and to provide assurance that no asymptomatic infected foodhandlers would come in contact with food. Ill foodhandlers were instructed not to return to food handling tasks until 3 days after recovering from diarrhea. The manager instituted a policy of no bare-hand contact with food. Ready-to-eat foods in a cold table were discarded during the initial assessment. The chef agreed to discard all open packages of ready-to-eat foods in storage (cold holding). Foods at unsafe temperatures found in steam table containers during the initial visit were discarded immediately. The general manager of the facility agreed to send a letter to other groups who had eaten foods catered from the hotel kitchen, informing them of the possibility that they had been exposed to norovirus.

This was an outbreak of norovirus gastroenteritis associated with a luncheon held at a hotel. This outbreak was likely due to transfer of virus from infected food service workers to ready-to-eat food served to the meeting group.

(45)
Suspected Norovirus Gastroenteritis Associated with a Restaurant

December

Ramsey County

On December 30, 2002 the Minnesota Department of Health (MDH) was notified through the foodborne illness hotline of gastrointestinal illness among three of six co-workers who ate together at a restaurant in St. Paul on December 20. The three individuals denied any other common exposures. On January 3, 2003 MDH received an additional complaint of gastrointestinal illness from an individual who ate at the restaurant on December 29. MDH was unable to determine how many individuals ate with the complainant, and of those, how many may have become ill.

A sanitarian from the City of St. Paul went to the restaurant on January 6, 2003 and interviewed the restaurant manager. The restaurant manager reported that the restaurant had not received any other complaints, but reported that several staff members had recently been ill with vomiting and diarrhea. The restaurant provided the sanitarian with a list of all ill restaurant employees on January 8. MDH epidemiologists received this list on January 9 and began interviewing the English-speaking employees. The sanitarian interviewed the Spanish-speaking employees at the restaurant on January 10. A case was defined as a person with onset of vomiting or diarrhea (≥ 3 loose stools in a 24-hour period). No stool samples were collected from ill employees, due to the length of time that had passed since the ill employees had recovered.

Three of the four individuals who reported illness after eating at the restaurant were interviewed. All three had vomiting and diarrhea, two of three had fever, and two of three had abdominal cramps. The median incubation period was 39 hours (range, 28 to 44 hours). The median duration of illness was 53 hours (range, 42 to 72 hours). The cases ate at the restaurant on December 20 and 29 and became ill on December 21 and 31. The cases reported eating a variety of items, including pork chop dishes, tacos, chicken Verde, enchiladas, salad, beans, rice, salsa, chips, and bean dip.

Fifteen employees were interviewed, and eight met the case definition. Four other employees reported a mild illness of fever and abdominal cramps, but did not meet the case definition. The median incubation and duration of illness could not be calculated. Employees' onsets of illness ranged from December 15 to December 31. Seven of eight (88%) ill employees had diarrhea, six of eight (75%) had vomiting, five of eight (53%) had cramps, and two of seven (29%) reported fever.

The sanitarian emphasized the importance of thorough handwashing and limiting bare-hand contact with ready-to-eat foods with the restaurant manager.

This was an outbreak of suspected norovirus gastroenteritis among persons who ate at or were employed at a restaurant. Three patrons reported gastrointestinal symptoms after eating at the restaurant during a time period when multiple employees were working while ill with, or after

recently recovering from, an illness compatible with norovirus gastroenteritis. Vehicles for transmission to patrons likely included foods contaminated by infected food workers.

(46)

Norovirus Gastroenteritis Associated with a Restaurant

December

Ramsey County

On December 27, 2002 the Minnesota Department of Health (MDH) received a report that four of 10 people had become ill with gastrointestinal symptoms after eating dinner together at a restaurant in Roseville on Saturday, December 21. The group of 10 represented three different households. The morning after the restaurant dinner, nine of the 10 had gathered for a luncheon in a private home, but one of the four persons who subsequently became ill had not attended the luncheon. MDH initiated an investigation in collaboration with sanitarians and an epidemiologist from the St. Paul-Ramsey County Department of Public Health (SPRCDPH).

MDH epidemiologists interviewed the patrons about food consumption and illness history. A case was defined as a person with onset of vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) after eating at the restaurant. SPRCDPH sanitarians visited the restaurant on December 27 and again on December 30 to assess foodhandling practices and employee illnesses. A roster of restaurant employees and names of patrons who had dined at the restaurant on December 20 and December 21 were provided by restaurant management. Stool samples were collected from four ill persons and submitted to MDH for bacterial and viral testing.

Information on symptoms and food exposures was gathered for all 10 persons in the group. One person was likely a secondary case with onset of illness occurring 2 days after a household member's onset. Of the remaining nine persons, four (44%) met the case definition. All had diarrhea and cramps, two (50%) had vomiting and two (50%) reported fever. The median incubation period was 35 hours (range, 32 to 37 hours), and the median duration of illness was 35 hours (range, 26 to 65 hours). No cases sought medical attention. All four stool samples were negative for *Campylobacter*, *E. coli* O157:H7, *Salmonella*, *Shigella*, and *Yersinia*, and all four were positive for norovirus. One of the four positive stools was from the secondary case.

Lettuce was significantly associated with illness (4 of 4 [100%] cases vs. 0 of 5 [0%] controls; odds ratio, undefined; lower limit of 95% confidence interval, 2.6; $p = 0.01$). Lettuce was consumed on chicken fajita pitas, tuna sandwiches, and burgers eaten by cases. Lettuce was not purchased pre-shredded, but was shredded in the restaurant. On December 27, the SPRCDPH sanitarian observed that food workers had extensive bare-hand contact with ready-to-eat food items, including lettuce, in violation of the state food code that requires limiting direct hand contact with such foods. A sanitarian returned to the restaurant on December 30 to provide further education and recommendations to restaurant staff on foodhandling practices.

The restaurant owner told the SPRCDPH sanitarian that no employees had been ill with gastrointestinal symptoms and that no other complaints from patrons had been received. Of the 44 employees that worked on December 21, MDH epidemiologists interviewed 13 (30%) by

phone. Eleven employees denied any gastrointestinal symptoms in themselves or in their household members since December 15. One of those who denied symptoms was one of the two employees who shredded lettuce on December 21; the second employee who shredded lettuce could not be interviewed. Two servers reported recently experiencing vomiting, diarrhea, nausea, cramps, and aches. One server became ill on December 23 and one on December 24. Both were ill for 2 days.

A sample of December 21 patrons was identified through credit card receipts provided by the restaurant and twenty patrons from eight different parties were contacted. None reported gastrointestinal symptoms after eating at the restaurant. Ten of these 20 patrons ate lettuce-containing menu items.

This was an outbreak of norovirus gastroenteritis associated with a restaurant. Lettuce was the likely vehicle. No additional cases were identified. While an unidentified ill food worker was a plausible source of contamination, the source could not be confirmed with the available information.

PROBABLE FOODBORNE OUTBREAKS

(1)

Gastroenteritis Associated with a Restaurant

January

Hennepin County

On January 3, 2002 the Minneapolis Division of Environmental Health (MEH) received a call from a restaurant manager. The manager had received a foodborne illness complaint from a party of two who dined at the restaurant on January 2. On January 7, MEH received another complaint about the same restaurant. This complaint was registered by someone who was ill after dining at the restaurant on December 31, 2001 with a group of 11 co-workers. MEH and the Minnesota Department of Health Acute Disease Investigation and Control Section initiated an investigation. An epidemiologist from Hennepin County Community Health Department was also notified.

A sanitarian from MEH interviewed complainants by phone about food consumption and illness history. A case was defined as any person who developed vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) subsequent to eating at the restaurant. The sanitarian visited the restaurant on January 4 to evaluate foodhandling practices and to collect food samples. One stool sample was collected from a complainant and sent to the MEH laboratory for bacterial culture.

Both members of the party of two that dined at the restaurant on the afternoon of January 2 met the case definition. The two people had another common meal at another restaurant on December 31, but that was with a group of at least eight other people, none of who had reportedly become ill. Both had diarrhea and chills, with incubation periods of 11 and 15 hours, respectively. Because both cases were still ill at the time of their interview on January 3, durations of illness were not calculated. Food items consumed included carpaccio, salmon, lobster sauce, risotto, crème brulee, pop and water.

The third case had eaten at the restaurant with 10 co-workers on the night of December 31. He became ill 5.5 hours later with diarrhea, cramps, nausea, and a headache. The symptoms lasted for approximately 12 hours. The food items this person consumed included Chilean sea bass, a salad of mixed greens, gorgonzola cheese, a light dressing, roasted squab, truffles and leaks, custard, a flourless chocolate torte, red wine, and a martini. The case declined to provide the names and numbers of the other people in his dining party, but reported that none of them were ill, and that they had eaten sea scallops.

The stool sample from a case tested at the MEH laboratory was negative for *Campylobacter*, *E. coli* O157:H7, *Salmonella*, *Shigella*, and *Yersinia*. A few colonies of *Bacillus cereus* were isolated from the stool.

Prior to the complaints, the restaurant had seven critical foodhandling violations at its last inspection in November 2001. On January 4, the MEH sanitarian visited the restaurant, focusing on the food items consumed by the first two cases. Hazard Analysis and Critical Control Points (HACCP) food flows of carpaccio, salmon, lobster sauce, risotto, and crème brulee revealed that the restaurant staff did not take any food temperatures during the preparation of these foods. A sample of risotto taken for lab analysis was at 50°F and had been prepared the previous day, suggesting inadequate food cooling procedures. The sanitarian made recommendations to the restaurant concerning proper food cooling and handwashing practices.

Culture of samples of lobster broth, raw salmon, and risotto tested at the MEH laboratory did not yield any significant findings.

The temporal clustering of two separate foodborne illness complaints among people who had eaten at the same restaurant suggested the possibility of a foodborne outbreak. The symptoms and incubation periods reported for the three ill persons are consistent with a foodborne bacterial intoxication such as that caused by *Bacillus cereus* diarrheal toxin. One of the ill individuals had *Bacillus cereus* cultured from a stool sample; however, this was not definitive evidence of causality. Problems with food cooling procedures were identified at the restaurant. Due to the small number of cases and the lack of interviews with non-ill patrons, this could not be confirmed to be a foodborne outbreak.

(2)

Suspected Norovirus Gastroenteritis Associated with a Restaurant

February

Hennepin County

On February 25, 2002 the Minnesota Department of Health (MDH) received a complaint of possible foodborne illness among eight of 10 people (Group A) from six different households who attended a birthday party and shared a common meal at a restaurant in Maple Grove on February 6. The complainant said she would have called sooner, but had been out of town on vacation and had not been aware of the illnesses until recently. She also reported that she knew of a second group (Group B) where all 10 attendees became ill after another birthday party held at the same restaurant on February 6. A person from each group had reportedly called another health department to complain prior to calling MDH on February 25. MDH forwarded the complaint to the Hennepin County Community Health Department (HCCHD) for further investigation. MDH epidemiologists interviewed party attendees about food consumption and illness history. A case was defined as a person with onset of vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) after attending the party. Due to the time delay since the illnesses, no stool samples were collected. A sanitarian from HCCHD visited the restaurant on February 26.

Five of 10 party attendees from Group A were interviewed. Four of the five (80%) met the case definition. Cases lived in three different households; one was a child and three were adults. All had vomiting, three (75%) had diarrhea and cramps, and no one reported fever or bloody stools. No cases sought medical attention. The median incubation period was 32.5 hours (range, 30 to 33.5 hours). The median duration of illness was 15.5 hours (range, 12.5 to 18 hours). Foods consumed by all four cases were pizza, French fries, and pop.

HCCHD received an illness report from Group B on February 22 but was not able to reach any Group B members by phone. Restaurant management told the HCCHD sanitarian that there were three ill employees at the beginning of February. They came back to work on February 6, the day that Group A and Group B ate at the restaurant. The complainant from Group A had mentioned that one of the kitchen staff had a sick child sitting in a booth, and that the worker would come out periodically to check on the child. Restaurant employees were not interviewed individually by the sanitarian.

The symptoms and incubation periods fit the profile for gastroenteritis caused by norovirus. However, a definite epidemiologic association between the restaurant meal and the illnesses could not be confirmed with the available information.

(3) Gastroenteritis Associated with a Meeting

February

Hennepin County

On February 22, 2002 the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of illness from a person who had attended a professional meeting at a hotel in Bloomington on February 20. Approximately 105 persons from 56 companies attended the function. Food service included morning and afternoon breaks with rolls, breads, bagels, pastry, bars, cookies, beverages, and a lunch with wild rice soup, sliced sirloin, cut potatoes, vegetables, bread, and beverages. The complaint was forwarded to City of Bloomington Environmental Health (CBEH) for investigation.

A menu and list of patrons who attended the function were obtained from the hotel staff. A phone call was placed to each company on the patron list. CBEH staff interviewed patrons about illness symptoms and food history. A case was defined as a person who attended the meeting and subsequently experienced onset of illness involving vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) and one other symptom. CBEH staff conducted an environmental health investigation at the hotel focusing on critical food safety and flow of food issues. No stool samples were collected.

Twenty-three patrons representing 19 of the 56 companies in attendance were interviewed. Of these, five (22%) met the case definition. All cases were male. Ages of four cases were 38, 42, 50, and 50 years. All cases (100%) had diarrhea, three (60%) had cramps, three (60%) had nausea, one (20%) had bloody stools, and one (20%) had sweats, chills, and body aches. No cases reported vomiting. The median incubation period, based on the lunch meal, was 4 hours (range, 3 to 17 hours). The median duration period was 21 hours (range, 1 to 32 hours).

Three of the five cases were co-workers. Two cases reported either exposure to children in daycare or exposure to co-workers who had recent gastrointestinal illness. Two patrons with milder symptoms, not meeting the case definition of illness, also reported recent enteric illness among others at home or at work.

Brownies served during the afternoon break was the only food item statistically associated with illness (3 of 5 [60%] cases vs. 2 of 18 [11%] controls; odds ratio, 2.0; 95% confidence interval, 1.2 to 121.6; $p < 0.05$). If the exposure was the brownies, the median incubation period would have been 2 hours (range, 1 to 15 hours). All patrons interviewed consumed the soup, sirloin, potatoes, and vegetables during lunch.

The environmental health investigation revealed no evidence of critical food safety problems or violations for the meeting on February 20.

This was a probable outbreak of gastroenteritis associated with a meeting held at a hotel. The source, vehicle, and pathogen were undetermined. The clinical characteristics of the illnesses and epidemiological findings do not necessarily indicate a common exposure to a known pathogen.

(4)

Gastroenteritis Associated with a Restaurant

April

Brown County

On May 2, 2002 a restaurant patron called the Minnesota Department of Health (MDH) foodborne illness hotline to report a suspected foodborne illness that began after she and three other people ate dinner at an establishment in New Ulm on April 24. It was the only meal the four patrons had in common. The Brown County sanitarian called the restaurant to ask if there had been other reports of illness. MDH staff interviewed the four patrons. A case was defined as any person who ate at the restaurant and subsequently developed vomiting and diarrhea (≥ 3 loose stools in a 24-hour period). The cases were not willing to provide stool samples.

