MINNESOTA DEPARTMENT OF HEALTH 2004 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
2004 Gastroenteritis Outbreak Summary

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MINNESOTA DEPARTMENT OF HEALTH
2004 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.

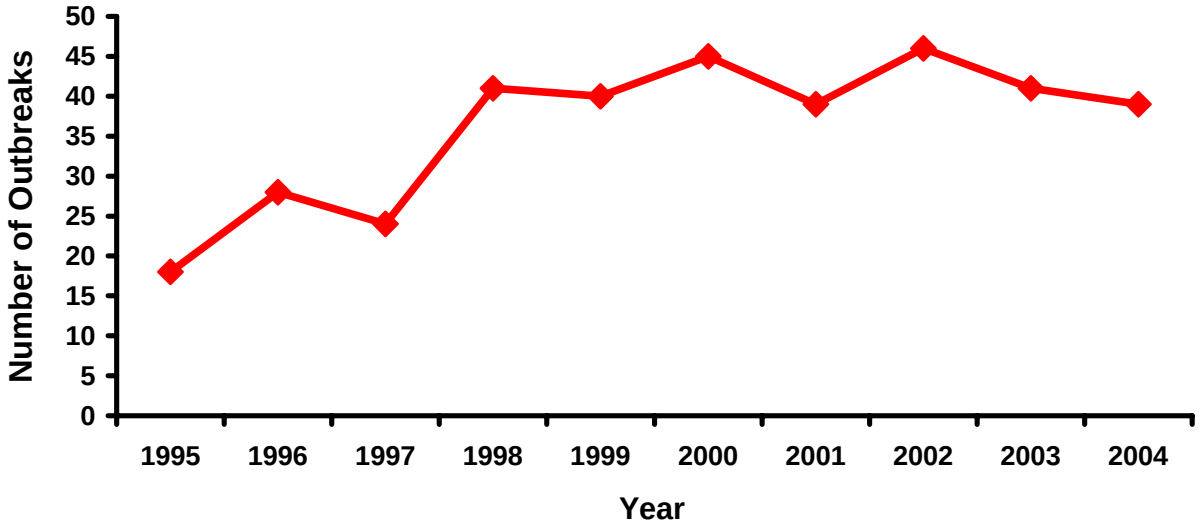
CONFIRMED AND PROBABLE NON-FOODBORNE, NON-WATERBORNE OUTBREAKS

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 2004, the Minnesota Department of Health (MDH) Acute Disease Investigation and Control Section identified a total of 108 outbreaks of gastroenteritis involving at least 3,553 cases of illness. The 108 outbreaks were classified as follows (see page 1 for definitions): 39 confirmed foodborne outbreaks, 13 probable foodborne outbreaks, one confirmed waterborne outbreak, and 55 non-foodborne, non-waterborne gastroenteritis outbreaks. During the past 10 years, the median number of confirmed foodborne outbreaks identified per year was 39 (range, 18 to 46). During the past 5 years, the median number of confirmed foodborne outbreaks identified per year was 41 (range, 39 to 46). The median number of cases of illness identified per confirmed foodborne outbreak in 2004 was eight (range, two to 115).

Number of Confirmed Foodborne Outbreaks Per Year, Minnesota, 1995-2004



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 (1-877-FOOD-ILL) was implemented. In 2004, 32 (82%) of the 39 confirmed foodborne outbreaks were initially reported to MDH or local public health agencies via phone calls from the public; the remaining seven outbreaks were identified through active laboratory-based surveillance for bacterial pathogens.

Of the 39 confirmed foodborne outbreaks, 24 (62%) were either laboratory-confirmed (n=23) or epidemiologically defined (n=1) outbreaks of norovirus gastroenteritis. There were five (13%) confirmed foodborne outbreaks caused by *Salmonella*, two (5%) caused by *E. coli* O157:H7, and one (3%) caused by *Shigella*. The remaining seven confirmed foodborne outbreaks (18%) were classified as bacterial intoxications (caused by *Clostridium perfringens*, *Staphylococcus aureus*, or *Bacillus cereus*).

The importance of norovirus as a cause of foodborne disease outbreaks in 2004 continues a pattern that has been observed for over two decades in Minnesota. During 1981-2004, 263 (48%) of 545 confirmed outbreaks of foodborne disease were due to norovirus, while 112 (21%) confirmed foodborne outbreaks were caused by infectious bacterial pathogens such as *Salmonella* and *E. coli* O157. Therefore, over this 24-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.

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 other foodborne norovirus outbreaks, ill or convalescent individuals contaminate shared food (e.g., self-serve food items in a wedding reception buffet or school cafeteria). Prevention of further disease transmission during norovirus outbreaks is accomplished by emphasizing good handwashing procedures, minimizing bare-hand contact with ready-to-eat food items, minimizing environmental contamination, and excluding ill employees from work until 72 hours after recovery.

There were five confirmed foodborne outbreaks caused by *Salmonella* in 2004. Two outbreaks associated with parties held at private homes were caused by improperly cooked turkey and egg dishes, respectively. One salmonellosis outbreak was associated with nationally distributed ground beef and involved cases in multiple states. The other two salmonellosis outbreaks 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, environmental contamination, and inadequate cooking, hot holding, cooling, and reheating of multiple food items.

MDH identified two foodborne outbreaks caused by *E. coli* O157:H7 in 2004, both due to contaminated ground beef. One of the outbreaks was associated with frozen ground sirloin patties sold by a national retailer. The other outbreak was associated with ground beef used in a spaghetti sauce served at a church supper.

Seven of the confirmed foodborne outbreaks identified in Minnesota in 2004 were bacterial intoxications caused by pathogens such as *Clostridium perfringens*, *Bacillus cereus*, and *Staphylococcus aureus*. These outbreaks often lack laboratory confirmation, as the resulting illnesses typically are of short duration. A recurring theme in outbreaks of bacterial intoxications is improper time and temperature control of potentially hazardous food items such as meats, rice, and sauces.

There was one waterborne outbreak of norovirus identified by MDH in 2004; this outbreak was associated with a swimming beach.

There were 53 non-foodborne, non-waterborne outbreaks of gastroenteritis identified in 2004. The majority of outbreaks in this category were associated with person-to-person transmission of enteric pathogens, predominantly norovirus, in nursing homes, schools, daycares, and other facilities. For reasons that are unclear, most norovirus outbreaks in nursing homes occur during the winter months.

CONFIRMED FOODBORNE OUTBREAKS

(1)
Norovirus Gastroenteritis Associated with a Fast-Food Restaurant

January Olmsted County

On January 9, 2004, Olmsted County Public Health Services (OCPHS) received a complaint from an individual who had become ill with vomiting and diarrhea after eating at a fast-food restaurant in Rochester, Minnesota. On January 9, OCHPHS received another complaint from a group of four students who became ill after dining at the same restaurant. Individuals from both complaints reported eating at the restaurant on January 7. The Minnesota Department of Health (MDH) was notified on January 12.

Epidemiologists from OCPHS obtained a list of additional patrons who dined at the restaurant on January 7. Interviews were conducted with patrons (complainants and additional patrons) to determine food items eaten and illness history. A case was defined as an individual who developed vomiting or diarrhea (≥3 loose stools in a 24-hour period) after dining at the restaurant on January 7. Stool samples were collected from two food workers and one household member of a food worker; these samples were sent to MDH for bacterial and viral testing.

A sanitarian from OCPHS visited the restaurant to assess food preparation procedures. Interviews were conducted with employees of the restaurant to determine recent illness history, work schedules, and normal work duties.

Of the 15 patrons interviewed, six (40%) met the case definition. All six cases had vomiting, five (83%) had diarrhea, four (67%) had cramps, and three (50%) had fever. The median incubation period, calculated from the individual meal times, was 37 hours (range, 31 to 49 hours). Since most cases were still experiencing symptoms when they were interviewed, the median duration of illness was not determined. No particular food items were significantly associated with illness among patrons.

One food worker reported an onset of vomiting and diarrhea on January 9. Another food worker reported a household member with diarrhea on January 6. This food worker reported not being ill, and worked on January 7. Stool samples from the two food workers and the ill household member of the food worker were positive for norovirus. Nucleic acid sequences of the three viruses were identical.

The sanitarian from OCPHS noted that food workers were not routinely using gloves when handling ready-to-eat food items at the restaurant.