Three of the four patrons met the case definition. All three had diarrhea, one had abdominal cramps, and no one reported vomiting, fever, or bloody stools. The incubation periods for the three cases were 33.5 hours, 34 hours, and 75 hours. The durations of illness were 5 hours, 14 hours, and 40 hours. The four patrons reported eating the same foods as one another. The meal included barbeque ribs and raised salad, which consisted of lettuce, mayonnaise, bacon, croutons, and dressing. There had been no other complaints of illness, according to restaurant management.

This was a probable outbreak of gastroenteritis associated with a restaurant. No etiologic agent or specific food vehicle was identified.

(5)

Gastroenteritis Associated with an Event at a Hotel

May

Douglas County

On May 3, 2002 the Minnesota Department of Health (MDH) foodborne illness hotline was contacted by the organizer of an event. The event was held at a hotel in Alexandria on the evening of May 2. The organizer reported that of approximately 205 attendees, she knew of

three attendees who were ill with gastrointestinal symptoms. The information was shared with the MDH West Central District epidemiologist as well as Douglas & Pope Counties Environmental Health (DPCEH), and an investigation was initiated. MDH epidemiologists interviewed complainants by phone about food consumption and illness history. A case was defined as any person who attended the event and subsequently developed vomiting or diarrhea (≥ 3 loose stools in a 24-hour period). Stool kits were sent to the three original complainants. On May 3, the sanitarian inspected the food service hotel and spoke with management and employees about recent illnesses and foodhandling procedures.

The three complainants all met the case definition. All three cases were female and their ages were 25, 27, and 56 years, respectively. The cases reported eating from a buffet line; items consumed included hamburgers, hot dogs, fixings (e.g., condiments, mushrooms, pickles, lettuce and tomatoes), coleslaw, chips and dip, veggie tray, potato salad, pop, water, and ice. Incubation periods were 0.5 hours, 2.5 hours, and 9.5 hours, respectively. All three cases had diarrhea, and two of the three had cramps; no one reported vomiting, fever, or bloody stools. All three cases were still ill at the time of their interviews, so duration of illness could not be assessed. One of the cases submitted a stool sample to MDH; the sample was collected 3 days after she recovered. The stool was negative for *Campylobacter*, *E. coli* O157:H7, *Salmonella*, *Shigella*, *Yersinia*, astrovirus, norovirus, *Clostridium perfringens*, *Bacillus cereus*, and staphylococcal enterotoxin. *Staphylococcus aureus* was cultured from the stool.

The inspection of the hotel food service by DPCEH found some time-temperature violations. The walk-in cooler was found to be at 45-47°F instead of the recommended 41°F or below. Hot dogs were being improperly cooled in a deep plastic container instead of in the recommended shallow pans. There was one report of one food worker who was ill with vomiting and diarrhea. Names and phone numbers of other attendees were not forthcoming despite requests from MDH; therefore, a case-control study evaluating risk factors for illness could not be performed.

This was a probable outbreak of gastroenteritis associated with an event held at a hotel. The clinical and epidemiologic characteristics of the illnesses were consistent with bacterial intoxications. The significance of *Staphylococcus aureus* in one case's stool sample is not clear. Lack of cooperation from the event organizers, who had originally reported the illnesses, precluded an adequate investigation of the event.

(6)
Gastroenteritis Associated with a Restaurant

June

Freeborn County

On June 12, 2002 the Minnesota Department of Health (MDH) received a complaint from a person who reported gastrointestinal illness after eating at a restaurant in Albert Lea on June 11. The City of Albert Lea forwarded an additional independent complaint on June 14 from two people who reported gastrointestinal illness after eating at the same establishment on June 13. Epidemiologists from MDH interviewed complainants by phone about food consumption and illness history. A case was defined as any person who developed vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) after eating food from the restaurant.

All three of the persons in the two parties were interviewed. All three met the case definition. All three reported diarrhea, vomiting and cramps. Two (67%) reported fever. Meal dates were June 11 and 13. Two of the cases had incubation periods of 3.5 hours, and one had an incubation of 6.5 hours. Duration of illness was approximately 12, 16, and 17 hours for each case. The cases ate a variety of foods: meat and potato burrito, soft tacos, and/or potatoes Ole with cheese.

A MDH sanitarian visited the restaurant on June 14 and reviewed food preparation procedures. The establishment had a good food preparation protocol in place; however, temperatures were not taken to monitor that foods were cooling to the appropriate temperatures. Most foods were thrown away at the end of the day, except for hamburger that is kept in the cooler for reuse the next day.

The clinical characteristics of these illnesses were consistent with a foodborne bacterial intoxication. However, the specific etiology could not be determined. No single food was conclusively identified as the vehicle.

(7)

Gastroenteritis Associated with a Restaurant

July

Hennepin County

On July 30, 2002 the Minneapolis Division of Environmental Health (MEH) received a foodborne illness complaint from a group that had dined at a restaurant on the night of July 26. The four persons denied having any other meals in common. Prior to this complaint, MEH had received four separate illness reports from persons who had dined at the same restaurant between June 4 and July 12. In each complaint, only one ill individual was identified, and there was not enough information available to confirm an epidemiologic link between the complaints. An investigation of these complaints by MEH identified pasta as an item common to most of the complainants; MEH found that uncooked pasta may have been shipped to the restaurant in an unrefrigerated truck, and made recommendations to the restaurant to correct the problem. MEH initiated an investigation of the complaint about the July 26 meal date in collaboration with epidemiologists from the Minnesota Department of Health (MDH) and epidemiologists from the Hennepin County Community Health Department (HCCHD).

MEH sanitarians and HCCHD epidemiologists interviewed the complainants with the July 26 meal date about food consumption and illness history. A case was defined as a person with onset of vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) after eating at the restaurant. No stool samples were collected. On July 30, a MEH sanitarian went to the restaurant to evaluate foodhandling procedures. Food samples were also collected and tested by the MEH laboratory.

Three of the four persons (75%) in the July 26 group met the case definition. All three had diarrhea and cramps, and one reported a low-grade fever. No one had vomiting. Incubation periods were 7.5, 8.5, and 9 hours. Duration of symptoms was reported as 1 to 2 days. The common item eaten by all three cases, but not by the non-ill person, was rosemary potatoes and sour cream. MEH conducted a food preparation review on that food item. Raw potatoes were

cubed, then blanched and held at room temperature throughout the shift. Upon order, spices and butter were added to the potatoes, which were then cooked in oil and served. Sour cream mixed with bacon bits and scallions was served with the potatoes; the sour cream mix was often held in the refrigerator for up to 2 days. Potatoes that had been held at room temperature and sour cream mix were sampled. The potato sample yielded a result of 2,900 *Bacillus cereus* organisms per gram. According to CDC guidelines, at least 10^5 *B. cereus* organisms per gram must be isolated from an epidemiologically implicated food in order to confirm *B. cereus* as the etiologic agent. The sour cream mix sample did not yield any notable results. MEH recommended that in order to prevent temperature abuse, the restaurant keep the blanched potatoes refrigerated until they were cooked in oil and served. The restaurant immediately corrected the problem, and no violations were noted on a follow-up inspection on September 19.

This was a probable foodborne outbreak associated with a restaurant. Blanched potatoes that were held at room temperature were the suspected vehicle, and a bacterial toxin produced by the diarrheal form of *B. cereus* or *Clostridium perfringens* was the suspected etiology. Previous foodborne illness complaint investigations at the restaurant had identified other problems with foods being held at improper temperatures. However, with the small number of cases, a definite association between the potatoes and the illnesses could not be confirmed.

(8)

Gastroenteritis Associated with a Restaurant

September

Dakota County

On September 26, 2002 the Minnesota Department of Health (MDH) received a complaint on the foodborne illness hotline about three persons who became ill shortly after eating at a restaurant in Eagan on September 25. The complainant reported that there were other individuals from her company who dined at the restaurant on the same day. MDH requested that the complainant ask the other individuals to call MDH if they experienced illness. Two of three people from an additional party called to report illness.

MDH staff interviewed the five individuals that became ill after eating at the restaurant. An MDH sanitarian visited the restaurant on September 26, 27, and 30. A short list of customers who ate at the restaurant on September 25 was obtained from credit card receipts, but none of the patrons could be reached. The four restaurant employees were interviewed about recent illness in themselves or anyone in their family; there were no reports of illness. A case was defined as a person who had vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) after eating at the restaurant. No stool samples were collected.

All five complainants consumed fried rice and egg rolls. Two of five complainants met the case definition and reported diarrhea; one of these cases also reported vomiting and one reported abdominal cramps. Both cases had an incubation period of 1 hour, and the case that had recovered at the time of the interview had a duration of 21 hours. The three individuals who did not meet the case definition reported severe nausea and sweats.

Several critical violations were identified during the restaurant inspection on September 26; the violations were discussed with one of the owners at the restaurant. The restaurant was told to discontinue storing raw meats over produce and other ready-to-eat items in the walk-in cooler, to discontinue overcrowding the walk-in cooler, to use the appropriate time guidelines to cool fried rice, to discard any rice that had not been cooled properly or had been held in the temperature danger zone (41°F to 140°F), to discontinue storing rice dispensing utensils in containers of standing water, to clean and sanitize utensils every four hours, and to discontinue allowing food to sit on the floor after delivery. In addition, the restaurant was instructed to employ a state certified food manager and told that employees must use approved beverage containers for drinking. These containers must not be placed on food contact surfaces and must be stored in a manner that will not contaminate food or equipment. Other items that were reported, but were not critical, included not storing food with newspaper on top of it, not using unapproved food storage containers (i.e., plastic bags from grocery stores), using an appropriate method to cool fried rice after it has been cooked, ensuring that rice is not left to cool in the rice cooker after the rice has been cooked, and replacing the missing ceiling tiles in the food prep area.

All of the rice and egg rolls found in the establishment at the time of the inspection were either hot (above 140°F) or cold (below 41°F). No foods were found to be within the temperature danger zone. The owner was instructed to complete a cooling chart for the rice that was used to make fried rice.

The sanitarian visited the restaurant the morning of September 27 to review the citations that had been issued, along with the cooling chart from the rice that was prepared the previous night. Several critical violations had been corrected; however, the cooling chart for the night of September 26 was incomplete. The last documented temperature was 76°F and was taken before the owners went home at 9:00 p.m. A stem thermometer inserted in the rice on September 27 read 38°F. On the morning of September 27, the owner reported that he was not working the night of September 24 and a part-time cook had prepared and cooled the rice that was used for fried rice on September 25 (the complainants' meal date). The part-time cook was unavailable for interview at the time of the inspection. Interviewing employees was difficult due to language barriers. The owner was instructed to complete another cooling chart for the rice that is used for fried rice. The sanitarian emphasized that the rice must cool to a temperature of 41°F or below within 4 hours. The owner was instructed that anyone cooking rice must know how to properly handle and cool this potentially hazardous food and it must be discarded if it is not cooled properly.

Another inspection was conducted on September 30. A review of the cooling chart for the rice cooked on September 27 found that the rice was cooled to 69°F after 2 hours and 38°F after 4 hours.

The epidemiological and environmental health assessments indicated that these illnesses were consistent with a bacterial foodborne intoxication (i.e., *Bacillus cereus* or *Staphylococcus aureus*). The likely food vehicle was fried rice that was improperly cooled and stored. Mishandled fried rice is a common vehicle for the emetic form of *B. cereus*, suggesting that *B.*

cereus was the etiologic agent. An employee that was not trained in safe foodhandling prepared this rice. The owner was scheduled to attend a safe foodhandling course in October, 2002.

(9)

Gastroenteritis Associated with a Restaurant

October

Hennepin County

On October 9, 2002 a restaurant patron called the Minnesota Department of Health (MDH) to report a suspected foodborne illness. Two of six patrons dining together became ill after eating at a restaurant in Minneapolis on October 6. The two ill persons had no other foods in common. MDH epidemiologists interviewed the six patrons. A case was defined as any person who ate at the restaurant and subsequently developed vomiting and diarrhea (≥ 3 loose stools in a 24-hour period). Two (33%) of the six patrons met the case definition. Both cases had diarrhea and cramps; neither reported vomiting, fever, or bloody stools. The incubation periods for the two cases were 12 hours and 16 hours. The durations of illness were 1.5 hours and 24 hours. One patron sought medical attention for the symptoms.

The two patrons reported eating the same foods as one another. The meal was a hot turkey sandwich that included bread, turkey, mashed potatoes, and gravy. Four in this party ate the hot turkey sandwich and three ate the mashed potatoes. A sanitarian from the Minneapolis Division of Environmental Health (MEH) went to the restaurant on October 10 and reviewed food preparation procedures. According to the restaurant management, there had been no other reports of patron illnesses. The sanitarian found problems with keeping foods at proper temperatures. Samples of mashed potatoes were taken to the MEH laboratory and elevated plate counts were found.

This was a probable outbreak of foodborne bacterial intoxications associated with a restaurant.

(10)

Gastroenteritis Associated with a Restaurant

October

Washington County

On October 14, 2002 the Washington County Department of Public Health and Environment (WCDPHE) received a complaint from two individuals who ate together at a restaurant in Woodbury on October 10. On October 18, the Minnesota Department of Health (MDH) received a complaint from the La Crosse County (Wisconsin) Health Department regarding a Wisconsin resident who had also eaten at the same restaurant, also on October 10.

A case was defined as a person with onset of vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) after eating at the restaurant. All three complainants met the case definition. All three cases reported diarrhea, vomiting, and cramps. Onsets of illness occurred on October 12. The median incubation period was 33 hours (range, 31 to 39 hours). The duration of illness was 12 hours for the one case who had recovered at the time of interview. One case went to a physician and submitted a stool sample. The stool sample tested negative for bacterial pathogens at the

clinical laboratory. MDH was unable to obtain the stool sample for further testing (i.e., for norovirus). All three complainants reported eating a hamburger. Two of the three reported eating lettuce, tomatoes, ketchup, and fries with their hamburgers.

WCDPHE sanitarians inspected the restaurant and interviewed the restaurant manager on October 23. The restaurant manager reported that the restaurant had not received any other complaints and that none of the employees were ill. Employees were not individually interviewed. The restaurant could not provide a list of other patrons who dined at the restaurant on October 10. The sanitarians noted a significant amount of bare-hand contact with ready-to-eat foods. The sanitarians reinforced the importance of proper handwashing and of limiting bare-hand contact with ready-to-eat foods.

Based on the complainants' incubation periods and symptoms, this was a probable outbreak of suspected norovirus gastroenteritis associated with a restaurant. The source of the outbreak was not identified.

(11)
Gastroenteritis Associated with a Restaurant

November

Hennepin County

On November 14, 2002 the City of Bloomington Environmental Health (CBEH) received complaints of illness involving vomiting and diarrhea from a group of 17 patrons who had eaten at a hotel on November 11. Food items were consumed from a self-service lunch buffet and included vegetarian lasagna, fried chicken, red garlic mashed potatoes, raw vegetables, cut fruit, rolls, butter, beef barley soup, salad dressings, shredded cheese, bacon bits, and onion rings. The group also consumed beverages including ice water, coffee, juice, bottled beverages, and cookies purchased from a grocery store in Richfield. CBEH interviewed eleven of the 17 patrons about food consumption and illness history. Additionally, eight patrons apart from this group who also consumed food on the same day from the same buffet were interviewed about food consumption and illness history. A case was defined as someone who had eaten at the hotel and subsequently experienced vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) plus one other symptom. One case submitted a stool sample to the Minnesota Department of Health (MDH) for bacterial and viral testing.

Seven (37%) of 19 patrons interviewed met the case definition; illnesses were reported only from the group of 17 patrons. Six (86%) had diarrhea, four (57%) had vomiting, two (29%) had cramps and two (29%) had fever. The median incubation period was 32 hours (range, 14 to 84 hours). The median duration of illness was 42 hours (range, 27 to 77 hours; three illnesses were ongoing at the time of interview). Three individuals visited health care providers. The stool specimen submitted to MDH tested negative for *Campylobacter*, *E. coli* O157:H7, *Salmonella*, *Shigella*, *Yersinia*, and norovirus. No food items were statistically associated with illness.

CBEH staff conducted an environmental health investigation at the establishment on November 14, focusing on critical food safety issues including receiving, storage, preparation, holding,

employee hygiene, and overall facility sanitation. Employees were not interviewed about illness history.

The clinical and epidemiological characteristics of these illnesses were compatible with norovirus gastroenteritis. The vehicle and source of contamination were not identified.

(12)

Norovirus Gastroenteritis Associated with a Restaurant

November

Hennepin County

On Tuesday, November 19, 2002 the Minnesota Department of Health (MDH) received a call from a physician about a child with diarrhea who had attended a birthday party at a restaurant in Maple Grove on Saturday, November 16. The child's parent reported that several other children from the party were also ill with gastrointestinal symptoms. MDH forwarded the complaint to the Hennepin County Community Health Department (HCCHD) for further investigation.

On November 19, HCCHD epidemiologists obtained a list of birthday party attendees and food items served. Party attendees were interviewed by phone about food consumption and illness history. Parents were also asked whether the children attended the same daycares, schools, or if they had other activities in common. A case was defined as a person with onset of vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) after attending the party.

On November 20, an HCCHD sanitarian inspected the restaurant and interviewed employees who had worked on November 19. Because over 1,600 people were served on November 16, a list of names and phone numbers for other groups that had reservations for that day was obtained from the restaurant. These other groups were contacted by phone by HCCHD and MDH epidemiologists to ascertain if illness was confined to one group of diners.

Six stool samples were obtained; five were from restaurant patrons and one was from a restaurant employee who had onset of illness subsequent to the patrons' onsets. The stool samples were sent to MDH for bacterial and viral testing.

All 12 persons (10 children and two adults) who attended the birthday party were interviewed. Seven (58%) met the case definition. Five cases (71%) had vomiting, three (43%) had diarrhea, three (43%) had cramps, three (43%) had fever, two (28%) had chills, and two (28%) had body aches. The median incubation period was 37.5 hours (range, 10 to 49 hours) and the median duration of symptoms was 24 hours (range, 15.5 to 32 hours). One person developed symptoms 2 days after other family members had been ill; this person was likely a secondary case.

Eleven other groups identified from the restaurant's reservation list for November 16 were contacted, and five (45%) of those groups reported gastrointestinal illness. In all, 21 (12%) of 178 persons from the five different groups reported vomiting or diarrhea, with a median incubation period of 33 hours from their meal at the restaurant (range, 30 to 37 hours). In addition, there were nine likely secondary cases from these other groups.

All six stools (five from patrons and one from a restaurant employee) tested positive for norovirus and negative for *Campylobacter*, *E. coli* O157:H7, *Salmonella*, *Shigella*, and *Yersinia*. Gene sequencing was conducted on viruses from three different cases (two cases from unrelated groups who held birthday parties at the restaurant on November 16, and one from the restaurant employee) and all three sequences matched.

When the restaurant was inspected by an HCCHD sanitarian on November 20, no major problems were identified. The two employees who had prepared the food for November 16 were interviewed and did not report any illness since November 11. Eight other employees were also interviewed; no one reported any illness in the past week. In addition, restaurant management reported that none of the employees were out sick or reported any illness during the week before November 16. However, two staff did report having diarrhea and vomiting after November 16; one had onset on November 18 and the other on November 21.

Food items consumed by cases included pizza, cake, and beverages. These items involved very little preparation or handling by staff. Most of the food items served at the restaurant are eaten without utensils. Handling of food by children could have increased the potential for contamination if there was an ill child in the restaurant.

The restaurant included an arcade area; the sanitarian reviewed cleaning schedules and procedures for this area. Of concern was the children's play area known as the "ball pit". The restaurant had staff dedicated to maintaining the arcade area. The plastic balls are scheduled for cleaning and sanitizing every Tuesday. Plastic balls are placed into the sink and submerged with a lid-like device. The manager reported that any fecal accidents reported in the ball pit would be attended to as they occur, and the plastic balls would be cleaned and sanitized in the aforementioned method. No deficiencies in this procedure were noted, and the overall sanitation of the arcade area was satisfactory.

This was an outbreak of norovirus gastroenteritis associated with an exposure at a restaurant on November 19. At least 28 people became ill. It is unclear how the cases were exposed to the virus, which may have been introduced into the restaurant by an ill patron or restaurant employee. The potential for viral spread in the restaurant was increased because of the large number of children present, the number of surfaces that could have been contaminated by an infected person, and the close proximity of the children in the arcade area. Consumption of foods that required direct hand contact to eat may have contributed to viral transmission, but there was not sufficient evidence to rule out non-foodborne modes of transmission.

(13)

Suspected Norovirus Gastroenteritis Associated with a Birthday Party

November

Chisago County

On November 18, 2002 the Minnesota Department of Health (MDH) was notified of gastrointestinal illness occurring among people who attended a birthday party in the city of Wyoming on November 16. Complete lists of guests and foods served at the party were obtained. Epidemiologists from MDH interviewed guests by telephone to gather information about their

illness and foods they had eaten at the party. A case was defined as any person who had attended the party and subsequently became ill with vomiting or diarrhea (≥ 3 loose stools in a 24-hour period). One stool kit was delivered to an ill guest.

Four adults and five children attended the party. All nine individuals were interviewed, and three (33%) met the case definition. One person was excluded from the analysis because she was ill with a fever the day of the party. Of the three cases, three (100%) had vomiting, two (67%) had cramps, two (67%) had fever, and one (33%) had diarrhea. All three cases became ill on November 17. The median incubation period was 21 hours (range, 20 to 31 hours) and the median duration of illness was 9 hours (range, 2 to 16 hours). The children at the party ate hot dogs, cheese curls, yogurt, juice, cake, and ice cream. The adults ate lasagna, bread, cake, and ice cream. All of the menu items were purchased from the store and/or made from scratch. Drinking juice was significantly associated with illness (3/3 exposed vs. 0/5 unexposed; relative risk, undefined; 95% confidence interval lower limit, 1.8; $p=0.02$). The stool kit delivered to an ill guest was not returned to MDH for testing.

A probable outbreak of norovirus gastroenteritis occurred among guests at a birthday party. Drinking juice was significantly associated with illness; however, person-to-person transmission could not be ruled out, as one guest reported having a fever the day of the party.

(14)

Norovirus Gastroenteritis Associated with a Restaurant

December

Anoka County

On Friday, December 20, 2002 the Anoka County Community Health and Environmental Services Department (ACCHEs) notified the Minnesota Department of Health (MDH) of a complaint of possible foodborne illness among a group of eight people from different households who shared a common meal at a restaurant in Coon Rapids on December 15. ACCHEs obtained information on the four ill people. Non-ill persons were not interviewed directly. A case was defined as any person who developed vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) after eating at the restaurant. One stool sample was submitted to the MDH Public Health Laboratory for bacterial and viral testing.

All four ill persons (who lived in four different households) met the case definition. Two were male and two were female. All had vomiting, diarrhea, and cramps. One (25%) reported fever. No one sought medical attention. The median incubation period was 52.5 hours (range, 40 to 54 hours). The median duration of illness was 32 hours (range, 10 to 36 hours). The stool sample submitted by one case was negative for *Campylobacter*, *E. coli* O157:H7, *Salmonella*, *Shigella*, and *Yersinia*. The stool was positive for norovirus. All four cases reported eating the house salad, mixed vegetables, and mashed potatoes. Three cases had an entrée of fish and one case had steak. Cases reported that the non-ill persons ate similar foods.

A sanitarian from ACCHEs contacted the restaurant manager by phone on December 20. ACCHEs reprimanded restaurant management for not reporting complaints from the ill persons

to ACCHES as required by the state food code. The manager denied that any employees were ill with diarrhea and vomiting, but did volunteer that a female patron had vomited in the restroom of the restaurant on the evening of December 14. Recommendations were made about employee handwashing and cleaning and disinfection of environmental surfaces.

This was an outbreak of norovirus gastroenteritis associated with a restaurant. It is unclear whether transmission occurred via food contaminated by an unidentified ill food worker (food workers were not interviewed to ascertain illness histories) and/or via contaminated environmental surfaces contaminated by a patron who reportedly vomited in the restaurant.

(15)

Norovirus Gastroenteritis Associated with a Restaurant

December

St. Louis County

On December 24, 2002 the Minnesota Department of Health (MDH) was notified through the foodborne illness hotline that two individuals had eaten together at a restaurant in Proctor on December 22 subsequently had gastrointestinal symptoms. The individuals denied other common exposures. On December 27, MDH received a separate complaint about the same restaurant from a patron who also dined on December 22. MDH notified the St. Louis County Public Health Department (SLCPHD) of the illnesses. SLCPHD staff spoke with the manager of the restaurant that evening of December 27. The restaurant reported that it had received one complaint from a patron, and that no employees were known to have been ill. On December 30, a sanitarian from SLCPH visited the restaurant. No food workers were interviewed, and there were no significant foodhandling violations identified by SLCPHD.

The three ill persons reported vomiting and diarrhea 24 to 30 hours after eating at the restaurant; illnesses lasted less than 24 hours. One stool sample was collected from an ill patron and submitted to MDH for testing; the stool was positive for norovirus.

This was a probable outbreak of norovirus gastroenteritis associated with a restaurant. However, because food workers were not interviewed, and no attempt was made to identify additional cases, the link between the restaurant and the illness could not be confirmed.

(16)

Norovirus Gastroenteritis Associated with a Restaurant

December

Hennepin County

On December 30, 2002, the Hennepin County Community Health Department (HCCHD) received a foodborne illness complaint. A group of three people had become ill with vomiting and diarrhea 15 hours after eating sandwiches from a restaurant in Maple Grove on December 29. The three people lived in the same household, but denied any other common meals. HCCHD epidemiologists and sanitarians initiated an investigation. An HCCHD epidemiologist interviewed the patrons about food consumption and illness history. A case was defined as a person with onset of vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) after eating at the

restaurant. HCCHD sanitarians visited the restaurant on December 30 to assess foodhandling practices and employee illnesses. Stool samples were collected from all three patrons and from one recently ill restaurant employee; the samples were submitted to the Minnesota Department of Health for testing.

All three patrons met the case definition. All had vomiting and diarrhea, two had cramps, and one reported a fever. Incubation periods were 15.5 hours (for two cases) and 16 hours (for one case). All three cases were still ill at the time of interview, so duration of illness could not be calculated. All three cases had stool samples test positive for norovirus.

The restaurant manager told the HCCHD sanitarian that there were two food workers who had recently had a gastrointestinal illness. All restaurant employees were interviewed, and two met the case definition. One had become ill on December 27 and one on December 31. The stool sample submitted by one food worker was negative for norovirus. All open food items dated December 28 and December 29 were discarded, all food contact surfaces and equipment were cleaned and sanitized, and the ill food workers were excluded from work until 72 hours after cessation of symptoms. No additional patron complaints were reported.

This was a probable foodborne outbreak of norovirus gastroenteritis associated with a restaurant. Although the three cases denied other common meals, they did live in the same household. Exposure to norovirus from a source other than the restaurant could not be ruled out. It is possible that the food workers' illnesses were unrelated to the cases' illnesses.

CONFIRMED WATERBORNE OUTBREAKS (RECREATIONAL WATER)

(1)

Norovirus Gastroenteritis Associated with a Hotel Swimming Pool and Hot Tub

March

Wadena County

On March 5, 2002 the Minnesota Department of Health (MDH) was notified by an MDH sanitarian about gastrointestinal illness and rashes among families who attended an overnight hockey tournament held in Wadena from March 1 to 3. The hockey team players were elementary school-aged children who belonged to one of three hockey teams from two different cities. The majority of the team members and their families stayed overnight at a hotel in Wadena on March 2. The teams consumed meals from a variety of venues throughout the weekend. The two cities' teams held two separate potlucks at the hotel on March 2. A continental breakfast was served at the hotel on March 3. A concession stand at the arena served food to the teams, including hot dogs for a weekend-long hot dog eating contest. Finally, persons staying overnight at the hotel swam extensively in the pool and hot tub.

On March 5, MDH obtained a list of players from City A. On March 6, MDH obtained a list of players on the two teams from City B. Epidemiologists from MDH interviewed attendees about food consumption, exposure to the hotel pool and hot tub, and illness history. A case was defined as a person with onset of vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) after staying overnight at the hotel. One stool sample was collected from an ill child and submitted to MDH for bacterial and viral testing. Sanitarians from MDH and Morrison County went to the hotel to conduct an inspection of the pool and spa on March 6.

Eighty team players, parents, and siblings were interviewed, and 36 (45%) met the case definition. Twenty-nine (81%) cases had vomiting, 20 (56%) had diarrhea, 19 (53%) had cramps, and 16 (44%) had fever. Onsets of illness occurred from March 1 to 6. The median incubation period could not be calculated due to multiple potential exposures. The median duration of illness was 22 hours (range, 0.5 to 48 hours).

City A and City B held separate potluck meals at the hotel on March 2. Among the items served were meatballs, sloppy joes, fried chicken, pizza, hot dogs, pasta salad, nacho cheese dip, chips, vegetables and dip, fruit, venison sausage, brownies, and cookies. Eating at the potlucks was not significantly associated with illness.

The hockey arena concession stand served hot dogs for a hot dog eating contest that was held during the tournament. Families from City A participated in this contest and consumed over 100 hot dogs during the course of the tournament. The families from City B did not participate in

this contest. Consumption of food from the concession stand was not significantly associated with illness.