This was an outbreak of norovirus gastroenteritis associated with a fast-food restaurant. The source of contamination was likely a restaurant employee; contamination of food items may have occurred as a result of an ill household member or asymptomatic shedding of norovirus by a food worker. OCPHS will work with the restaurant to implement a no bare-hand contact policy of ready-to-eat foods and stress the importance of handwashing.

(2)
Norovirus Gastroenteritis Associated with a Restaurant

January Anoka County

On January 16, 2004, the Minnesota Department of Health (MDH) Acute Disease Investigation and Control Section received a report from an Anoka County sanitarian of a complaint of gastrointestinal illness among a party of six people who had eaten at a restaurant in Coon Rapids, Minnesota on January 10. The six people in the party were relatives from three different households. They reported no other common exposures surrounding the time of their illness onsets. An investigation was immediately initiated.

An Anoka County sanitarian visited the restaurant on January 16. The sanitarian conducted interviews of three employees. Some of the other employees were Spanish-speaking and were interviewed using the restaurant manager as an interpreter. The restaurant manager also interviewed the server for the complainant's party; the server was no longer an employee of the restaurant. The corporate office for the restaurant chain contacted the Anoka County sanitarian and was referred to MDH to discuss the outbreak investigation.

MDH staff interviewed persons associated with the complaint and additional patrons of the restaurant (identified through credit card receipts) about food consumption and illness history. A case was defined as a person with vomiting or diarrhea ($\geq$3 loose stools in a 24-hour period) after dining at the restaurant. One of the original complainants submitted a stool sample to MDH for viral testing.

On January 18, MDH staff were able to reach the other members of the original complainant's party. An MDH epidemiologist spoke extensively with the original complainants to determine if these six individuals had any other common exposures. They did not have any other common meals or exposures in the 72 hours before or after this meal.

MDH epidemiologists attempted to work with Anoka County to obtain a list of restaurant patrons who would have dined there on January 10 (from reservation lists, checks, or credit card receipts). The corporate office of the restaurant chain did not facilitate this request in a timely or comprehensive manner. On January 26, the restaurant submitted six patron names from credit card receipts to MDH to be contacted about their food consumption and illness history. MDH staff were able to reach and obtain information from three of these parties. The restaurant then provided four additional names. By January 30, MDH staff were able to reach five parties (excluding the original complainants) who ate at the restaurant on January 10. These five parties accounted for 14 patrons. No illness was found among these patrons. Upon interview, it seemed that some of the patrons were aware of the investigation prior to contact by MDH epidemiologists. Due to the amount of time that had already passed since the meal on January 10, no further patrons were contacted.

All six of the patrons in the original complainant's party met the case definition. All six cases had diarrhea, five (83%) had vomiting, four (67%) had cramps, and two (40%) had fever. The median incubation period was 31.5 hours (range, 15.5 to 42.5 hours). The median duration of

illness was 73 hours (range, 60 to 106 hours). One case submitted a stool sample to MDH that tested positive for norovirus.

Univariate analysis showed that consumption of chicken (4 of 6 cases vs. 1 of 14 controls; odds ratio [OR], 26.0; 95% confidence interval [CI], 1.7 to 682.4; $p = 0.01$), a side of vegetables (4 of 6 cases vs. 1 of 14 controls; OR, 26.0; 95% CI, 1.7 to 682.4; $p = 0.01$), and cheese fries (6 of 6 cases vs. 5 of 14 controls; OR, undefined; 95% CI lower limit, 1.83; $p = 0.01$) were statistically associated with illness. However, these results should be interpreted with caution as the food histories for all patrons in this outbreak were open-ended, i.e., patrons reported the foods they consumed at the restaurant and were not questioned (yes/no) about individual items from the entire menu.

The Anoka County sanitarian visited the restaurant on January 16. No illness was found by the sanitarian among three employees that were interviewed, or among five additional employees (four of whom were Spanish-speaking) interviewed by the restaurant manager. No outside interpreters other than the restaurant manager were brought in by Anoka County to speak with these employees.

This was a foodborne outbreak of norovirus gastroenteritis associated with eating at a restaurant in Coon Rapids. Due to limited and potentially biased information on restaurant staff, time constraints, and the limited number of patrons that could be contacted by MDH staff, the outbreak could not be adequately characterized. The ultimate source of the viral contamination at the restaurant could not be determined.

(3)
Norovirus Gastroenteritis Associated with a Restaurant

January Ramsey County

On January 26, 2004, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of gastrointestinal illness in one of two individuals after eating at a restaurant in Roseville, Minnesota on January 22. On January 28, 2004, the MDH foodborne illness hotline received a complaint from two additional people who became ill with vomiting and diarrhea after dining at the same restaurant on January 25. The St. Paul-Ramsey County Department of Public Health (SPRCDPH) was notified of the complaints on January 28.

A sanitarian from SPRCDPH visited the restaurant to assess food preparation procedures. Interviews were conducted among food preparers and servers to determine recent illness.

Epidemiologists from MDH interviewed the complainants to obtain information on consumption of foods/beverages and illness history. A case was defined as a person who consumed food items from the restaurant and subsequently became ill with vomiting or diarrhea (≥3 loose stools in 24-hour period). Stool samples were collected from three patrons (three separate households representing both complaints) and submitted to MDH for bacterial and viral testing.

Of the four patrons interviewed, three (75%) met the case definition. All three cases reported vomiting, three (100%) had diarrhea, one (33%) had cramps, and no cases reported fever. The median incubation period, calculated from meal times at the restaurant, was 33 hours (range, 25 to 39 hours). Two cases were still experiencing symptoms at the time the interview was completed; at that time the median duration of symptoms was 27 hours (range, 21 to 62 hours).

The small number of patrons interviewed precluded meaningful statistical analysis. However, all three cases reported eating lettuce or fruit at the restaurant. Stool samples from the three patrons were positive for norovirus. Nucleic acid sequences of all three viruses were identical.

The manager of the restaurant informed the sanitarian from SPRCDPH that they had not received any complaints of illness and that no food workers from the restaurant had recently been ill with gastrointestinal symptoms. A limited number of food workers were interviewed by the sanitarian from SPRCDPH. Due to language barriers, some of the food preparers were interviewed by having the manager act as the translator. The sanitarian discussed proper handwashing and foodhandling procedures with the restaurant, as well as the importance of excluding persons with gastrointestinal symptoms from handling food.

This was an outbreak of norovirus gastroenteritis associated with a restaurant. The source and vehicle of the etiologic agent were not determined. Contamination of lettuce or fruit items by an ill food worker may have been the source of this outbreak; however, this could not be confirmed with the available information regarding potential food worker illness.

(4)
Norovirus Gastroenteritis Associated with Submarine Sandwiches

January Rock County

On January 27, 2004, the Minnesota Department of Health (MDH) received a report from Nobles-Rock County Public Health Services (NRCPHS) concerning employees of a local company (Company A) who became ill after eating a lunch catered by a restaurant in Luverne, Minnesota. The initial report indicated that employees were allowed to order personal sub sandwiches from the restaurant on January 23, and that approximately 20 of the 30 employees became ill with vomiting and diarrhea following the lunch. MDH also received numerous independent complaints from patrons who reported becoming ill after dining at the same establishment.

Epidemiologists from MDH conducted phone surveys of Company A employees to obtain information on consumption of foods/beverages and illness history. Epidemiologists from MDH also interviewed patrons (unrelated to Company A) who complained of illness after dining at the same restaurant; food and illness histories were collected from these individuals. A case was defined as an individual who consumed food items from the restaurant and subsequently became ill with vomiting or diarrhea (≥3 loose stools in 24-hour period).

A sanitarian from NRCPHS visited the restaurant to evaluate food preparation and handling procedures and to interview staff regarding any recent illness. Stool samples were collected

from one Company A employee and two food workers; these samples were submitted to MDH for bacterial and viral testing.
Of 27 Company A employees interviewed, 24 (89%) met the case definition. Two additional employees reported mild gastrointestinal symptoms that did not meet the case definition; these two employees were excluded from the analysis. Nineteen cases (79%) had diarrhea, 18 (75%) had vomiting, 18 (75%) had cramps, and four of 20 (20%) reported fever. The median incubation period, calculated from the time of the catered lunch on January 23, was 34 hours (range, 14 to 66 hours). The median duration of illness was 40 hours (range, 1 to 123 hours).

Of 12 patrons interviewed from the independent complaints, 10 (83%) met the case definition. Nine (90%) had vomiting, nine (90%) had cramps, seven of nine (78%) had diarrhea, and three of six (50%) had fever. Meal dates were January 23 (four cases), January 24 (two cases), January 25 (two cases), January 26 (one case), and January 30 (one case). The median incubation period, calculated from individual meal dates, was 29 hours (range, 21 to 44 hours). The median duration of illness was 37 hours (range, 6 to 62 hours).

One food worker reported an onset of vomiting and diarrhea on January 21, this individual worked on January 22 and January 23. Another food worker reported a household member with vomiting and diarrhea on January 22. This food worker reported not being ill, and worked on January 23. Three additional food workers reported onset of gastrointestinal illness from January 25 to January 28.

Stool samples from one Company A employee and one food worker were positive for norovirus. Nucleic acid sequences of the two viruses were identical.

A meaningful case-control study to evaluate potential food vehicles could not be performed due to lack of non-ill controls. Produce items were the most frequently reported food consumed by the cases. Twenty-two Company A cases (92%) reported having lettuce, 17 (71%) had olives, and 18 (75%) had tomatoes. Among independent complainant cases, 10 (100%) had lettuce, six of nine (67%) had tomatoes, three of six (50%) had olives, and three of six (50%) had onions.

The sanitarian from NRCPHS noted that employees of the restaurant were following procedure by washing their hands and wearing gloves while assembling sandwiches. However, the employees were not using gloves while preparing vegetables (washing, slicing, etc.) before being used in the sub sandwiches.

This was an outbreak of norovirus gastroenteritis associated with a restaurant. Transmission likely occurred through contamination of ready-to-eat food items by an ill employee.

(5)
Norovirus Gastroenteritis Associated with Sandwiches

February Hennepin County

On February 9, 2004, the Minnesota Department of Health (MDH) foodborne illness hotline received a report of gastroenteritis from a group that had dined together at a restaurant in Minneapolis, Minnesota on February 3. On February 5, the Minneapolis Division of

Environmental Health (MEH) had received a complaint from an individual who ate at the same restaurant on February 2. MDH forwarded both complaints to an epidemiologist from the Hennepin County Public Health Protection (HCPHP), and an investigation was initiated.

The restaurant provided MEH and HCPHP with a partial list of patrons who dined on February 2 or 3. Patrons were contacted by phone and interviewed about food and beverage consumption and illness history. A case was defined as a person with onset of vomiting or diarrhea ($\geq$3 loose stools in a 24-hour period) after eating at the restaurant. Two cases submitted stool specimens to the MDH Public Health Laboratory for bacterial and viral testing.

An MEH sanitarian went to the restaurant on February 9 to evaluate foodhandling practices and employee illnesses. A list of all restaurant employees was obtained, and employees were interviewed about job duties and illnesses. Stool samples were obtained from two of the restaurant workers who had reported recent gastrointestinal symptoms.

Eleven patrons were interviewed, and eight cases from four separate groups were identified. Two of the cases were identified from patron receipts, and six of the cases were identified through patron complaints to MDH or MEH. Meal dates were February 2 (two cases) and February 3 (six cases). Six cases (75%) had diarrhea, five (63%) had vomiting, three (38%) had cramps, and two (25%) had fever. The median incubation period was 38 hours (range, 22 to 41 hours), and the median duration of illness was 26 hours (range, 5 to 72 hours). One case reported that three family members had also become sick a few days after the case's onset. No cases sought medical attention for their symptoms. Stool specimens were submitted by two cases (from the same household), and both were positive for norovirus.

Public health staff interviewed all 26 restaurant employees. In all, four food workers reported experiencing gastrointestinal symptoms between January 31 and February 9. Two had onset on January 31, one had onset on February 5, and one could not recall their illness onset date. One ill food worker had worked at the restaurant while symptomatic. Two of the four ill food workers submitted stool specimens, and both were positive for norovirus. The MDH Public Health Laboratory sequenced norovirus PCR products from both of the food workers and one of the patrons; the sequences were identical.

The MEH sanitarian identified several foodhandling violations at the restaurant on February 9. The restaurant had failed to report a patron complaint to MEH as required by the food code, a food worker had worked while ill with gastroenteritis, there was no ill employee log, and handwashing stations lacked nailbrushes and paper towels. The sanitarian ordered the restaurant to minimize bare-hand contact with ready-to-eat food items by the proper use of utensils and/or gloves. The MEH sanitarian made follow-up visits to the restaurant for further food safety training and to verify compliance with orders. On June 9, 2004, the City of Minneapolis held an administrative hearing and fined the restaurant $250.00.

Food items that were common to the cases were various types of sandwiches (patty melts, fish sandwiches, turkey sandwiches) and drinks with ice. Based on the presence of ill food workers in the restaurant and the frequency of bare-hand contact with ready-to-eat foods such as sandwich toppings, sandwiches were the most likely vehicles.

This was a foodborne outbreak of norovirus gastroenteritis associated with a restaurant. Norovirus genetic sequences from ill patrons and ill food workers were identical. The presence of infected food workers in the restaurant resulted in viral contamination of ready-to-eat food items such as sandwich toppings that were handled during food preparation.

(6)
Suspected Norovirus Gastroenteritis Associated with a Hockey Tournament

February Koochiching County

On February 20, 2004, the Minnesota Department of Health (MDH) received a report of vomiting and diarrhea among players and family members of a hockey team after attending a tournament in International Falls, Minnesota during February 13-15. The coach of this hockey team, Team A, reported that the players and family became ill during and after the tournament. On February 21, MDH received a report of a second hockey team, Team B, whose members became ill after attending the same tournament in International Falls.

Epidemiologists from MDH contacted players and family members from Team A and Team B. Individuals were interviewed to obtain information on food/beverage consumption and illness history. A case was defined as a player or family member of Team A or B who attended the hockey tournament and became ill with vomiting or diarrhea (≥3 loose stools in 24-hour period). A stool sample from one individual on Team A was submitted to MDH for bacterial and viral testing.

Of the 48 individuals interviewed from Team A, 20 (42%) met the case definition. Fourteen of 18 cases (78%) reported cramps, 15 of 20 (75%) had diarrhea, 13 (65%) had vomiting, and five of 17 (29%) had fever. The median duration of symptoms was 61 hours (range, 7 to 101 hours). Onset dates of illness for Team A occurred before, during, and after the hockey tournament. The stool sample from the individual on Team A was negative for norovirus.

Pizza was consumed by Team A the evening of February 14. The pizzas were kept in one of the motel rooms so that it could be consumed primarily by the players. However, some of the individuals that were staying in that room reportedly had vomiting and diarrhea the same evening. Consuming this pizza was significantly associated with illness (11 of 20 cases vs. 5 of 27 controls; odds ratio [OR], 5.4; 95% confidence interval [CI], 1.4 to 20.0; $p = 0.01$). When the cases with onset of illness occurring prior to the pizza meal were removed, the association between pizza consumption and illness was even stronger (9 of 11 cases vs. 5 of 27 controls; OR, 19.8; 95% CI, 3.2 to 121.5; $p < 0.001$). The median incubation period, calculated from an estimated meal time for the pizza, was 29 hours (range, 3 to 57 hours).

Of the 52 individuals interviewed from Team B, 10 (19%) met the case definition. Nine cases (90%) had cramps, seven (70%) had vomiting, six of nine (67%) had diarrhea, and three of nine (33%) had fever. The median duration of symptoms was 51 hours (range, 6 to 196 hours). No stool samples were collected from Team B.

Individuals from Team B stayed at the same motel as Team A; both teams stayed at the motel during February 14 and part of February 15. Among cases from Team B, consuming the continental breakfast on February 15 in the motel lobby approached a statistically significant association with illness (4 of 8 cases vs. 6 of 33 controls; OR, 4.5; 95% CI, 0.87 to 23.3; p = 0.08). The analysis did not include two cases with an onset of illness prior to the continental breakfast on February 15. Food items for the continental breakfast included bagels, toast, English muffins, coffee, juice, and water.

This was an outbreak of gastroenteritis associated with a hockey tournament in International Falls. The etiological agent was not determined, but illnesses were compatible with norovirus gastroenteritis. Foodborne transmission appeared to amplify an ongoing person-to-person outbreak. Specifically, contamination of pizza by individuals affiliated with Team A amplified the outbreak among Team A members. The continental breakfast served February 15 was shared by both teams and may have been the source of illness for some members of Team B.