At the time of the hotel inspection, the sanitarians reviewed the pool and hot tub maintenance records, inspected the pool and hot tub, and tested the levels of free chlorine in the pool and hot tub. The sanitarians noted that there were no clear violations. However, the pool had been partially drained, and there were some discrepancies with the pool and hot tub maintenance records.

Univariate analysis showed that activities at the hotel were associated with gastrointestinal illness. Thirty-three of 36 cases (92%) and 10 of 32 controls (31%) reported swimming in the pool on Saturday (odds ratio [OR], 24.2; 95% confidence interval [CI], 6.0 to 98.0, $p < 0.001$). Twenty-three of 33 cases (70%) and nine of 31 controls (29%) reported using the hot tub on Saturday (OR, 5.6; 95% CI, 1.9 to 16.5, $p = 0.001$). Seventeen of 33 cases (52%) and two of 32 controls (6%) reported swimming in the pool on Sunday (OR, 15.9; 95% CI, 3.3 to 77.8, $p < 0.001$). Nine of 32 cases (28%) and two of 32 (6%) controls reported using the hot tub on Sunday (OR, 5.9; 95% CI, 1.2 to 29.9, $p = 0.02$). Twenty-eight of 29 cases (97%) and 15 of 25 controls (60%) reported eating the hotel breakfast on Sunday (OR, 18.7; 95% CI, 2.2 to 160.1, $p = 0.001$). In a stepwise logistic regression model, only swimming in the pool on Saturday remained independently associated with gastrointestinal illness (OR, 20.8; 95% CI, 4.0 to 109.6; $p < 0.001$).

Swimming in the pool on Sunday also was significantly associated with development of rash (8/11 [73%] cases vs. 19/66 [29%] controls; OR, 6.6; 95% CI, 1.6 to 27.6; $p = 0.005$).

The stool sample collected from an ill child tested positive for norovirus.

This was an outbreak of norovirus gastroenteritis among persons who stayed overnight at the hotel. The environmental health assessment and epidemiological evidence implicated the pool as the source of norovirus infections and rash illness among the families that attended the overnight hockey tournament.

(2)

Norovirus Gastroenteritis Associated with a Swimming Beach

June

Hennepin County

On June 22, 2002 the Hennepin County Community Health Department (HCCHD) was notified through a Hennepin County dispatcher of gastrointestinal illness among six individuals who swam together at a beach in Long Lake on June 20 between 1:00 and 3:00 p.m. The six individuals denied any other common exposures and had not shared any foods or drinks at the beach. A sanitarian from HCCHD interviewed the six complainants and closed the beach on June 22 as a precautionary measure. On June 24, the sanitarian contacted the City of Long Lake

to determine if that agency had received any complaints. There were no additional complaints received by the City of Long Lake or the Minnesota Department of Health (MDH). About 3 hours later on the same day, the City of Long Lake received an independent complaint about the beach and referred the complainant to HCCHD. HCCHD received this report of gastrointestinal illness among five children who swam at the beach on June 20 between noon and 3:00 p.m. A case was defined as a person with onset of vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) after swimming at the beach. One stool sample was collected and submitted to MDH for bacterial and viral testing.

Thirteen persons were interviewed, and 11 met the case definition. All 11 cases reported vomiting and 10 (91%) reported diarrhea. The incubation period ranged from 21 to 32 hours. The stool sample tested positive for norovirus.

This was a waterborne outbreak of norovirus infections among persons who swam at a beach on June 20 between noon and 3:00 p.m. The beach was closed for 3 days during the investigation and reopened on June 25 after there was a lack of evidence of an ongoing disease transmission among persons who swam at the beach. The cause may have been an ill person contaminating the water with feces or vomitus while swimming at the beach, but this was not confirmed.

(3) **Cryptosporidiosis Associated with a Community Swimming Pool**

July

Otter Tail County

On July 31, 2002 the Minnesota Department of Health (MDH) received a complaint about gastrointestinal illness among children who swam in an indoor community pool in Fergus Falls during the month of July. A pool representative confirmed that there were children who had been ill with vomiting and diarrhea. These children attended swimming lessons or a summer day camp program at the pool. Epidemiologists from MDH consulted with sanitarians from MDH Environmental Health Services (EHS) and initiated an investigation on July 31.

On July 31, pool management provided epidemiologists with lists of children who attended the summer day camp program and children who attended swimming lessons. MDH did not receive telephone numbers for the children who attended swimming lessons. As an alternative to telephone calls, MDH sent a letter home to the parents of children who took swimming lessons, requesting that all parents call us to complete an interview about their child. The letter was faxed on August 1 to the school that coordinated transportation for these children. Epidemiologists from MDH interviewed parents about their child's swimming dates, times, and activities. A case was defined as a person with onset of vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) after swimming at the pool in the 7 days prior to illness onset. Fourteen stool samples were collected from ill persons. Additional cases were identified through statewide routine surveillance for *Cryptosporidium* and by telephone calls received from people in the community

who had heard about the outbreak. Sanitarians from MDH visited the facility multiple times between July 31 and September 6.

Ninety-seven persons were interviewed, and 52 (54%) met the case definition. Forty-seven of 50 (94%) cases reported diarrhea, 45/48 (94%) cramps, 29/49 (59%) vomiting, and 25/43 (58%) fever. Onsets of illness occurred from July 22 to August 1, peaking on July 30. The median incubation period could not be calculated due to multiple potential exposures. The median duration of illness was 67 hours (range, 2 to 484 hours). None of the cases were hospitalized, but six cases saw their healthcare provider. Sixteen cases tested positive for *Cryptosporidium parvum*. There were four secondary cases that did not swim in the pool but had close contact with persons who did; three of four visited their healthcare provider and were positive for *C. parvum*.

Swimming in the pool was statistically associated with illness (52 of 52 [100%] cases vs. 18/29 [62%] controls; odds ratio [OR], undefined; $p < 0.0001$). Among persons who swam in the pool, there were several factors that were statistically associated with illness, including swimming on July 22 (42 of 50 [84%] cases vs. 7 of 15 [47%] controls; OR, 6.0; 95% CI, 1.4 to 26.4; $p = 0.006$), swimming on July 23 (44 of 49 [90%] cases vs. 8 of 15 [53%] controls; OR, 7.7; $p = 0.004$), swimming on July 25 (44 of 50 [88%] cases vs. 8/15 [53%] controls; OR, 6.4; 95% CI, 1.4 to 30.5; $p = 0.007$), swallowing water (36 of 39 [92%] cases vs. 5 of 11 [45%] controls; OR, 14.4; $p = 0.002$), and taking swimming lessons (41 of 52 [79%] cases vs. 2 of 18 [11%] controls; OR, 29.8; $p < 0.0001$). None of these variables remained independently associated with illness after being analyzed using a stepwise logistic regression model.

At 3:00 p.m. on July 31, the MDH sanitarian spoke with the pool operator on the phone and recommended that the pool close until MDH could visit the facility. The pool was not licensed by MDH. Around 7:30 p.m. the sanitarian visited the pool, which had remained open. The sanitarian asked that all children exit the pool, at which time the pool was closed. The sanitarian reviewed the pool maintenance records and found that chlorine and pH were the only readings that had been taken. The chlorine feeder had been out of service from June 27 to July 16, during which time the pool was inappropriately hand-fed chlorine. The records indicated that the level of chlorine in the pool ranged from 0 to 1 parts per million (ppm) from July 13 to 16. The Minnesota pool code rules require that the free chlorine residual be at least 0.5 ppm. From July 17 to 31, chlorine levels were between 1 and 3 ppm. The flow meters had not been working, so the corresponding rate-of-flow meter readings were not monitored or documented. The sanitarian supervised the chlorination shocking of the pool. The pool re-opened on August 1.

On August 1, a physician from Fergus Falls notified an epidemiologist that he had diagnosed two patients with cryptosporidiosis who reported swimming at the pool during the 7 days prior to their onsets of illness. Given this information and the preliminary epidemiological evidence, the epidemiologist recommended that the pool close indefinitely until public health officials could identify the cause of the illnesses. The pool complied with this request. On August 7, epidemiologists received confirmation that additional persons who swam at the pool were

infected with *C. parvum*. The pool was drained, cleaned, and closed for the summer. The pool planned to reopen on September 9 after previously scheduled alterations and maintenance.

On September 6, sanitarians from MDH EHS visited the pool in an attempt to identify any deficiencies in pool operations that might have contributed to the outbreak of cryptosporidiosis. The investigation included an inspection of the pool's disinfection, recirculation, and filtration systems, interviews of pool staff, and a review of pool records. The contractor that replaced the pool's old filter reported that the sand bed was dangerously low, missing 8 of the required 18 vertical inches of sand. After the outbreak, the recirculation pump, filter, and flow meter were replaced with code-compliant models. A minimum required flow rate was established, which the new recirculation system was found to meet or exceed at the time of the re-opening inspection. This alteration work was performed under an MDH plan number. No significant problems related to the new systems were noted on September 6 and the pool became licensed by MDH. Previously, the pool staff had not taken any special precautions to minimize the risk of fecal accidents in the pool. Recommendations for minimizing the risk of fecal contamination of the pool were issued to facility management.

This was a waterborne outbreak of cryptosporidiosis associated with an indoor swimming pool. Fifty-two persons became ill after swimming in the pool; 16 of those had confirmed infections with *Cryptosporidium parvum*. *Cryptosporidium* oocysts most likely contaminated the pool water when a person who was or had recently been ill with diarrhea swam in the pool. Persons infected with *Cryptosporidium* should not swim in recreational water for 2 weeks after their symptoms have stopped. Oocysts of *Cryptosporidium* are relatively resistant to chlorine and are not readily inactivated by the recommended chlorine levels for pools. Precautions taken to minimize fecal contamination of the water are the best methods to prevent outbreaks of cryptosporidiosis in recreational water.

(4)

Cryptosporidiosis Associated with a Hotel Swimming Pool

August

Blue Earth County

On August 12, 2002 the Minnesota Department of Health (MDH) Acute Disease Investigation and Control Section received a phone call from a member of a softball team (Team A) from the Twin Cities area. Over the weekend of Friday, August 2 to Sunday, August 4, the team was in Mankato for a tournament and stayed at a local hotel. The caller reported that over half of the team had subsequently developed gastrointestinal illness. An outbreak investigation was initiated in collaboration with sanitarians from the MDH district office in Mankato. On August 20, the hotel reported that another softball team (Team B) from northern Minnesota had also reported illness after the tournament. Subsequently, MDH received reports of gastrointestinal illness among four other hotel guests who were not associated with the softball tournament.

Names and phone numbers of persons who attended the tournament with Team A or Team B were obtained from the original complainants. Persons were interviewed about illness history and exposures, including foods consumed and exposures to the hotel swimming pool and whirlpool. A case was defined as any person who was at the hotel and who subsequently became ill with diarrhea (≥ 3 loose stools in a 24-hour period) or vomiting or who had a stool specimen test positive for *Cryptosporidium*. Stool samples were collected from 13 ill persons (12 associated with Team A and one associated with Team B) and submitted to the MDH Public Health Laboratory for testing.

MDH sanitarians and pool engineers inspected and monitored the pool and whirlpool several times from August 12 to August 20.

Illness histories and exposure information were obtained from a total of 70 people, including all 38 persons affiliated with Team A, 27 of 29 persons affiliated with Team B, and five persons who stayed at the hotel but were not associated with either team. Of the 70 persons interviewed, 41 (59%) met the case definition. This included 23 cases from Team A, 14 cases from Team B, and four persons who stayed at the hotel independent from either team.

Thirty-four cases (83%) had diarrhea, 33 (80%) had cramps, 25 (61%) had fever, 12 (29%) had vomiting, and no one had bloody stools. Seven cases (17%) reported going to a doctor because of their symptoms; no one was hospitalized. Illness onset dates ranged from August 3 to August 12, peaking on August 8. Swimming in the hotel pool was associated with illness in a stepwise multiple logistic regression model (38 of 41 [93%] cases vs. 10 of 29 [34%] controls; odds ratio, 49; 95% confidence interval, 11 to 213; $p < 0.0001$). For the cases affiliated with Team A and Team B, the days they had used the pool were August 2 and August 3. For the cases not affiliated with the softball tournament, the days they had used the pool ranged from August 3 through August 7. The median incubation period from pool exposure was 5 days (range, <1 day to 7 days). One person associated with Team A may have started experiencing symptoms either shortly before or during swimming. The median duration of illness was 6 days (range, 1 day to 14 days).

All 12 ill persons affiliated with Team A who submitted a stool specimen to MDH were positive for *Cryptosporidium*, as was the one person affiliated with Team B who submitted a stool. In late August, another case of laboratory-confirmed cryptosporidiosis was reported to MDH from a clinical laboratory; this case had stayed at the same hotel as Team A and B on August 5 through August 7 and had swam in the hotel pool. This brought the total number of laboratory-confirmed cases with pool exposure to 14. There was also a laboratory-confirmed secondary case of *Cryptosporidium* infection: the younger sibling of the positive case from Team B tested positive after becoming ill on August 21, 13 days after the sibling's onset.

On August 12, an MDH sanitarian noted that the pool logbook was missing entries for the dates of August 2, 3, and 4. The chlorine level was not checked at that time, because the hotel reported that the pool had been superchlorinated the evening before the sanitarian's visit. The

hotel reported that it had not received any other complaints. On August 15, when the preliminary results from the epidemiologic investigation indicated a possible outbreak of cryptosporidiosis associated with the pool, the pool and spa were closed for superchlorination. The chlorine concentration was confirmed to be 50 ppm when monitored on August 16 and 17. Sand from the filters was replaced and the filters were disinfected with a 6,000 ppm chlorine solution. The pool and spa remained closed until August 18. As required by the state pool code, the hotel had a sign advising persons with communicable disease not to swim; however, it did not have a required sign posted stating that persons should shower before entering the pool.

This was a waterborne outbreak of cryptosporidiosis associated with a hotel swimming pool. There were 41 cases of illness identified, of which 14 were laboratory-confirmed as *Cryptosporidium* infections. There was also one laboratory-confirmed secondary case. *Cryptosporidium* can enter a pool when oocysts are shed in fecal material from an infected swimmer. One laboratory-confirmed case associated with Team A may have had started experiencing symptoms either shortly before or during swimming, representing a potential source of *Cryptosporidium* in the pool. Oocysts of *Cryptosporidium* are resistant to the levels of chlorine used in the standard continuous disinfection of swimming pools. In general, persons with gastrointestinal symptoms should avoid entering pools until symptoms have resolved; persons with *Cryptosporidium* should not swim for 2 weeks after symptoms resolve in order to prevent the spread of infection.

(5)

Cryptosporidiosis Associated with a Resort Swimming Pool

August

Ottertail County

On August 20, 2002 a Minnesota Department of Health (MDH) epidemiologist received a call from an MDH pool engineer reporting a complaint from an Illinois resident who reported gastrointestinal illness among several members of her family after vacationing in Minnesota. The complainant indicated that seven of 11 people in three different households became ill after staying at a resort in Detroit Lakes from August 3 through August 10. The resort was a 100-unit facility on a lake with multiple swimming beaches, an outdoor swimming pool, an outdoor children's pool, and a spa. All meals were included with the resort stay. The resort received a second independent complaint on August 20. The complainant indicated that three individuals in different households were experiencing gastrointestinal symptoms of long duration after staying at the resort. An investigation was initiated on August 21, before MDH became aware of the second complaint.

Lists of names and phone numbers of resort guests from August 3 through August 10 were obtained. MDH epidemiologists contacted persons from Minnesota, Illinois, Iowa, North Dakota, and Texas that stayed at the resort during that time period. Resort guests were interviewed by phone about illness history and food and drinking water consumption at the resort, at area restaurants, and at private parties. Resort guests were also asked about recreational

water activities such as use of the pools or spa, swimming in the lake, and other lake activities. Four stool specimens from Minnesota residents were obtained for enteric pathogen testing at MDH. A case was defined as any person who developed vomiting or diarrhea (≥ 3 loose stools in a 24-hour period) after vacationing at the resort.

MDH Environmental Health sanitarians conducted an investigation at the resort on August 21. The lodging facilities, food and beverage facilities, and swimming pools and spa were inspected. A list of foods served during the week of August 3 was obtained and used by epidemiologist for interviewing guests. During the inspection, the sanitarian inquired about additional complaints of illness reported directly to the resort. MDH Environmental Health staff conducted an in-depth review of pool operations on September 6.

Forty-seven persons were interviewed. Three persons were excluded from the analysis because they either had mild gastrointestinal illness that did not meet the case definition or because their illness histories were not complete. Sixteen (36%) of the remaining 44 persons met the case definition. Thirteen (81%) cases reported diarrhea, 10 (63%) reported vomiting, 10 (16%) reported abdominal cramps, eight of 14 (57%) reported fever and one (6%) reported bloody stools. Illness onsets ranged from August 11 to August 15. The median duration of illness was 130 hours (range, 2 to 287 hours). Five persons reported visiting a health care provider for their illness; two of these five visited an emergency room. Two persons reported submitting stools for testing at their health care provider. The two specimens were reported to be negative; however, MDH was unable to verify what tests were conducted on these stools. The four stools tested at MDH were collected 7 to 13 days after the cases' recovery from illness. All four were negative for *Campylobacter*, *E. coli* O157, *Salmonella*, *Shigella*, *Yersinia*, and norovirus. Two of the stools were positive for *Cryptosporidium parvum*.

Swimming in the swimming pool was associated with illness (15 of 15 [100%] cases vs. 9/13 [69%] controls; odds ratio [OR], undefined; 95% confidence interval [CI], undefined; $p < 0.001$). Swimming in the children's pool was also associated with illness (5 of 14 [36%] cases vs. 1 of 22 [5%] controls; OR, 12.0; 95% CI, 1.01 to 577; $p = 0.02$). Stratified analysis showed that among those who did not use the children's pool, swimming in the swimming pool was still associated with illness (9 of 9 [100%] cases vs. 13 of 24 [54%] controls; OR, undefined; lower limit of 95% CI, 1.26; $p = 0.01$). Furthermore, among those who did not use the swimming pool, swimming in the children's pool was not associated with illness. All of the cases that swam in the children's pool also swam in the swimming pool; i.e., swimming in the pool could account for all of the cases. No other food, drinking water, restaurant, or recreational exposures were associated with illness.

The initial environmental health investigation focused on both food and recreational water. An inspection of the kitchen facilities found one critical violation, that staff at the snack bar were not sanitizing dishware. Eighteen non-critical violations dealing with storage of utensils, food storage, and deficiencies on the physical facilities were also found. The initial inspection of the swimming pool detected no chlorine in the water. Pool maintenance records were incomplete

from August 1 through August 6, and no records were kept from August 7 through August 17. No monitoring of alkalinity and cyanuric acid had been done in that time period. In addition, the August 6 entry had a question mark and a value recorded that cannot be measured with the testing kit, indicating confusion of testing values. Chlorine levels in the children's pool and spa were 10 ppm and 9 ppm, respectively. The spa needed to be cleaned. All three pools needed rate-of-flow indicators and working thermometers. User safety and sanitation rules were not posted in dressing rooms or the pool area. Other violations included the lack of signs indicating that children need to be monitored by adults when the lifeguard is not present, and indicating the location of the nearest phone in case of an emergency.

The swimming pool was closed immediately. The swimming pool was shocked with chlorine and tested an hour later at higher than 10 ppm. The swimming pool remained closed for 18 hours to allow for recirculation.

The in-depth review conducted on September 6 uncovered a direct connection between the swimming pool and the pool discharge pit. There was no air gap in this connection except for an accidental break in the drainpipe. A direct connection without backflow prevention was also found between the well water system and the swimming pool. The inspectors also found that water in the pool was recirculated at a rate of 70 gallons per minute (less than 50% the required rate), resulting in turnover of water only once in 12 hours. Orders were issued to close the two pools and the spa until critical violations were corrected and verified by MDH staff. The pools and spa remained closed for the remainder of the season.

This was an outbreak of cryptosporidiosis associated with swimming in the outdoor swimming pool at a resort. Although the original source of contamination was not confirmed, an infected swimmer could have introduced the parasite into the pool. Lack of chlorination, inadequate water recirculation and other gross lapses in routine maintenance likely contributed to transmission of *Cryptosporidium* to swimmers over a prolonged period of time.

**NON-FOODBORNE, NON-WATERBORNE OUTBREAKS:
OUTBREAKS DUE TO ANIMAL CONTACT**

(1)

Campylobacteriosis and Cryptosporidiosis Associated with Calf Contact

May

Kittson County

In June 2002, an infection control nurse at Kittson Memorial Hospital in northwestern Minnesota reported three culture-confirmed cases of *Campylobacter jejuni* infections to the Minnesota Department of Health (MDH). The nurse also reported that the three cases all had links to the same local dairy farm (Dairy A). Also in June, two cases of *Cryptosporidium* infections in residents of Kittson County were reported to MDH; these cases also had links to Dairy A. In the summer of 2000, Dairy A had been implicated in an outbreak of campylobacteriosis associated with consumption of malts made with unpasteurized milk. An investigation was initiated in collaboration with the Minnesota Department of Agriculture (MDA) Dairy and Food Inspection Division.

A case was defined as a Kittson County resident with a confirmed enteric infection since May 1, 2002, and with an epidemiologic link to Dairy A. Cases were interviewed by MDH epidemiologists about illness history and exposures, including exposures to water, unpasteurized milk, and animals. An MDH public health veterinarian and an MDA dairy inspector visited Dairy A on June 27 to evaluate the situation and to obtain samples from calves and from the bulk milk tank. The calf samples were sent to MDH for bacterial and parasitic testing and the milk samples were sent to the MDA laboratory.

Five cases were identified; three were infected with *Campylobacter jejuni* and two were infected with *Cryptosporidium*. Four cases were female, and one was male. Ages of cases were 2, 8, 22, 31, and 35 years. Illness onset dates ranged from May 23 to May 31. Symptoms of the *Cryptosporidium* cases were nausea, vomiting, cramps, and diarrhea; one case was ill for 8 days and the other was still symptomatic 1 month after onset. Both of the cases of cryptosporidiosis were hospitalized, for 1 and 2 days, respectively. Symptoms of the *Campylobacter* cases were cramps, diarrhea, and fever. Their illness durations were 4, 5, and 21 days. One of the *Campylobacter* cases was hospitalized for 3 days.

All five cases reported recent direct contact with cattle from Dairy A. One of the *Campylobacter* cases worked at Dairy A and had milked sick cows. The other two *Campylobacter* cases had purchased calves from Dairy A in early May; one of these two cases reported that their calves had diarrhea for over 2 weeks after the purchase. One of the *Campylobacter* cases was the parent of one of the *Cryptosporidium* cases. The other *Cryptosporidium* case was a child whose family had purchased Dairy A calves in May; the child had regular contact with the calves, including daily bottle feeding.

The MDH public health veterinarian and MDA dairy inspector observed ample opportunities at Dairy A for contamination of the environment. The barn, parlor, milk room, and break room, including door handles, were visibly contaminated with manure. Over 1,100 cows were milked three times a day. Eighteen of the 20 calves observed appeared lethargic and dehydrated. Three had active diarrhea. Dairy A operators declined to provide a list of employees or a list of persons who had recently purchased calves.

Milk samples were taken from each of the two bulk tanks and stool samples were taken from 10 calves. The investigators also visited the home of one of the *Campylobacter* cases and one of the *Cryptosporidium* cases and obtained stool samples from their calves. The milk samples were negative for bacterial and parasitic pathogens. One dairy A calf was positive for *Campylobacter jejuni*. Stool from one of the two calves sampled from the *Campylobacter* case's home was positive for the Shiga toxin I gene by PCR; no serotype of enterohemorrhagic *E. coli* was reported because no individual colonies could be isolated for testing. Both of the two calves sampled from the *Cryptosporidium* case's home were positive for *Campylobacter jejuni* and *Giardia lamblia*.

The MDA dairy inspector scheduled regular visits with Dairy A operators, emphasizing environmental hygiene. Dairy A ended its practice of selling calves to local families.

This was an outbreak of campylobacteriosis and cryptosporidiosis associated with contact with calves from a single dairy farm. This outbreak highlighted the importance of avoiding exposure to cattle manure, which is a known source of several enteric pathogens.

(2)

***Campylobacter coli* Infections Associated with Chicken and Pig Contact**

June

Traverse County

In August 2002, as part of routine active laboratory-based surveillance activities, the Minnesota Department of Health (MDH) interviewed three cases of culture-confirmed *Campylobacter coli* infections that were all residents of Traverse County. MDH epidemiologists interviewed the three cases by phone about illness history and potential exposures. The MDH Public Health Laboratory performed pulsed-field gel electrophoresis (PFGE) subtyping on the three isolates.

All three cases were male; two were brothers. The onset dates of the cases were June 14 (one case) and June 26 (two cases). All three cases had diarrhea, two had cramps, two had bloody stools, two had fever, and one had vomiting. Illness durations were 5 days, 13 days, and over a month, respectively. One case was hospitalized for 1 day. All three cases worked on a local farm. Job duties included handling chickens, cleaning pens, and hauling pig waste. One case reported that some of the pigs on the farm had recently been ill.

The three *Campylobacter coli* isolates had an indistinguishable PFGE subtype, designated CMP154.

This was an outbreak of *Campylobacter coli* infections with an indistinguishable PFGE subtype. Exposure to chicken or pig manure was the most likely source of the infections.

(3)

Campylobacteriosis Among Volunteer Workers at a Flooded Turkey Farm

June

Roseau County

On June 18, 2002 an Infection Control Coordinator from the Altru Health System in Grand Forks, North Dakota called the Minnesota Department of Health (MDH) to report gastrointestinal illness among members of a baseball team from Roseau County. The team had volunteered to help pick up 13,000 turkey carcasses after a severe rainstorm on a free-range turkey farm. Two of the team members had been diagnosed with campylobacteriosis.

The farmer provided the names and phone numbers of 24 people who worked on the farm on June 9, 10, or 11. MDH epidemiologists interviewed volunteer workers about their activities, measures they might have taken to prevent illness, meals eaten on the farm, and their illness history. A case was defined as a person who picked up turkey carcasses and subsequently became ill with vomiting or diarrhea (≥ 3 loose stools in a 24-hour period). Stool samples collected from three of nine workers reporting illness were cultured at MDH for *Campylobacter*, *E. coli* O157:H7, *Salmonella*, *Shigella*, and *Yersinia*.

On June 27, epidemiologists from MDH visited the farm and interviewed the farmer about the clean up effort, available handwashing facilities, and meals served to the volunteer workers.

Twenty farm workers were interviewed, including the farmer, his wife and his father. Nine (45%) people met the case definition. One person reported mild symptoms that did not meet the case definition; this person was excluded from further analysis. The median age of the cases was 16 years (range, 10 to 59 years). The median age of the well volunteers was 42 years (range, 27 to 56 years). The median incubation period was 3 days (range, 1 to 3 days). Nine cases (100%) had diarrhea, nine (100%) had abdominal cramps, seven (78%) had fever, and three (33%) had vomiting. The median duration of illness was 96 hours (range, 48 to 168 hours). No hospitalizations were reported; six cases saw their health-care provider and four visited emergency rooms. Five cases received antibiotics.

Two enteric cultures were identified as *Campylobacter* species at the referring lab. One of these isolates was further identified as *Campylobacter coli* by the MDH Public Health Laboratory, but the other did not survive transit. Samples submitted by two cases after starting antibiotics were negative.

One meal was served each day on June 9, 10, and 11; no meal was statistically associated with illness. All 19 volunteer workers reported having contact with dead turkeys and turkey manure. Seventeen of 19 workers wore boots, and 11 of 19 used gloves (latex and/or cotton or leather work gloves) as protective equipment. Neither boots nor gloves were statistically protective.

Twelve (71%) of 17 workers reported washing their hands before eating: seven in the kitchen sink with soap and running water, four in a communal bucket without soap and one using a hose and soap. Handwashing was protective (4 of 12 [33%] hand washers became ill vs. 5 of 5 [100%] of those who did not wash their hands before eating; relative risk [RR], 0.33; 95% confidence interval [CI], 0.15 to 0.74; $p = 0.01$). When the three methods of handwashing were compared among the handwashers, only handwashing in the kitchen sink was protective: (0 of 7 who washed in the kitchen sink became ill vs. 4 of 5 [80%] of those using the bucket or hose to wash their hands [3 of 4 using the bucket and the one using the hose reported illness]; RR, undefined; $p = 0.006$).

This was an outbreak of *Campylobacter* enteritis transmitted by direct contact with animals. Washing hands with soap and running water was protective.