(7)
Norovirus Gastroenteritis Associated with a Birthday Party

February Carlton County

On February 17, 2004, the St. Louis County Public Health Department notified the Minnesota Department of Health (MDH) of a complaint of gastrointestinal illness among birthday party attendees at a hotel in Carlton County on February 15. The party was an overnight event including store-bought foods and food made by the host's mother.

On February 18, MDH epidemiologists notified the Carlton County Public Health Department and the MDH Environmental Health Division about the complaint and began an outbreak investigation. MDH received a list of food items served at the party and a list of birthday party attendees from the party host. MDH also obtained a list of foods served the morning after the party at the hotel's continental breakfast, and was in contact with the hotel management about the health of their employees. MDH staff began interviewing birthday party attendees regarding illness history and food/beverage consumption using a standard questionnaire. Those who prepared food for the party were also interviewed for illness history and food/beverage consumption.

A case was defined as a person who had consumed food beverages served at the birthday party at the hotel on February 15 and who had subsequently experienced vomiting or diarrhea ($\geq$3 loose stools in a 24-hour period). Two party attendees submitted stool samples to MDH for bacterial and viral testing.

Ten people who attended the party were interviewed, and six (60%) met the case definition. All six cases had diarrhea and vomiting, four (67%) had cramps, and two (33%) reported fever. The median incubation period was 15 hours (range, 9.5 to 21 hours). The median duration of illness was 22.5 hours (range, 5 to 26 hours). Two cases submitted stool samples to MDH; both were positive for norovirus. Viral nucleic acid from both positive samples had identical sequences.

Univariate analysis showed that drinking Mountain Dew (5 of 5 cases vs. 0 of 3 controls; odds ratio [OR], undefined; 95% confidence interval [CI] lower limit, 1.82; $p = 0.02$) was significantly associated with illness. Drinking any soda also approached significance (6 of 6 cases vs. 1 of 3 controls; OR, undefined; 95% CI lower limit, 0.69; $p = 0.08$). Soda served at the party was stored in an ice-water bath in the bathroom sink of the hotel room.

In addition to the six cases, one party attendee reported onset of diarrhea 20 hours before other attendees of the birthday party (therefore, this attendee was ill with cramps and diarrhea during the party). This attendee did not report drinking Mountain Dew, but had consumed other soda, and had purchased soda that may have been stored in the ice water bath. Since this case stayed overnight at the hotel with the other party attendees, experiencing illness symptoms could have resulted in the contamination of the soda cans that were being held in the sink.

This was an outbreak of norovirus gastroenteritis associated with a birthday party at a hotel. Norovirus can withstand freezing temperatures and has a low infectious dose (<100 viral particles). Drinking Mountain Dew was significantly associated with illness. Drinking any soda also approached significance. The individual who became ill with gastroenteritis during the party was the likely source of the outbreak.

(8)
Norovirus Gastroenteritis Associated with a Party at a Private Home

February Hennepin County

On February 19, 2004, the Minnesota Department of Health (MDH) was notified via the foodborne illness hotline of a suspected outbreak of gastrointestinal illness among persons who had attended a birthday party at a private home in Bloomington, Minnesota on February 15. The main food items at the party were prepared by a grocery store in Edina, Minnesota. The organizer of the birthday party received calls from multiple guests who reported vomiting and diarrhea shortly after the event. MDH initiated an investigation.

The organizer of the birthday party was interviewed to get an overview of the birthday party, a description of foods that were served, the timeline in which foods were served, and how they were served. A complete list of guests was obtained. Epidemiologists from MDH interviewed attendees by phone regarding illness and food consumption histories. A case was defined as vomiting or diarrhea ($\geq$3 loose stools in a 24-hour period) with onset on or after February 15 in any person who attended the party. Stool samples were collected from attendees who met the case definition or were suspected to be secondary cases. On all stool samples, the MDH Public Health Laboratory conducted routine bacterial cultures and PCR testing for norovirus.

An inspector from the Minnesota Department of Agriculture (MDA) interviewed the management staff of the grocery store, performed an inspection of the deli food preparation area, reviewed employee illness logs, and interviewed food workers about illness history. From the interviews, the inspector determined that the fruit and vegetables were obtained from the grocery store's produce warehouse. Another MDA inspector visited the warehouse, interviewed its management staff, inspected the food preparation areas, and obtained sales records, production

records, and employee rosters; MDH epidemiologists interviewed food workers about illness history.

Interviews of the birthday party organizer revealed that 49 persons attended the event. The food was picked up by the organizer at noon, and served at the party from 2:00 to 5:00 p.m. Some of the food was kept in the refrigerator in the interim. The prepared foods included a bruschetta basket (a bowl of tomato-garlic mixture surrounded by slices of toasted sourdough parmesan baguette, intended to be self-constructed), a meat and cheese platter (hard salami, smoked turkey, oven-roasted turkey, roast beef, Swiss cheese, Colby cheese, pickles, olives, and grape tomatoes), a vegetable platter (baby carrots, celery, cucumber, cauliflower, broccoli, green and red pepper slices, and dill dip), a fruit platter (pineapple, strawberries, cantaloupe, honeydew, grapes, and a cream cheese-based dip), and a cake (buttercream frosting with raspberry filling). Other foods included packaged pumpernickel bread, three types of boxed crackers, champagne, sparkling juice, white wine, red wine, cartons of lemonade, pop, and water.

All 49 guests of the party were interviewed. Ten (20%) guests met the case definition. Four (40%) cases were male and six (60%) were female. The median incubation period was 46 hours (range, 15.5 hours to 73 hours). The median duration of illness was 34 hours (range, 6 hours to 3 days). Eight (80%) cases reported vomiting, seven (70%) reported non-bloody diarrhea, seven (70%) reported cramps, and one (10%) reported fever. None sought medical attention. Five additional attendees reported mild gastrointestinal symptoms that did not meet the case definition. Two secondary cases were reported; both attended the party and were not ill during the time of initial interview, but had household members who were ill from the party. Of note, in a family of five that attended the party, one child had been ill with vomiting during February 12-13, and was fully recovered at the time of the party. However, an older sibling had onset of vomiting and cramps in the late evening on February 15 (with recovery during the morning of February 17) and the mother had onset of vomiting mid-day on February 17 (with recovery during the afternoon of February 18). All five family members reported not eating or touching any food items during the party. These ill family members were excluded from analyses.

Univariate analysis showed that multiple items were significantly associated with illness: bruschetta tomato mixture (6 [50%] of 12 who ate this vs. 4 [14%] of 29 who did not; risk ratio [RR], 3.6; 95% confidence interval [CI], 1.2 to 10.6; p=0.04); sourdough parmesan baguette slices (7 [44%] of 16 who ate this vs. 3 [12%] of 25 who did not; RR, 3.7; 95% CI, 1.1 to 12.1; p = 0.03); vegetable platter (8 [36%] of 22 who ate from this vs. 2 [10%] of 20 who did not; RR, 3.6; 95% CI, 0.87 to 15.1; p = 0.05); cucumber (5 [56%] of 9 who ate this vs. 4 [13%] of 32 who did not; RR, 4.4; 95% CI, 1.5 to 13.2; p = 0.01); broccoli (3 [75%] of 4 who ate this vs. 7 [18%] of 38 who did not; RR, 4.1; 95% CI, 1.7 to 9.8; p = 0.04); cracked pepper crackers (4 [100%] of 4 who ate this vs. 5 [14%] of 36 who did not; RR, 7.2; 95% CI, 3.2 to 16.2; p < 0.01); toasted butter crackers (5 [50%] of 10 who ate this vs. 4 [13%] of 30 who did not; RR, 3.8; 95% CI, 1.2 to 11.3; p = 0.03); fruit platter (7 [41%] of 17 who ate from this vs. 3 [13%] of 24 who did not; RR, 3.3; 95% CI, 1.0 to 11.0; p = 0.04); pineapple (5 [56%] of 9 who ate this vs. 5 [16%] of 31 who did not; RR, 3.4; 95% CI, 1.3 to 9.3; p = 0.03); cantaloupe (6 [60%] of 10 who ate this vs. 4 [13%] of 30 who did not; RR, 4.5; 95% CI, 1.6 to 12.8; Fisher exact p < 0.01); cake (10 [37%] of 27 who ate this vs. none of 14 who did not; RR and 95% CI indeterminate; p < 0.01); and lemonade (3 [75%] of 4 who drank this vs. 7 [19%] of 36 who did not; RR, 3.9; 95% CI, 1.6 to

9.2; $p = 0.04$). No items from the meat and cheese platter except the grape tomatoes (2 [100%] of 2 who ate this vs. 8 [20%] of 40 who did not; RR, 5.0; 95% CI, 2.7 to 9.3; $p = 0.05$) approached significance. By multivariate analysis, no foods were independently associated with illness.