**Confirmed Foodborne Outbreaks
Minnesota, 2002**

Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	Contributing Factor	County
Jan	Restaurant, table service	4	0	Pizza	Suspected bacterial intoxication	Unknown	Hennepin
Jan	Restaurant, table service	14	1	Unknown	Astrovirus	Unknown	Hennepin
Jan	Catered conference	40	4	Coleslaw	Norovirus	Unknown	Ramsey
Jan	Holiday party	15	2	Cut fruit	Norovirus	Unknown	Hennepin
Jan	Restaurant, table service	6	0	Mexican food	Suspected bacterial intoxication	Time/temperature abuse	Hennepin
Mar	Restaurant, table service	43	3	Chicken	Bacterial intoxication	Time/temperature abuse	Olmsted
Mar	Restaurant, table service	4	1	Refried beans	<i>Clostridium perfringens</i> intoxication	Time/temperature abuse	Anoka
Mar	Restaurant, fast food	7	3	Submarine sandwiches	Norovirus	Ill food worker	Ramsey
Mar	Restaurant, table service	8	2	Pop	Norovirus	Unknown	Anoka
Mar	Restaurant, fast food	38	7	Submarine sandwiches	Norovirus	Likely ill food workers	Scott
Apr	Catered meeting	6	4	Unknown	Norovirus	Ill person at event	Hennepin

**Confirmed Foodborne Outbreaks
Minnesota, 2002 (continued)**

Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	Contributing Factor	County
Apr	Restaurant, buffet	2	2	Unknown (suspect chicken)	<i>Salmonella</i> Enteritidis	Unknown	Dakota
Apr	Restaurant, table service	2	1	Turkey sandwiches	Norovirus	Ill food worker	Nobles
May	Restaurant, table service	5	0	Sandwiches	Suspected norovirus	Ill food worker	Hennepin
May	Workplace luncheon	12	0	Sandwich condiments	Suspected norovirus	Likely ill foodhandler	Anoka
May	Private home	9	2	Punch	Norovirus	Unknown	Anoka
May	Restaurant, table service	18	4	Mexican food	Norovirus	Food worker with an infected child	Olmsted
May	Restaurant, table service	27	4	Cold sandwich items	Norovirus	Infected food workers	Morrison
May	Restaurant, table service	3	0	Shrimp and pork	Suspected <i>Clostridium perfringes</i> intoxication	Time/temperature abuse	Scott
May	Restaurant, fast food	3	1	Submarine sandwiches	Norovirus	Food worker with ill child	Hennepin
Jun	Catered wedding reception	17	0	Turkey slices	Suspected norovirus	Unknown	Crow Wing
Jul	Restaurant, table service	6	1	Multiple food items	Norovirus	Unknown	Anoka

**Confirmed Foodborne Outbreaks
Minnesota, 2002 (continued)**

Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	Contributing Factor	County
Jul	Restaurant, table service	15	5	Unknown	<i>Salmonella</i> Newport	Cross-contamination, time-temperature abuse, infected food workers	Crow Wing
Jul	Private home	6	0	Salads	Suspected norovirus	Ill foodhandler	Hennepin
Aug	Catered lunch buffet	55	4	Meat and cheese trays	Norovirus	Infected food worker	St. Louis
Aug	Wilderness camp	12	1	Multiple self-serve items	Norovirus	Likely ill person(s) at camp	St. Louis
Aug	Restaurant, table service	6	2	Cold food platter	Norovirus	Infected food workers	Nicollet
Sep	Retail product	8	8	Ground beef	<i>E. coli</i> O157:H7	Contaminated ground beef	Multi-County, Multi-State
Sep	Workplace luncheon	11	0	Meat and potato dish	Suspected <i>B. cereus</i> intoxication	Unknown	Hennepin
Oct	Private home	18	5	Fried rice with egg	<i>Salmonella</i> Enteritidis	Time/temperature abuse	Olmsted
Oct	Catered wedding reception	34	4	Unknown	Norovirus	Unknown	Hennepin
Oct	Restaurant, table service	4	4	Salads	<i>Campylobacter jejuni</i>	Likely cross-contamination	Ramsey
Oct	Amish community	48	7	Homemade candy	Norovirus	Ill foodhandlers	Fillmore

**Confirmed Foodborne Outbreaks
Minnesota, 2002 (continued)**

Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	Contributing Factor	County
Oct	Wedding reception	22	0	Salad and chicken	Suspected norovirus	Unknown	Hennepin
Nov	Restaurant, table service	19	14	Unknown	<i>Salmonella</i> Typhimurium	Cross-contamination, time-temperature abuse, infected food workers	Hennepin
Nov	Restaurant, table service	76	9	Salad	Norovirus	Possible cross-contamination	Ramsey
Nov	Restaurant, table service	4	1	Multiple food items	Norovirus	Infected food workers	Rice
Nov	Catered wedding receptions	40	5	Multiple food items	Norovirus	Unknown	Ramsey
Nov	Restaurant, buffet	5	3	Unknown	Norovirus	Unknown	Anoka
Nov	Restaurant, table service	9	3	Chicken	<i>Clostridium perfringens</i> intoxication	Time/temperature abuse	Olmsted
Nov	Restaurant, takeout	6	2	Unknown	Norovirus	Unknown	Hennepin
Nov	Restaurant, buffet	28	2	Potatoes, bar beverages	Norovirus	Unknown	Scott
Dec	Restaurant, fast food	3	3	Suspect lettuce	<i>E. coli</i> O157:H7	Unknown	Multi-County, Multi-State
Dec	Luncheon	13	1	Unknown	Norovirus	Infected food workers	Olmsted

**Confirmed Foodborne Outbreaks
Minnesota, 2002 (continued)**

Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	Contributing Factor	County
Dec	Restaurant, table service	3	0	Unknown	Suspected norovirus	Ill food workers	Ramsey
Dec	Restaurant, table service	9	3	Lettuce	Norovirus	Unknown	Ramsey

TOTAL: 46

**Confirmed Waterborne Outbreaks (Drinking Water and Recreational Water)
Minnesota, 2002**

Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	Contributing Factor	County
Mar	Hotel swimming pool/hot tub	36	1	Recreational water	Norovirus	Unknown	Wadena
Jun	Swimming beach	11	1	Recreational water	Norovirus	Likely contamination from ill swimmer(s)	Hennepin
Jul	Community swimming pool	52	16	Recreational water	<i>Cryptosporidium</i>	Likely contamination from ill swimmer(s)	Otter Tail
Aug	Hotel swimming pool	41	14	Recreational water	<i>Cryptosporidium</i>	Likely contamination from ill swimmer(s)	Blue Earth
Aug	Resort swimming pool	16	2	Recreational water	<i>Cryptosporidium</i>	Inadequate chlorination and maintenance	Otter Tail

TOTAL: 5

**Non-Foodborne, Non-Waterborne Gastroenteritis Outbreaks
Minnesota, 2002**

Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	County
Jan	Nursing home	20	0	Person-to-person	Norovirus suspected	Wright
Jan	Nursing home	13	0	Person-to-person	Norovirus suspected	Hennepin
Jan	Nursing home	200	0	Person-to-person	Norovirus suspected	Hennepin
Jan	Nursing home	23	0	Person-to-person	Norovirus suspected	Beltrami
Jan	Hotel	12	2	Person-to-person	Norovirus	Hennepin
Feb	Nursing home	88	0	Person-to-person	Norovirus suspected	Dakota
Feb	Nursing home	34	0	Person-to-person	Norovirus suspected	Pope
Feb	Nursing home	13	0	Person-to-person	Norovirus suspected	Ramsey
Feb	Nursing home	20	0	Person-to-person	Norovirus suspected	Fillmore
Feb	Elementary school	17	0	Person-to-person	Norovirus suspected	Scott
Mar	Nursing home	15	0	Person-to-person	Norovirus suspected	Ramsey
Mar	Multiple	4	0	Unknown	Unknown	Ramsey
Mar	Nursing home	15	0	Person-to-person	Norovirus suspected	Ramsey
Mar	Nursing home	15	0	Person-to-person	Norovirus suspected	Ramsey
Mar	Nursing home	26	0	Person-to-person	Norovirus suspected	Carver

**Non-Foodborne, Non-Waterborne Gastroenteritis Outbreaks
Minnesota, 2002 (continued)**

Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	County
Apr	Elementary school	31	20	Person-to-person	<i>Shigella sonnei</i>	Hennepin
Apr	Elementary school	12	0	Unknown	Unknown	Chippewa
Apr	Nursing home	34	0	Person-to-person	Unknown	Hennepin
May	Daycare	5	1	Person-to-person	<i>Shigella sonnei</i>	Hennepin
May	Community	5	5	Calf contact	<i>Campylobacter jejuni/Cryptosporidium</i>	Kittson
Jun	Daycare	3	3	Person-to-person	<i>Salmonella Oranienburg</i>	Anoka
Jun	Nursing home	40	1	Person-to-person	Norovirus	Dodge
Jun	Daycare	11	1	Person-to-person	Norovirus	Chisago
Jun	Daycare	2	1	Person-to-person	<i>Cryptosporidium</i>	Winona
Jun	Daycare	3	3	Person-to-person	<i>Shigella sonnei</i>	Hennepin
Jun	Farm	3	3	Pig/chicken contact	<i>Campylobacter coli</i>	Traverse
Jun	Farm	9	2	Turkey contact	<i>Campylobacter</i> species	Roseau
Jul	Daycare	3	3	Person-to-person	<i>Cryptosporidium</i>	Winona

**Non-Foodborne, Non-Waterborne Gastroenteritis Outbreaks
Minnesota, 2002 (continued)**

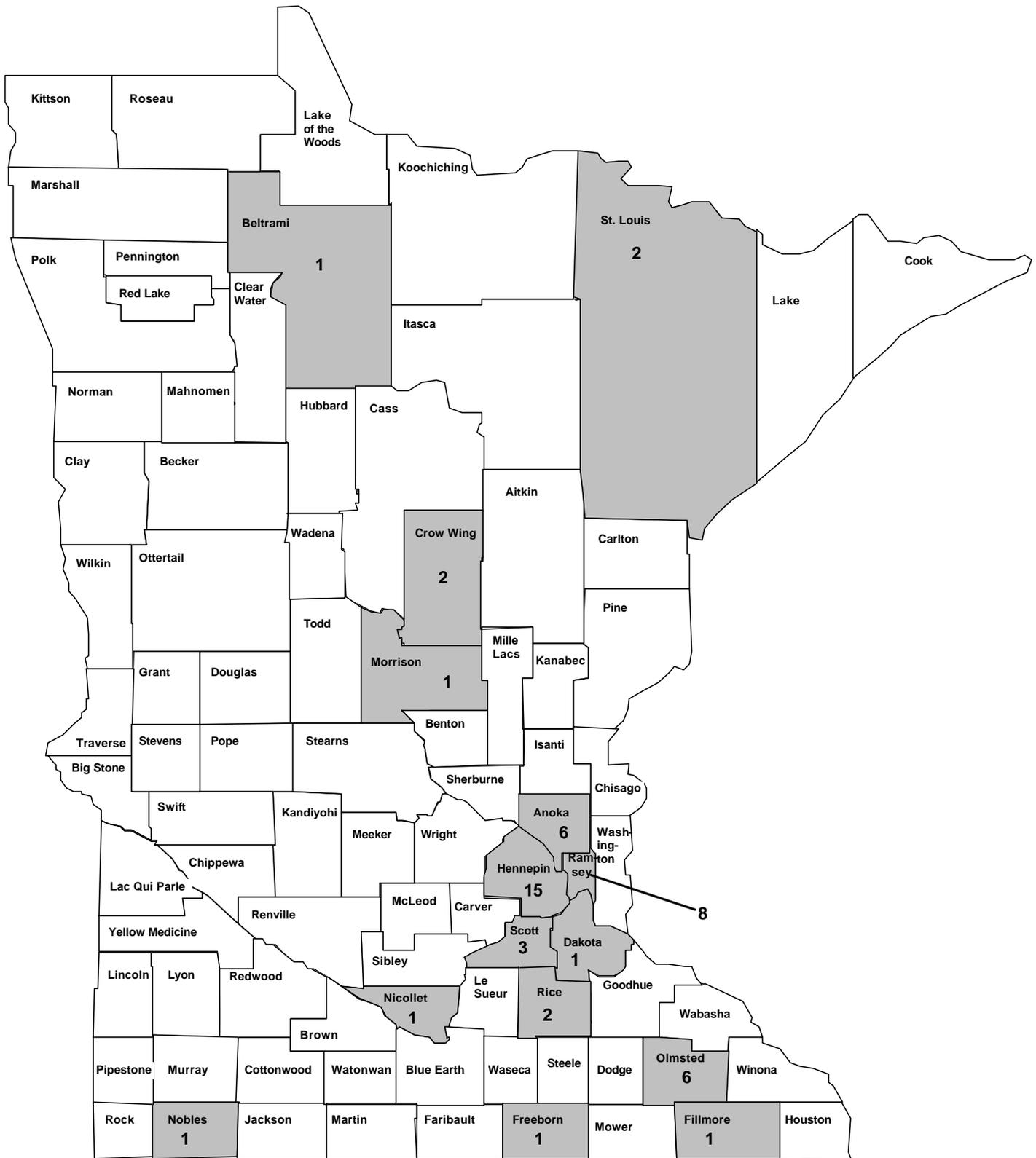
Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	County
Aug	Daycare	8	1	Person-to-person	<i>Shigella sonnei</i>	Hennepin
Sep	Elementary school	3	3	Person-to-person	<i>Shigella sonnei</i>	Ramsey
Oct	Daycare	25	8	Person-to-person	<i>Shigella sonnei</i>	Dakota
Nov	Nursing home	5	0	Person-to-person	Norovirus suspected	Goodhue
Nov	Nursing home	107	3	Person-to-person	Norovirus	Martin
Nov	Nursing home	212	7	Person-to-person	Norovirus	Wright
Nov	Football team	9	1	Person-to-person	Norovirus	Hennepin
Dec	Nursing home	52	3	Person-to-person	Norovirus	Wright
Dec	Nursing home	25	1	Person-to-person	Norovirus	Anoka
Dec	Nursing home	50	0	Person-to-person	Norovirus suspected	Hennepin
Dec	Nursing home	52	4	Person-to-person	Norovirus	McLeod
Dec	Elementary school	43	0	Person-to-person	Norovirus suspected	Ramsey
Dec	Hospital	31	2	Person-to-person	Norovirus	Martin
Dec	Nursing home	47	2	Person-to-person	Norovirus	Goodhue
Dec	Nursing home	51	0	Person-to-person	Norovirus suspected	Houston

**Non-Foodborne, Non-Waterborne Gastroenteritis Outbreaks
Minnesota, 2002 (continued)**

Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	County
Dec	Convent/assisted living	121	2	Person-to-person	Norovirus	Ramsey
Dec	Preschool	19	0	Person-to-person	Norovirus suspected	Carlton
Dec	High school	720	0	Person-to-person	Norovirus suspected	Ramsey
Dec	Nursing home	59	2	Person-to-person	Norovirus	Waseca
Dec	Nursing home	73	2	Person-to-person	Norovirus	Renville
Dec	Nursing home	41	4	Person-to-person	Norovirus	Aitkin
Dec	Daycare	6	0	Person-to-person	Norovirus suspected	Olmsted
Dec	Nursing home	20	0	Person-to-person	Norovirus suspected	Winona
Dec	Nursing home	60	3	Person-to-person	Norovirus	Stearns
Dec	Nursing home	31	1	Person-to-person	Norovirus	Jackson
Dec	Nursing home	106	0	Person-to-person	Norovirus suspected	Ramsey
Dec	Nursing home	71	0	Person-to-person	Norovirus suspected	Anoka
Dec	Nursing home	63	2	Person-to-person	Norovirus	Stearns
Dec	Nursing home	56	3	Person-to-person	Norovirus	Carver

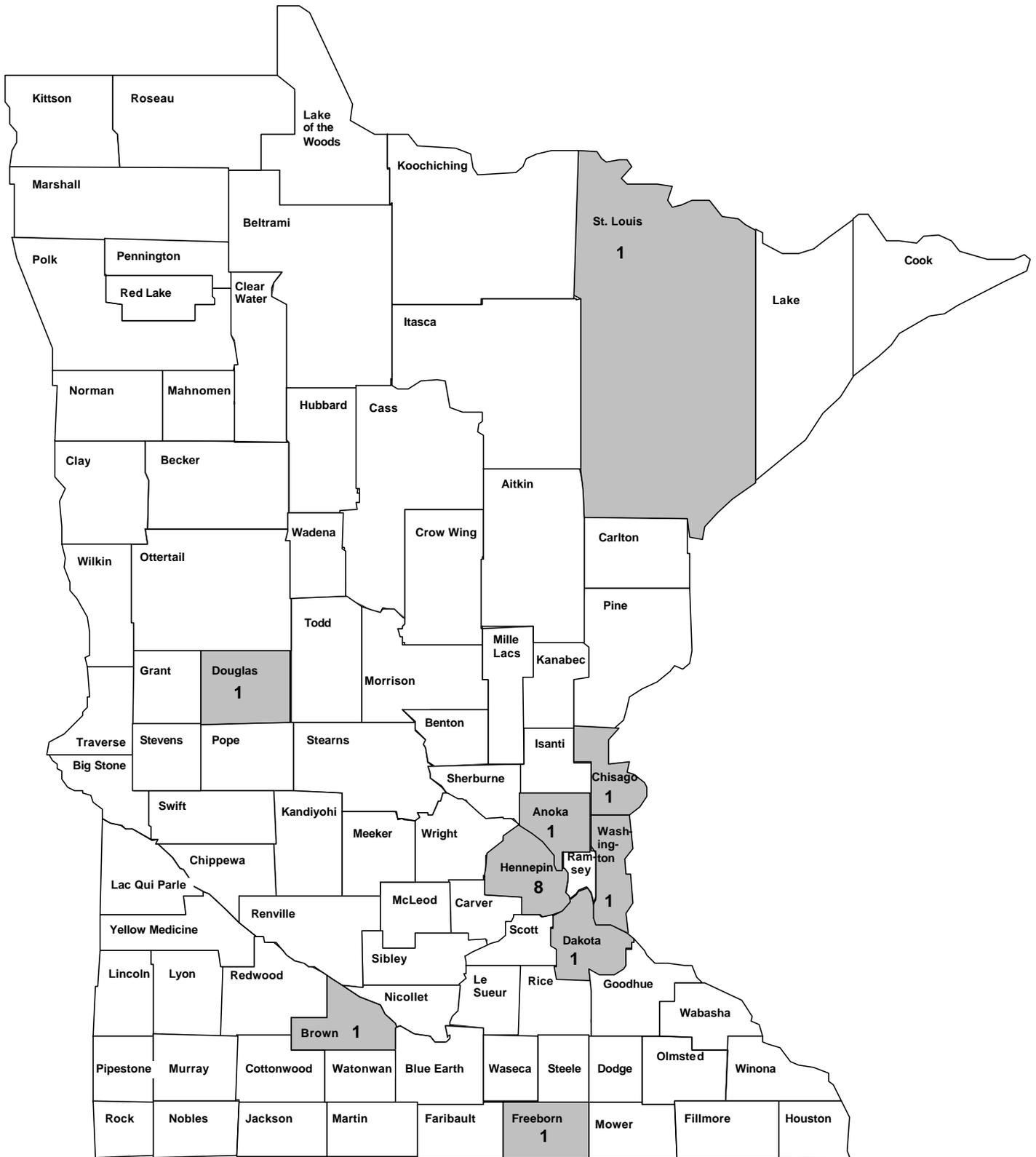
TOTAL: 57

Confirmed Foodborne Outbreaks by County, Minnesota, 2002 (n=46*)

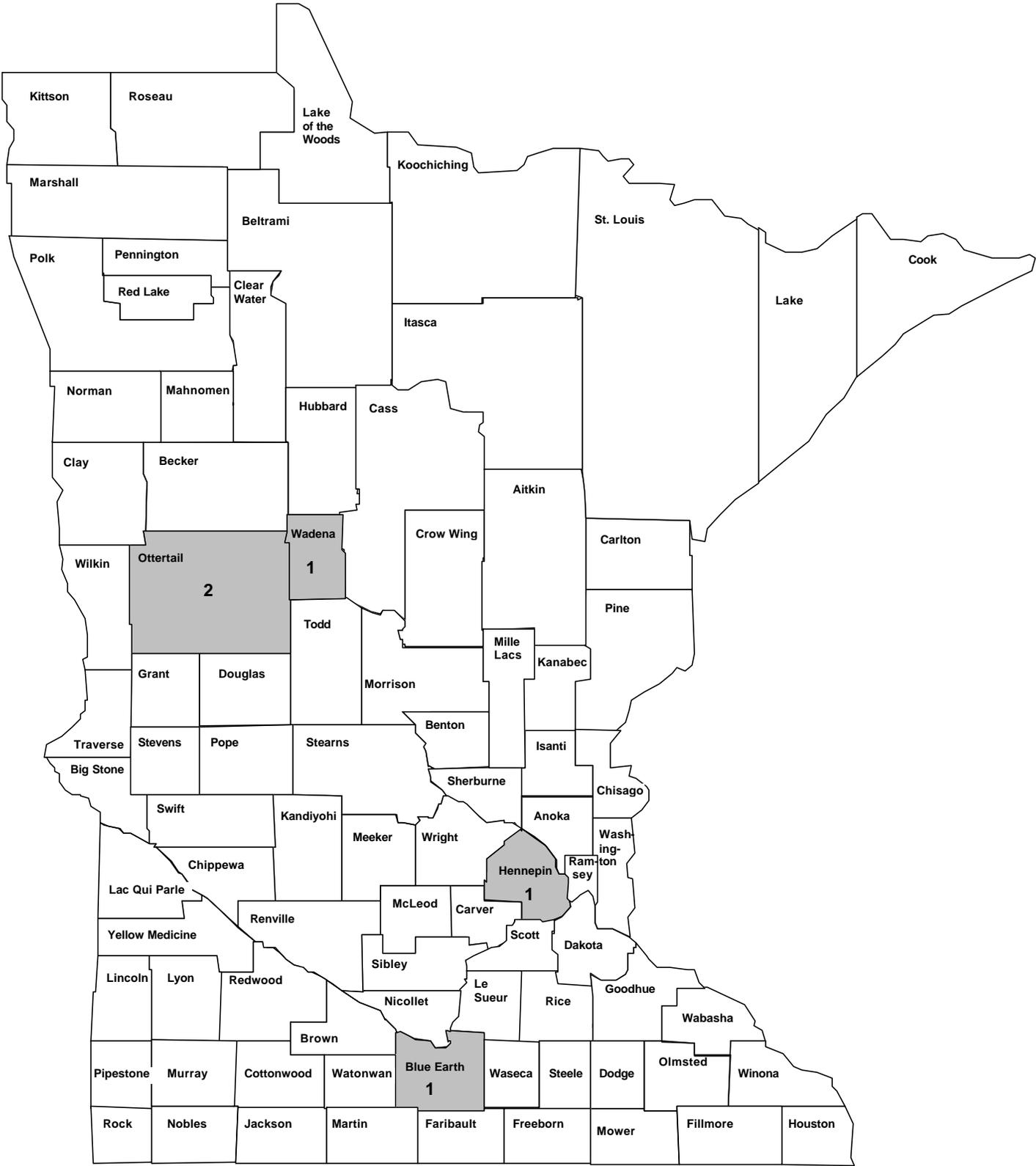


* Numbers on map add up to 51 because 44 of the 46 outbreaks involved single counties but two involved multiple counties. One outbreak involved Beltrami, Hennepin, Rice and Olmsted Counties. The other outbreak involved Freeborn, Hennepin, and Ramsey Counties.

Probable Foodborne Outbreaks by County, Minnesota, 2002 (n=16)



Confirmed Waterborne Outbreaks by County, Minnesota, 2002 (n=5)



**Foodborne Illness Complaints
Minnesota, 2002**

City or County	Foodborne Illness Complaints Faxed From MDH To City or County	Foodborne Illness Complaints Received By MDH From City or County	Total
Aitkin County	0	0	0
Albert Lea, City of	1	0	1
Anoka County	40	18	48
* Becker County	3	0	3
* Beltrami County	4	0	4
* Benton County	1	0	1
Big Stone County	0	0	0
Bloomington, City of	34	38	72
* Blue Earth County	7	0	7
Brooklyn Park, City of	9	0	9
Brown County	4	0	4
* Carlton County	3	0	3
+ Carver County	7	0	7
Cass County	4	0	4
Chippewa County	0	0	0
+ Chisago County	5	0	5
Clay County	1	0	1
* Clearwater County	0	0	0
Cook County	0	0	0
Cottonwood County	0	0	0
* Crow Wing County	10	0	10
Crystal, City of	3	0	3
+ Dakota County	62	0	62
* Dodge County	0	0	0

**Foodborne Illness Complaints
Minnesota, 2002**

City or County	Foodborne Illness Complaints Faxed From MDH To City or County	Foodborne Illness Complaints Received By MDH From City or County	Total
Douglas County	12	0	12
Duluth, City of	1	0	1
Edina, City of	10	2	12
Faribault County	0	0	0
* Fillmore County	2	0	2
* Freeborn County	1	0	1
Golden Valley, City of	9	1	10
Goodhue County	6	0	6
* Grant County	0	0	0
Hennepin County	58	17	75
Hopkins, City of	0	0	0
* Houston County	1	0	1
* Hubbard County	1	0	1
+ Isanti County	0	0	0
* Itasca County	2	0	2
* Jackson County	0	0	0
* Kanabec County	2	0	2
Kandiyohi County	2	0	2
* Kittson County	0	0	0
* Koochiching County	0	0	0
Lac Qui Parle County	0	0	0
Lake County	1	0	1
* Lake of the Woods County	0	0	0

**Foodborne Illness Complaints
Minnesota, 2002**

City or County	Foodborne Illness Complaints Faxed From MDH To City or County	Foodborne Illness Complaints Received By MDH From City or County	Total
Le Sueur County	2	0	2
Lincoln County	0	0	0
* Lyon County	0	0	0
* Mahnommen County	0	0	0
Maplewood, City of	14	0	14
* Marshall County	0	0	0
Martin County	0	0	0
* McLeod County	2	0	2
* Meeker County	0	0	0
* Mille Lacs County	1	0	1
Minneapolis, City of	80	78	158
Minnetonka, City of	13	0	13
Moorhead, City of	1	0	1
Morrison County	3	0	3
* Mower County	1	0	1
Murray County	0	0	0
New Brighton, City of	6	0	6
Nicollet County	4	0	4
Nobles County	0	3	3
* Norman County	0	0	0
Olmsted County	5	50	55
* Otter Tail County	0	0	0

**Foodborne Illness Complaints
Minnesota, 2002**

City or County	Foodborne Illness Complaints Faxed From MDH To City or County	Foodborne Illness Complaints Received By MDH From City or County	Total
* Pennington County	0	0	0
+ Pine County	2	0	2
Pipestone County	0	0	0
* Polk County	0	0	0
Pope County	0	0	0
Ramsey County	53	9	62
* Red Lake County	0	0	0
Redwood County	0	2	2
* Renville County	1	0	1
* Rice County	6	0	6
Richfield, City of	3	0	3
Rock County	0	0	0
* Roseau County	0	0	0
St. Cloud, City of	16	0	16
St. Louis County	7	18	25
St. Louis Park, City of	12	9	21
St. Paul, City of	71	0	71
+ Scott County	17	0	17
* Sherburne County	8	0	8
* Sibley County	0	0	0
Stearns County	1	0	1
* Steele County	1	0	1

**Foodborne Illness Complaints
Minnesota, 2002**

City or County	Foodborne Illness Complaints Faxed From MDH To City or County	Foodborne Illness Complaints Received By MDH From City or County	Total
* Stevens County	0	0	0
Swift County	0	0	0
Todd County	0	0	0
* Traverse County	0	0	0
Wabasha County	1	0	1
Wadena County	1	0	1
Waseca County	1	0	1
Washington County	34	20	54
Watonwan County	0	0	0
Wayzata, City of	1	1	2
Wilkin County	0	0	0
Winona County	3	0	3
+ Wright County	14	0	14
Yellow Medicine County	0	0	0
Bureau of Indian Affairs	3	0	3
Food and Drug Administration	4	0	4
+ MDH Environmental Health Services	3	3	6
Minnesota Department of Agriculture	26	0	26

**Foodborne Illness Complaints
Minnesota, 2002**

City or County	Foodborne Illness Complaints Faxed From MDH To City or County	Foodborne Illness Complaints Received By MDH From City or County	Total
University of Minnesota	0	0	0
United States Department of Agriculture	2	0	2
TOTAL	730	269	999

* complaint faxed to an outstate MDH Environmental Health Services District Office (n=57)

+ complaint faxed to MDH Environmental Health Services Metro District Office (n=110)

In 2002, the MDH Acute Disease Investigation and Control Section (ADIC) received 559 foodborne illness complaints from the public. Detailed information on symptoms and a 4-day food history was obtained from each caller (see form on next page), and the complaint was faxed to the appropriate jurisdiction for EACH restaurant, deli, grocery store, or other establishment mentioned in the complaint. The 559 complaints received by ADIC resulted in 730 faxes sent to environmental health agencies. In addition, ADIC received 269 foodborne illness complaints forwarded from other public health agencies.

FOODBORNE ILLNESS COMPLAINT FORM
Foodborne Illness Report
Minnesota Department of Health
Phone: (612) 676-5414 Fax: (612) 676-5730

Stool kit delivered **G**
Daily **G**

Complaint date: ___/___/___ Tennessee: **G** Reporter: _____
Agency: _____ Phone: _____ Fax: _____
First Name: _____ Last Name: _____ Age: _____ **Q** Female **Q** Male
Address _____ Zip: _____
Day phone: (_____) _____ Evening phone: (_____) _____
Occupation: _____ Daycare exposure: Yes No

Illness History: Illness onset: ___/___/___ Time: _____ Illness Recovery Date: ___/___/___ Time: _____
Vomiting Y N Onset date: ___/___/___ Time: _____ Vomiting recovery date: ___/___/___ Time: _____
Diarrhea Y N Onset date: ___/___/___ Time: _____ Diarrhea recovery date: ___/___/___ Time: _____
Number of stools per 24 hour period: _____ Cramps Y N Fever Y N temp: _____ Bloody stools Y N
Other symptoms: _____

Called healthcare provider: Y N Visited provider: Y N Please circle Office / ER Date of visit: ___/___/___
Provider requested stool sample: Y N Date stool submitted: ___/___/___ Result: _____ Hospitalized: Y N

Food History:

If only one person is ill; complete entire four day food history.