We then included into analyses all those who had reported gastrointestinal symptoms that did not meet the case definition (i.e., assigned the five individuals with mild symptoms as cases). Compared to the previous analysis, the grape tomatoes, cucumber, broccoli, and lemonade were no longer significant (i.e., $p \leq 0.05$). The wheat crackers (6 [60%] of 10 who ate this vs. 7 [21%] of 34 who did not; RR, 2.9; 95% CI, 1.3 to 6.7; $p = 0.04$) and fruit platter (10 [50%] of 20 who ate from this vs. 5 [19%] of 26 who did not; RR, 2.6; 95% CI, 1.1 to 6.4; $p = 0.03$) became significant. By multivariate analysis, associations with illness changed as different combinations of variables were entered into the stepwise logistic regression model. For example, when the variables bruschetta tomato mixture, sourdough Parmesan slices, vegetable platter, fruit platter, and cake were entered into the model, cake (adjusted odds ratio [AOR], 12.5; 95% CI, 1.3 to 117.9; $p = 0.03$) and the sourdough slices (AOR, 6.5; 95% CI, 1.4 to 29.5; $p = 0.02$) remained independently associated with illness. When the variables bruschetta tomato mixture, sourdough Parmesan slices, cantaloupe, and cake were entered, cantaloupe (AOR, 18.7; 95% CI, 1.9 to 189.1; $p = 0.01$) and the sourdough slices (AOR, 20.4; 95% CI, 2.3 to 180.7; $p < 0.01$) remained independently associated with illness. When the variables bruschetta tomato mixture, sourdough parmesan slices, cracked pepper crackers, cantaloupe, and cake were entered, no foods were independently associated with illness.

Interviews of the grocery store employees revealed that the vegetable platter and meat and cheese platter were assembled at the grocery's deli, while the fruit platter was assembled at the produce warehouse. The vegetables for the vegetable platter and the grape tomatoes for the meat platter also came from the produce warehouse. The cake was baked at a central bakery, shipped frozen to the grocery, and iced and decorated at the grocery. The buttercream icing for the cake was made at the grocery while the shelf-stable raspberry filling came in plastic bags from a central supplier. Inspection of the grocery store and the produce warehouse by environmental health showed no obvious hygienic violations. At the grocery store, one foodhandler at the deli assembled both the vegetable platter and the bruschetta basket. She denied having gastrointestinal symptoms in the "months" prior, but runs a home daycare of seven children. She reported that none of these children had been ill. Only one foodhandler in the bakery at the grocery store assembled the cake; she also denied having recent illness and does not live with family members. Twenty-nine of 33 foodhandlers at the produce warehouse who worked the week prior to the birthday party were interviewed; none reported gastrointestinal symptoms personally or among household contacts within 2 weeks of the party. However, one foodhandler at the produce warehouse reported that the supervisor wore gloves irregularly while he was handling the produce, and allowed his immediate family members (who were also foodhandlers at the warehouse) to do the same.

Stool specimens were submitted by three primary cases and the two secondary cases; all five specimens were positive for norovirus RNA. Subsequent sequencing showed them all to have the same sequence. All stool samples were negative for routine bacterial pathogens.

This was an outbreak of norovirus gastroenteritis among guests at a private birthday partly. Illness was associated with multiple food items, and a single source was not identified. Contamination of food may have occurred at the retail level or at the birthday party as a result of attendance by family members who were recently ill or who were incubating impending illness. Recommendations to the grocery store, the produce warehouse and the organizer of the event consisted primarily of reinforcing proper handwashing, use of gloves, and appropriate storage of food.

(9)
Norovirus Gastroenteritis Associated with a Restaurant

February Dakota County

On February 24 and 25, 2004, the Minnesota Department of Health (MDH) Acute Disease Investigation and Control Section foodborne illness hotline received two independent complaints of gastrointestinal illness from individuals who had eaten at a restaurant in Inver Grove Heights, Minnesota on February 21. An MDH sanitarian was notified and an investigation was immediately initiated.

MDH staff interviewed 67 patrons (including complainants and additional patrons from a list provided by the restaurant) about food consumption and illness history. A case was defined as a person who developed vomiting or diarrhea ($\geq$3 loose stools in a 24-hour period) after dining at the restaurant. Five cases submitted stool samples to MDH for bacterial and viral testing. An MDH sanitarian made a site visit to the restaurant on February 24. MDH staff also interviewed 50 food workers employed at the restaurant.

Thirteen of the 67 (19%) patrons interviewed met the case definition. Six of these cases were complainants and seven were identified from the patron list provided by the restaurant. Of these thirteen cases, one case became ill with gastrointestinal symptoms within a half hour after eating at the restaurant. Another case initially reported illness within 2 hours after the meal with no diarrhea, but later reported possibly having diarrhea 40 hours after the meal. Another case reported having an underlying condition that caused intermittent diarrhea. Since these individuals had clinical pictures that were unclear or differed from other cases, they were excluded from analysis. Nine of the 10 remaining patron cases (90%) had diarrhea and cramps, six (60%) had vomiting, and one (10%) had fever. The median incubation period was 23 hours (range, 5 to 38 hours). The median duration of illness was 9 hours (range, 5 to 29 hours). Five patron cases submitted stool samples to MDH; three were positive for norovirus. Viruses from the three positive patron cases (from two independent complaints) were sequenced; the sequences were identical.

Food histories for patrons were initially open-ended (i.e., patrons reported the foods they consumed at the restaurant and were not questioned [yes/no] about individual items from the entire menu), but patrons were contacted a second time to verify whether or not they had eaten soup or appetizers. Univariate analysis showed that consuming the cheese/broccoli soup (4 of 10 cases vs. 1 of 53 controls; odds ratio [OR], 34.7; 95% confidence interval [CI], 3.4 to 868.8; $p = 0.002$) was statistically associated with illness.

Upon inspection of the restaurant, several violations in cleaning and storage of food preparation equipment and utensils were identified. The restaurant did not have an employee illness log. Food worker interviews revealed that one employee who worked at the restaurant on February 20 and 21 had been ill with gastrointestinal symptoms from February 16 to 23, and had an ill family member. One employee had called in sick on February 18, but it was unclear if the employee had any gastrointestinal symptoms.

This was a foodborne outbreak of norovirus gastroenteritis associated with eating at a restaurant in Inver Grove Heights. A potential vehicle was the cheese/broccoli soup. The source of the viral contamination was likely infected food workers.

(10)
Norovirus Gastroenteritis Associated with a Potluck

February Blue Earth County

On March 1, 2004, the Minnesota Department of Health (MDH) received a report from a hospital infection control practitioner (ICP) concerning gastrointestinal illness among staff at Hospital A in Mankato, Minnesota. The ICP indicated that the nursing staff of the operating room unit held an informal potluck on February 27 and that approximately nine nurses had called in sick on March 1 with complaints of vomiting and diarrhea.

Epidemiologists from MDH conducted phone surveys of nurses from Hospital A's operating room unit to obtain information on consumption of foods/beverages and illness history. A case was defined as a nurse who attended the potluck and subsequently became ill with vomiting or diarrhea (≥3 loose stools in 24-hour period). Stool samples from four nurses were submitted to MDH for bacterial and viral testing.

Of the 28 nurses interviewed, 15 (54%) met the case definition. Fourteen cases (93%) reported diarrhea, 11 (73%) had cramps, eight (53%) had vomiting, and three of 14 (21%) had fever. Two additional nurses reported mild gastrointestinal symptoms that did not meet the case definition; these two were excluded from the analysis. The median incubation time, calculated from potluck meal times on February 27, was 32 hours (range, 22 to 55 hours). The median duration of symptoms was 37 hours (range, 13 to 57 hours). Two nurses reported an onset of vomiting and diarrhea on February 25 and 26; these two nurses were not classified as cases since they did not attend the potluck event. Stool samples from three cases were positive for norovirus. Nucleic acid sequences of the three viruses were identical.

Beef sandwiches, potato salad, potato chips, pickles, cake, and beverages (water, pop, coffee, etc.) were served at the potluck event. Consumption of potato chips was significantly associated with illness (12 of 15 cases vs. 3 of 9 controls; odds ratio [OR], 8.0; 95% confidence interval [CI], 1.2 to 52.2; $p = 0.04$). Consuming potato salad yielded an elevated odds ratio (13 of 15 cases vs. 6 of 9 controls; OR, 3.3; 95% CI, 0.43 to 24.8; $p = 0.33$). When one case with an incubation of 55 hours was removed from the analysis (because it may have represented a secondary case), the relationship between consumption of potato salad and illness became stronger (13 of 14 cases vs. 6 of 9 controls; OR, 6.5; 95% CI, 0.55 to 76.2; $p = 0.26$).

The potato salad was prepared on February 26 by an individual with an onset of vomiting and diarrhea on February 25. The potato chips were reportedly served in a large bowl; individuals consumed this food item throughout the day, including one nurse who reported periodic episodes of diarrhea during the 2 weeks preceding the potluck.

This was an outbreak of norovirus gastroenteritis associated with a potluck event among nurses at Hospital A. The source of the outbreak was likely an ill nurse; transmission may have occurred as a result of an ill staff member preparing the potato salad or through bare-hand contact of food items at the potluck.

(11)
Norovirus Gastroenteritis Associated with a Restaurant

February Crow Wing County

On March 3, 2004, the Minnesota Department of Health (MDH) Acute Disease Investigation and Control Section received a call from an MDH sanitarian about a complaint of illness that was received by a restaurant in Pequot Lakes, Minnesota. The complainant stated that a large number of people from a group of wedding attendees had become ill with symptoms of gastrointestinal illness after eating at the restaurant on February 28. The restaurant also contacted MDH epidemiologists through the Minnesota Foodborne Illness Hotline on March 3 to report this complaint and an additional complaint that had been received at the restaurant from someone outside the wedding group. An investigation was immediately initiated.

MDH staff interviewed 25 persons from the wedding group and 10 other patrons (names obtained from credit card receipts, including the second complainant's party and four other parties who ate at the restaurant) about food consumption and illness history. A case was defined as a person with vomiting or diarrhea ($\geq$3 loose stools in a 24-hour period) after dining at the restaurant. Five cases submitted stool samples to MDH for bacterial and viral testing. An MDH sanitarian made a site visit to the restaurant on December 18. MDH staff also interviewed the 26 food workers employed at the restaurant. One food worker submitted a stool sample to MDH for bacterial and viral testing.

Twenty-four of the 35 (69%) patrons interviewed (20 from the wedding group, four from the group of other patrons) met the case definition. All 24 cases had diarrhea, vomiting, and cramps; eight (33%) had fever. The median incubation period was 35 hours (range, 16 to 57 hours). The median duration of illness was 42 hours (range, 4 to 68 hours). Five patron cases (all from the wedding group) submitted stool samples to MDH; three were positive for norovirus.

Univariate analysis showed that eating a baked potato (10 of 23 cases vs. 1 of 9 controls; odds ratio [OR], 6.2; 95% confidence interval [CI], 0.8 to 150.4; $p = 0.11$) and eating salad with French dressing (12 of 21 cases vs. 2 of 9 controls; OR, 4.7; 95% CI, 0.8 to 37.6; $p = 0.11$) approached significance. Univariate analysis also showed that consumption of dessert (18 of 24 cases vs. 3 of 6 controls; odds ratio [OR], 6.0; 95% confidence interval [CI], 1.1 to 35.5; $p = 0.04$) was statistically associated with illness. However, upon further investigation, it was discovered that the only patrons who reported eating dessert were part of the wedding group, and the dessert served was wedding cake. To account for this, the patrons were stratified on whether

or not they were part of this wedding group. Stratified univariate analysis showed no significant association between consumption of cake and illness. The stratified analysis also showed a statistical association of salad with French dressing with illness among non-wedding group patrons (4 of 4 cases vs. 1 of 5 controls; OR, undefined; 95% CI lower limit, 1.14; $p = 0.05$).

Upon inspection of the restaurant, the MDH sanitarian found that the restaurant had received no additional complaints. Food workers had ample opportunity for bare-hand contact with ready to eat food items, such as lettuce, tomatoes, onions, and croutons used for salad preparation.

The restaurant did not have an employee illness log. Food worker interviews revealed that four employees had been ill with symptoms of vomiting (one also had diarrhea) with onsets ranging from February 16 through March 1. The employee who was most recently ill provided a stool sample to MDH that tested positive for norovirus. Viruses from two of the four cases (one from the restaurant employee and one from a restaurant patron) were sequenced; the sequences were identical.

This was a foodborne outbreak of norovirus gastroenteritis associated with eating at a restaurant in Pequot Lakes. Vehicles likely included one or more ready-to-eat foods such as baked potatoes and salad. The source of the viral contamination was likely infected food workers.

(12)
Norovirus Gastroenteritis Associated with a Restaurant

February Olmsted County

On March 1, 2004, Olmsted County Public Health Services (OCPHS) received a report of gastrointestinal illness from a group of three family members who had eaten at a restaurant in Rochester, Minnesota on February 27. OCPHS followed-up with the restaurant on March 1 by telephone (the normal complaint process). The dining room manager reported there had been two employees who had been recently ill (symptoms unknown to the manager). OCPHS staff contacted these two employees (Employees A and B). Neither Employee A nor B reported recent symptoms of vomiting or diarrhea; however, Employee B lives with another employee (Employee C) who had reported recently experiencing diarrhea. Employee C's child had been recently ill with vomiting and diarrhea, and employee B had exposure to the ill child. OCPHS staff made a follow-up phone call to the restaurant on March 2 and spoke with the kitchen manager. He was aware of another staff member (Employee D) recently ill with gastrointestinal symptoms.

Based on these reports of ill staff members along with customer complaints of illness, a site visit was made to the restaurant the afternoon of March 2. During this visit, sanitarians interviewed remaining employees regarding recent illness history. The importance of excluding staff who are experiencing vomiting or diarrhea from work was reviewed with staff and managers. The importance of handwashing along with minimizing bare-hand contact with ready-to-eat foods was reinforced. Glove use was recommended in preparing ready-to-eat foods as an additional interim hand-hygiene measure. It was recommended to restaurant management that all ready-to-

eat food that would have been in contact with an ill employee be discarded and that food contact surfaces be re-cleaned and sanitized.

Another report of illness was received the morning of March 5. The ill party was one of a group of two who had eaten at the restaurant on the evening of March 2. Due to this second report of illness from a party unrelated to the family who became ill, an outbreak investigation was initiated and a second site visit to the restaurant was made.

A case was defined as a person who experienced vomiting or diarrhea (≥3 loose stools in a 24-hour period) after eating at the restaurant. Although a case-control study would normally be done, upon consultation with the Minnesota Department of Health (MDH), patron lists were not obtained and further patron interviews were not conducted due to the unique circumstances regarding initiation of the outbreak investigation (i.e., ill employees were identified during the routine complaint follow-up and interventions initiated). Investigators felt that a case-control study would not provide significant additional information that would enhance the interventions already implemented.

Sanitarians made site visits to the restaurant on March 2 and March 5. During the first visit, a list of employees was obtained from the dining room manager. All employees were interviewed using a standard food service employee questionnaire either onsite, during the visit, or via telephone. Employees were interviewed again on March 5 regarding any symptoms that may have developed since the first interview. An assessment of food preparation and staff hygiene was made 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 because it was known that some staff had recently been ill with vomiting or diarrhea.

Stool specimens from four patron cases and one restaurant employee were sent to the MDH Public Health Laboratory for bacterial and viral testing.

Four cases were identified from the two reports. All four cases had diarrhea and cramps, one (25%) had nausea, and one (25%) had dizziness. No cases reported vomiting. The median incubation period was 47 hours (range, 40 to 54 hours). None of the cases had recovered by the time of interview. Due to the limited number of patron interviews, statistical analysis of menu items was not done.

Sixteen restaurant employees were interviewed, and two reported recent gastrointestinal illness symptoms. One recently ill employee (Employee C) was on vacation when symptoms began (February 19) and didn't return to work until February 23, 3 days after symptoms resolved. Employee C's child was reportedly ill with vomiting and diarrhea beginning on February 18, with diarrhea persisting for 2 weeks. Employees B and C had contact with the ill child and both worked shifts at the restaurant in the two week time frame while the child was experiencing diarrhea. The other recently ill staff person (Employee D) reported experiencing vomiting and diarrhea beginning on February 20. Employee D worked a shift each day during the time frame of February 19–21. Duties performed included bare-hand contact with ready-to-eat foods.