If ill persons live in the same household complete entire four day food history.

If more than one person is ill and they live in different households, then record only the common meals.

Date of Illness Onset: ___/___/___

Meal Time Foods and Drinks Consumed and Location (including home)

Brk: _____
Lun: _____
Sup: _____
Oth: _____

Day Prior to Illness Onset: ___/___/___

Meal Time Foods and Drinks Consumed and Location (including home)

Brk: _____
Lun: _____
Sup: _____
Oth: _____

Two Days Prior to Illness Onset: ___/___/___

Caller's name: _____

Meal Time Foods and Drinks Consumed and Location (including home)

Brk: _____

Lun: _____

Sup: _____

Oth: _____

Three Days Prior to Illness Onset of Illness: ___/___/___

Meal Time Foods and Drinks Consumed and Location (including home)

Brk: _____

Lun: _____

Sup: _____

Oth: _____

Establishment or Product Complainant Suspects (for products, include brand, size, flavor, UPC, purchase date & location)

Number of persons exposed: _____ Number ill: _____ Did complainant call the establishment: Yes No

History of others Ill:

First name: _____ **Last name:** _____ **Age:** _____

Address: _____ **Phone:** _____

Illness onset date: ___/___/___ Onset time: _____ Recovery date: ___/___/___ Recovery time: _____

Vomiting Y N Onset date: ___/___/___ Time: _____ Vomiting recovery date: ___/___/___ Time: _____

Diarrhea Y N Onset date: ___/___/___ Time: _____ Diarrhea recovery date: ___/___/___ Time: _____

Number of stools per 24 hour period: _____ Cramps Y N Fever Y N temp: _____ Bloody stools Y N

Other symptoms: _____

Foods eaten at common event:

Agencies Notified **Q** MDH-EHS **Q** MDH-District Office **Q** MN Dept of Ag **Q** FDA **Q** USDA

Q Local Agencies: _____

Comments _____

Complainant Expectations: **Q** Follow-up restaurants/establishments requested **Or** **9** MDA Follow-up requested

9 Complaint to be logged in database only

MDH Use Only: Stool collected: ___/___/___ Received at MDH: ME I M

Results: Norovirus O157 *Shig* *Salm* *Campy* *Yersinia* Other_____ Negative

Notified case: ___/___/___ Notified local agency: ___/___/___

Original Caller: _____

History of others Ill:

First name:_____ **Last name:**_____ **Age:**_____

Address: _____ **Phone:** _____

Illness onset date: ___/___/___ Onset time: _____ Recovery date: ___/___/___ Recovery time: _____

Vomiting Y N Onset date: ___/___/___ Time: _____ Vomiting recovery date: ___/___/___ Time: _____

Diarrhea Y N Onset date: ___/___/___ Time: _____ Diarrhea recovery date: ___/___/___ Time: _____

Number of stools per 24 hour period: _____ Cramps Y N Fever Y N temp:_____ Bloody stools Y N

Other symptoms:_____

Foods eaten at common event:

History of others Ill:

First name:_____ **Last name:**_____ **Age:**_____

Address: _____ **Phone:** _____

Illness onset date: ___/___/___ Onset time: _____ Recovery date: ___/___/___ Recovery time: _____

Vomiting Y N Onset date: ___/___/___ Time: _____ Vomiting recovery date: ___/___/___ Time: _____

Diarrhea Y N Onset date: ___/___/___ Time: _____ Diarrhea recovery date: ___/___/___ Time: _____

Number of stools per 24 hour period: _____ Cramps Y N Fever Y N temp:_____ Bloody stools Y N

Other symptoms:_____

Foods eaten at common event:



Foodborne Disease Outbreak Investigation Guidelines
Minnesota Department of Health
Phone: (612) 676-5414 Fax: (612) 676-5743

The Minnesota Department of Health (MDH) has developed a model for investigating foodborne illness using a centralized group of interviewers (Team Diarrhea) coordinated with local environmental health assessment of the establishment(s) involved in the outbreak. This approach allows us to rapidly respond to reports of outbreaks, standardize outbreak investigations, maintain a statewide database of foodborne diseases, and distribute information quickly and consistently.

When local agencies learn of a possible outbreak, they should notify the Minnesota Department of Health immediately to initiate an appropriate outbreak response.

During investigations, epidemiologists at MDH and local agencies will work with a network of environmental health specialists and other health agencies to evaluate critical elements of the outbreak. Environmental health inspectors and field epidemiologists will focus on restaurant inspection, interviewing employees, and assessing food preparation and safety, while the central group of epidemiologists will coordinate patron interviews, stool collection and testing, and data analysis. MDH is responsible for compiling and storing outbreak data and for summarizing outbreaks; however, local agencies are invited to write or contribute to all final reports. MDH has an outbreak report template available for agencies that choose to write their own final reports. All final reports should be faxed or mailed to MDH within a month of completion of the outbreak investigation. Minnesota outbreak reports will be included in the annual Minnesota Department of Health Gastroenteritis Outbreak Summary. MDH will forward outbreak information to the Centers for Disease Control and Prevention for national archiving. Detailed and thorough outbreak reports are critical in assessing the burden of foodborne disease outbreaks in Minnesota and nationally. This model of foodborne disease outbreak investigation, with a core group of epidemiologists and an extensive network of environmental health specialists, local, state and federal health agencies, and field epidemiologists distributed across the state provides Minnesotans with an efficient foodborne disease surveillance system.

Investigation Guidelines

When investigating outbreaks, MDH uses the following guidelines to ensure a prompt and appropriate response to possible outbreaks and to obtain consistent and useful data from every investigation.

Particular attention has been given to areas of investigations that are easily and frequently overlooked, but which are critical to agent and vehicle identification. A sample outbreak investigation questionnaire is attached. Epidemiologic data often offers the only evidence of an outbreak source and the responsible organism. Therefore, interviews with all cases and controls must be detailed, thorough, and consistent.

I. Patron Investigation

Tennessee Statements

The Tennessee statement is a requirement by the Minnesota Data Practices Act to inform the subject being interviewed of:

- the purpose of the interview
- who will have access to the information
- the intended use of the information
- any consequence of providing or not providing the requested information

Patient Information

The following questions capture the essential data needed to assess outbreaks caused by bacterial, viral, and parasitic organisms. The information below should be obtained in every interview.

- 1) Demographic and locating information on respondent
 - Name and address
 - Day and evening phone numbers
 - Date of birth
 - Gender
- 2) Illness History (verify that controls had no gastrointestinal symptoms)
 - Fever (Yes/No) (Try not ask if the person felt feverish. Ask only if the person had a fever.)
 - Temperature (highest)
 - Diarrhea (Yes/No)

- Date of diarrhea onset
- Time of diarrhea onset, in military time
- Maximum number of stools in a 24-hour period (This is critical information because the definition of diarrhea is **3 stools in a 24-hour period**)
- Date of diarrhea onset
- Time of diarrhea onset, in military time
- Date of last episode of diarrhea
- Time of last episode of diarrhea
- Vomiting (Yes/No)
- Date of vomiting onset
- Time of vomiting onset, in military time
- Date of last episode of vomiting
- Time of last episode of vomiting, in military time
- Bloody stools (Yes/No)
- Abdominal cramps (Yes/No)
- First symptom
- Date of onset of first symptom--necessary in order to calculate the incubation period
- Time of first symptom (The specific hour of onset, in military time, is necessary to calculate the incubation period)
- Date of recovery--necessary in order to calculate the duration of illness
- Time of recovery (The specific hour of recovery, in military time, is necessary to calculate the duration of illness)
- Was person hospitalized? (Yes/No)
- If yes: where, admission date, discharge date
- Did person visit a physician? If yes, physician's name and phone number.
- Did person submit a stool culture? If yes, when.

3) Exposure History

- Ask about consumption of **every food** available to people involved in the outbreak.
- Ask specifically about **ice and water** consumption at every meal being evaluated.
- Ask specifically about **ice and water** consumed at any time other than at meals.
- Ask about all events associated with the outbreak.

Example: If the outbreak is associated with a wedding, ask about attendance at any showers, pre-wedding parties, the rehearsal dinner and the wedding reception. Occasionally, there may be two case clusters that need to be teased out in the epidemiological investigation. For example, one group may become infected at the bridal shower, and the organism may be transmitted at the wedding reception by a food vehicle such as the wedding cake made by the groom's sister the morning before the wedding.

4) Stool Cultures

Laboratory detection is most sensitive when samples are collected early in the course of illness. Always obtain stool samples as soon as possible when an outbreak is suspected. When this is not possible, samples should still be collected, even from persons whose symptoms have resolved. **Cases may continue to shed the bacteria or viruses for several days after recovery.** Persons with asymptomatic infections may excrete the organism for months.

Ideally, stool samples should be obtained from 4 to 6 cases. Samples should be refrigerated but **NOT FROZEN** until they are submitted to the laboratory. The exception to this is when a bacterial pathogen is suspected and specimens will not be submitted for several days, samples should be frozen until they are sent to MDH. For example, if stool kits are given to cases in a suspected *E. coli* O157:H7 outbreak on Friday and will not be delivered to MDH before Monday, samples should be frozen.

A viral pathogen (e.g., norovirus) may be suspected when the outbreak is characterized by:

- 1) median incubation period of 24-48 hours, and
- 2) vomiting in at least 50% of cases or vomiting more frequent than fever, and
- 3) median duration ≤ 2 days

A bacterial pathogen (e.g., *Salmonella*, *E. coli* O157:H7) may be suspected when the outbreak is characterized by:

- 1) fever and/or bloody stools
- 2) median duration > 2 days
- 3) median incubation period of 3 days or more (some bacterial pathogens, e.g., *Salmonella*, can have a shorter median incubation)

II. Investigation at the Food Service Establishment

- 1) When interviewing food workers, Tennessee statements should be written to reflect the needs of the investigation to share illness history information with the establishment management.

- 2) Obtain illness histories directly from **ALL** food workers and catering staff. Ask employees about illness within 10 days of the event (in some situations, such as an outbreak involving ongoing Salmonella transmission in a restaurant, determine if there was any employee illness in the relevant time period). Please do not rely on management assessment of illness in employees, but **interview all employees directly**. Ask about gastrointestinal illness in the families of food workers, and obtain detailed information about the foods each food worker assisted in preparing for the event and any foods they may have consumed. Obtain stool samples from all employees who were ill prior to or following the event.
- 3) Ask management and kitchen staff about food preparation and storage practices, including:
 - food worker tasks (do workers have multiple tasks, do servers prepare any food, etc.)
 - food preparation (who, when, how, shared cutting surfaces, shared utensils, etc.)
 - bare-handed or glove-handed contact by food workers
 - pre-cooking of any dishes
 - food storage
 - cooking methods
 - cooling methods
 - reheating methods
 - warming trays used
 - serving/delivery (self serve salads, hot/cold buffet table, Sterno heaters, ice beds, etc.)
 - cleaning surfaces, dishes (who, when, how)
- 4) Food samples are rarely tested, even when epidemiologically implicated. Occasionally, the Minnesota Department of Agriculture tests food, but MDH relies almost exclusively on stool samples from cases.

III. Report Summarizing the Event

The final report will be entered into the statewide outbreak database and included in the state's annual summary of foodborne disease outbreaks. Every report includes the following information:

Background Section:

- Date the investigating agency was notified of outbreak
- Description of the initial report made to the investigating agency
- Date of the event

Methods Section:

- Who provided information about attendees, including names and phone numbers
- Other agencies notified of the outbreak and investigation
- Number of people who attended the event
- Case definition (The standard definition: vomiting or diarrhea after attending the event)
- Number of people interviewed
- Number who met the case definition among those interviewed
- Number of stools collected for testing
- Pathogens tested for in stools

(Note: When possible, all persons interviewed should be selected **randomly** from guest lists, not by word of mouth from cases. Cases are likely to mention other ill persons which may bias the results. At least one control should be interviewed per case, and preferably two or more controls per case.)

Results Section:

- Percentage of interviewed cases with Fever
- Percentage of interviewed cases with Diarrhea (≥ 3 loose stools in a 24-hour period)
- Percentage of interviewed cases with Vomiting
- Percentage of interviewed cases with Bloody stools
- Percentage of interviewed cases with Abdominal cramps
- Incubation range
- Median incubation
- Duration range
- Median duration
- Results of stool testing
- Food items or events associated with illness.
- Odds ratio of implicated item(s)
- Confidence intervals for implicated item(s)
- p values for all implicated item(s)
- All relevant information found in the establishment investigation
- Results of food worker interviews
- Results of food worker stool cultures

Conclusion Section:

- Etiologic agent
- Discussion of route of transmission (contaminated food)

- Contributing factors (cold food items contaminated by infected food worker; person to person transmission; undercooked food; improperly stored food, etc.)
- Defense of conclusion, if needed (for example, how do the symptoms, median incubation period and median duration suggest a causal agent). Discuss all plausible sources of contamination when necessary.

**SAMPLE FOODBORNE OUTBREAK
INVESTIGATION QUESTIONNAIRE**

Tennessee: Y N

Date: _____

Interviewer: _____

**Name of Outbreak
City, Minnesota
Day, Month, Year**

Name (Last, First): _____ Date of birth ____/____/____ Sex: M F

Street: _____ City: _____ County: _____

State: _____ Zip code: _____ Phone (H) _____ (W) _____

Case Illness History: Illness onset: Date: ____/____/____ Time: _____ Recovery: Date: ____/____/____ Time: _____

Vomiting Y N Onset: Date: ____/____/____ Time: _____ Cramps Y N Fever Y N temp: _____ Bloody stools Y N

Diarrhea Y N Onset: Date: ____/____/____ Time: _____ Maximum number of stools per 24 hour period: _____

Diarrhea Recovery Date: ____/____/____ Time: _____ (Diarrhea duration: ____days / hours)

First symptom: _____

Other symptoms: Y N specify: _____ Onset of other symptoms: Date: ____/____/____ Time: _____

Called provider: Y N Visited provider: Y N Please circle: Clinic / ER Date of visit ____/____/____

Provider requested stool sample Y N Stool sample submitted: Y N ____/____/____ Hospitalized over night: Y N

Food History (for cases and controls): Date of meal: ____/____/____ Time of meal (military): _____

[sample menu]

Fried chicken	Y N	Soda	Y N	Type(s): _____
Ham	Y N	Fruit punch	Y N	
Au gratin potatoes	Y N	Coffee	Y N	
Baked beans	Y N	Water	Y N	
Potato salad	Y N	Ice	Y N	
Tossed salad	Y N	Other food	Y N	
dressing: _____	Y N	or drink:	_____	
Angel food cake	Y N			

Did any one in your household experience vomiting or diarrheal illness in the week prior to this dinner (party, wedding...): Y N

Name (last, first)	Age	Onset date
_____	_____	____/____/____
_____	_____	____/____/____
_____	_____	____/____/____