Bare-hand contact with ready-to-eat foods was reported. Staff hands contact bread during slicing. Staff hands also contact garlic during a process in which it is squeezed onto a plate and combined with oil and Parmesan cheese. Wait staff and bussing staff perform slicing and preparation of oil mixture as needed. Gloves were not routinely used. Staff reported using tongs for dishing salads.

Five stool samples were obtained, including one from each patron case and one from employee D. Sample kits were given to employees B and C (2 weeks previously recovered) to get samples from them and from employee C's child, but they did not submit samples. Norovirus was identified in the samples from all four patron cases. Nucleic acid sequencing was conducted on positive samples from three cases; the sequences obtained for all three viruses were identical. The stool sample submitted by employee D was negative for norovirus.

Numerous control measures were implemented at the restaurant. The store managers were instructed to restrict from work all ill food workers with vomiting or diarrhea for 3 days after recovery. The importance of having an employee illness policy in place and having all staff understand and use it appropriately was reviewed. Staff were instructed to report illness to store managers and reminded not to work when experiencing vomiting or diarrhea. The importance of handwashing was reinforced. The managers implemented a no bare-hand contact policy by utilizing single-use gloves for handling ready-to-eat foods. Management evaluated bread slicing and preparation of the oil mixture. The procedure was adjusted so that all bread was sliced and oil mixture prepared at one time. This eliminated multiple staff having contact with these foods. Management trained staff to use a procedure that includes both handwashing and use of clean single-use gloves for this work. The managers took additional control measures by discarding all open ready-to-eat foods on March 2 and March 5. All food contact surfaces were washed, rinsed and sanitized on March 2 and March 5.

This was an outbreak of norovirus gastroenteritis associated with a restaurant. This outbreak was likely due to transfer of virus from employees to ready-to-eat foods served to patrons. The source of the virus could have been either recently ill employees or ill household members of employees.

(13)
Bacillus cereus Intoxications Associated with Chicken Chow Mein

March Olmsted County

On March 9, 2004, Olmsted County Public Health Services (OCPHS) received a complaint attributing illness to eating at a restaurant in Rochester, Minnesota on March 4. The complainant and a friend had eaten chicken chow mein and steamed rice at the establishment, and both had become ill the next day with diarrhea, nausea, and cramps. An investigation was initiated when no other common exposures could be found to account for their illness.

On the morning of March 10 several OCPHS sanitarians visited the restaurant. A list of patrons who had eaten at the restaurant on March 4 was compiled from credit card receipts and checks. Eighteen patrons were contacted and interviewed using a standard questionnaire constructed in

part with a lunch and dinner menu from the restaurant. A case was defined as a person who experienced vomiting or diarrhea (≥3 loose stools in a 24-hour period) after eating at the restaurant.

Stool specimens were obtained from two patrons who met the case definition. These specimens were sent to the Minnesota Department of Health Public Health Laboratory, where they were tested for norovirus, *Salmonella*, *Shigella*, *Campylobacter*, *E. coli* O157:H7, *Yersinia*, *Bacillus cereus*, *Clostridium perfringens, Staphylococcus aureus*, and foodborne bacterial enterotoxins.

All 12 employees of the restaurant were interviewed using a standard food service employee questionnaire. An assessment of food preparation and staff hygiene was made using the principles of Hazard Analysis Critical Control Points and Active Managerial Control.

Of the 18 patrons interviewed, three (16%) met the case definition. Two were the original complainants who had eaten at the restaurant at noon. The third individual ate at the restaurant at 6:00 p.m. that same day. All three cases had diarrhea and nausea, and two (67%) had cramps. None of the cases reported vomiting. The median incubation period was 24 hours (range, 18 to 37 hours). The median duration of illness was 36 hours (range, 32 to 56 hours).

Of the two stool samples analyzed, one tested positive for *Bacillus cereus* enterotoxin (diarrheal type). Both samples were negative for all other pathogens. Analysis of the foods eaten by those interviewed showed that chicken chow mein was statistically associated with illness (odds ratio, undefined; $p < 0.01$).

The chicken chow mein was a cook-serve menu item, so no opportunities were identified for temperature abuse because no cooling, reheating, or hot-holding steps were identified. Chow mein was not being cooked at the time of the assessment. The environmental assessment identified inadequate handwashing practices, and possible cross-contamination. The following raw meats were held at temperatures above 41°F in the cold prep top for an unknown length of time: chicken at 48°F, beef at 50°F. Cooked rice that had been put into "bus tubs" and cooled overnight was found to be 45°F the morning of the assessment, even though the cooler temperature was found to be at 33°F.

None of the employees reported any symptoms of gastrointestinal illness in the last several weeks.

This was a outbreak of foodborne intoxications likely caused by the diarrheal form of *Bacillus cereus*. Although the chicken chow mein was statistically associated with illness, it is unclear when *Bacillus cereus* may have amplified in this food. The cook-serve preparation method did not reveal any obvious opportunities for sufficient amplification of *Bacillus cereus* to cause illness. The improperly cooled rice was also a potential vehicle. Inadequate cooling of raw meats and cross-contamination may also have contributed to the outbreak. The small number of cases identified in this outbreak suggest a limited, focused problem.

Follow-up actions included a review of cooling procedures as well as discussion about other deficiencies in food safety. A follow-up reassessment was scheduled to check on the items discussed.

(14)
Norovirus Gastroenteritis Associated with a Restaurant Buffet

April Hennepin County

On April 13, 2004, the Minnesota Department of Health (MDH) notified the City of Bloomington Environmental Health (CBEH) of five independent complaints of illness (received the same day) from persons who had attended a brunch meal served at a restaurant in Bloomington, Minnesota on April 11. Four additional independent complaints of illness from eating the brunch meal on April 11 were received by the MDH and CBEH on April 14 and 15. Approximately 698 patrons were served the buffet-style brunch meal (by reservation only), which included various appetizers, fruits and vegetables, breakfast items, meat entrees, and desserts. The CBEH initiated an outbreak investigation immediately. The restaurant management voluntarily closed the establishment on April 13.

Following a press release on April 16 about the outbreak investigation, CBEH Staff received 10 additional independent complaints of illness from patrons who had attended the brunch meal on April 11 and heard reports of the investigation.

On April 13, CBEH staff obtained a copy of the menu and reservation list from the restaurant management. Complainant and other groups selected randomly from the reservation list were interviewed about illness history and food consumption using a standard questionnaire. A case was defined as a person who had attended the brunch meal with subsequent onset of vomiting or diarrhea ($\geq$3 loose stools in a 24-hour period).

Also on April 13, CBEH Staff initiated an environmental health investigation at the restaurant focusing on employee health, food preparation and handling, and equipment. From April 13 to 16 CBEH Staff interviewed restaurant employees associated with the brunch meal about illness history, work duties, and food consumption. Seven stool kits were delivered to patrons, and 29 kits were delivered to employees for bacterial and viral pathogen testing at the MDH Public Health Laboratory (PHL). Employees associated with the brunch meal were excluded from the restaurant pending results of laboratory tests at the MDH PHL.

One hundred fifteen (67%) of 171 patrons interviewed met the case definition. Twenty-four patrons were removed from further analysis: 14 (8%) complained of mild illness symptoms but did not experience vomiting or diarrhea, and 10 (6%) complained of illness after the press release on April 16.

The median incubation was 33 hours (range, 2 to 59 hours). The median illness duration was 12 hours (range, 0.5 to 53 hours). Eighty-six (82%) of 105 cases reported vomiting, 77 (73%) of 105 cases reported diarrhea, 58 (60%) of 97 cases reported cramps, 43 (44%) of 98 cases reported fever, and 0 of 97 cases reported bloody stools.

Seven (20%) of 35 employees interviewed met the case definition. Two (6%) employees reported milder illness symptoms but did not experience vomiting or diarrhea. The illness onsets of six of the seven employee cases coincided with the illness onsets of the patron cases. These employees (among others) had eaten food from the buffet. One employee had an onset of illness on April 7.

Five of the seven patron stool specimens were received at the MDH PHL, and four tested positive for norovirus. Two of the five specimens were also submitted for bacterial analyses, and both tested negative for *Salmonella*, *Shigella*, *Campylobacter*, and *E. coli* O157:H7.

Seven of 28 employee stool specimens received at the MDH PHL were tested for norovirus, and five were positive; six of six specimens tested for *Salmonella*, *Shigella*, *Campylobacter*, and *E. coli* O157:H7 were negative. Genetic sequencing was conducted on norovirus from one patron and three employees (including the index case), and all sequences were identical.

Several food items served at the brunch meal were associated with illness by univariate analysis, including the fruit tray (76 of 99 cases vs. 19 of 42 controls; odds ratio [OR], 4.0; 95% confidence interval [CI], 1.7 to 9.2; $p < 0.001$), beets (25 of 98 cases vs. 2 of 42 controls; OR, 6.8; 95% CI, 1.5 to 62.0; $p < 0.01$), Spring vegetables (29 of 98 cases vs. 5 of 42 controls; OR, 3.1; 95% CI, 1.1 to 11.1; $p = 0.03$), strawberries (37 of 99 cases vs. 6 of 42 controls; OR, 3.6; 95% CI, 1.3 to 11.3; $p < 0.01$), and mushroom sauce (36 of 98 cases vs. 7 of 42 controls; OR 2.9; 95% CI, 1.1 to 8.5; $p = 0.02$).

By multivariate unconditional logistic regression, the fruit tray (OR, 3.7; 95% CI, 1.6 to 8.6; $p = 0.002$) and beets (OR, 5.7; 95% CI, 1.1 to 28.0; $p = 0.03$) were associated with illness.

A food employee reported onset of vomiting and diarrhea the afternoon of April 7 (index case) with recovery of these symptoms by the morning of April 10. This employee did not work at the restaurant on April 7 and 8. The morning of April 9 this employee left the restaurant due to illness, returned to work on April 10 and prepared several of the food items associated with illness, including the fruit tray and beets.

The environmental health investigation revealed no other apparent critical violations or non-compliant risk factors. Employees not infected with norovirus or who had reported no illness symptoms returned to work at the restaurant beginning on April 16.

This was an outbreak of norovirus gastroenteritis associated with a buffet meal served at a restaurant on April 11. Multiple food items were implicated as vehicles of transmission. An infectious food employee was confirmed as the source of contamination.

(15)
Norovirus Gastroenteritis Associated with a Restaurant

April Hennepin County

On April 28, 2004, the Minnesota Department of Health (MDH) foodborne illness hotline received a report concerning a group that became ill after eating at a restaurant in Hopkins,

Minnesota on April 24. Epidemiologists and environmental health specialists from Hennepin County Public Health Protection (HCPHP) were subsequently notified.

On April 29, HCPHP requested a list of patrons from the restaurant to obtain information on consumption of foods/beverages and illness history. A case was defined as a person who ate at the restaurant on April 24 and subsequently became ill with vomiting or diarrhea (≥3 loose stools in 24-hour period).

An environmentalist from HCPHP visited the restaurant on April 29 to evaluate food preparation and handling procedures. The employees of the restaurant were interviewed regarding illness histories, food consumption, and job duties performed from April 17 to April 24. Stool specimens were collected from three patrons and one foodhandler; these samples were submitted to MDH for bacterial and viral testing.

The restaurant does not accept reservations and was phasing out accepting checks; hence a complete list of patrons was not available. The four patrons from the complaint were interviewed; all four met the case definition. Four (100%) cases had vomiting, two (50%) had diarrhea, two (50%) reported cramps, and two (50%) reported fever. The median incubation period for the patrons, calculated from the mealtime on April 24, was 38 hours (range, 34 to 40 hours). The median duration of diarrhea was 8 hours.

Thirty-one of the 33 employees were interviewed; six employees reported recent gastrointestinal symptoms. Four employees (67%) reported vomiting, four (67%) had diarrhea, four (67%) reported fever, and two (33%) had cramps. One employee reported household members who had similar symptoms prior to his/her illness onset date. One employee of the restaurant reported an illness onset of April 19.

During the inspection, the environmentalist from HCPHP noted foodhandling violations. No employee illness log was available. A common towel, instead of paper towels, was being used at handwashing stations. Ice scoops were being stored inside of the ice containers, instead of in the holder on the outside of the ice container.

Stool samples from two patrons and one food worker tested positive for norovirus. Nucleic acid sequences of the three viruses were identical.

This was an outbreak of norovirus gastroenteritis associated with a restaurant. The vehicle was not determined in this investigation. Transmission likely occurred through contamination of food items by an infected employee.

(16)
Norovirus Gastroenteritis Associated with a School Cafeteria

April Dakota County

On May 4, 2004, the Minnesota Department of Health (MDH) was notified of an increased absenteeism among students at an elementary school in Lakeville, Minnesota. According to

school officials, over 20% of the student population was reported absent on April 30 due to illness.

Epidemiologists from MDH obtained a complete roster of students and staff that attended/worked at the school. Interviews were conducted with parents of students to obtain information on school-related activities, foods consumed at school, and illness history. A case was defined as a student who attended the school and became ill with vomiting or diarrhea (≥3 loose stools in a 24-hour period) since April 26.

A MDH sanitarian visited the school to evaluate food preparation and handling procedures and to interview the food service staff regarding any recent illness. MDH also obtained a list of 15 parents who had volunteered to help during lunch at the school during the week of April 26; the volunteers helped serve food, supervise the students, and clean the cafeteria. Stool specimens were obtained from three students and sent to MDH for bacterial and viral testing.

Of the 74 students who were interviewed, 29 (39%) met the case definition. Twelve students reported mild gastrointestinal symptoms that did not meet the case definition; these students were excluded from the analysis. Twenty-seven cases (93%) had vomiting, 19 (66%) had cramps, 11 (38%) had diarrhea, and 11 (38%) reported fever. The median duration of symptoms was 32 hours (range, <1 to 146 hours). Stool samples from two students were positive for norovirus. Only one norovirus isolate could be sequenced. A third stool sample was negative for norovirus and positive for *Campylobacter jejuni*.

Several food items served at the school cafeteria during the week of April 26 were significantly associated with illness by univariate analysis, including chicken nuggets on April 27 (24 of 29 cases vs. 18 of 31 controls; odds ratio [OR], 3.5; 95% confidence interval [CI], 1.04 to 11.5; $p = 0.05$), tater tots on April 27 (20 of 27 cases vs. 14 of 31 controls; OR, 3.5; 95% CI, 1.1 to 10.6; $p = 0.03$), cookie dough on April 28 (23 of 28 cases vs. 16 of 32 controls; OR, 4.6; 95% CI, 1.4 to 15.1; $p = 0.01$), sloppy joes on April 30 (9 of 29 cases vs. 19 of 33 controls; OR, 0.33 [protective]; 95% CI, 0.12 to 0.94; $p = 0.04$), potato chips on April 30 (9 of 29 cases vs. 20 of 33 controls; OR, 0.29 [protective]; 95% CI, 0.1 to 0.84; $p = 0.02$), and a beverage on April 30 (9 of 28 cases vs. 19 of 31 controls; OR, 0.3 [protective]; 95% CI, 0.1 to 0.87; $p = 0.04$).

Six cases were determined to likely be secondary cases due to relatively long incubation periods from lunch on April 28 (68 to 182 hours). When these six cases were removed from the analysis the relationship between cookie dough and illness became stronger (19 of 22 cases vs. 16 of 32 controls; OR, 6.3; 95% CI, 1.6 to 25.7; $p = 0.009$), and chicken nuggets and tater tots were no longer significantly associated with illness. Cookie dough (adjusted OR, 19.3; 95% CI, 3.4 to 111.1; $p = 0.0009$) and sloppy joes (protective) were independently associated with illness after analysis with stepwise regression. The median incubation period, calculated from the lunch of April 28 with the cookie dough, was 24 hours (range, 8 to 53 hours).

A traceback of the cookie dough revealed that this was a commercial product that was made with pasteurized eggs and sold pre-sliced; however, there was a warning label that stated "this product should not be eaten raw." Two students reported an onset of gastrointestinal symptoms before the cookie dough was served on April 28; both students reported eating lunch that particular day.

There were anecdotal reports of students becoming ill as early as April 26; however, MDH was unable to interview anyone with such an onset date. No recent illness was reported among the kitchen staff. Of the 15 cafeteria volunteers, five (33%) were interviewed; two reported becoming ill with diarrhea on April 30 and May 2, respectively.

This was an outbreak of norovirus gastroenteritis associated with a grade school cafeteria. The isolation of *Campylobacter* from one case appeared to be a coincidental finding. Cookie dough was implicated as the vehicle. The source of contamination was not identified. Since there was documentation of ill students attending the lunch in question (April 28), transmission may have occurred through contamination of ready-to-eat foods by ill students. Furthermore, the investigation revealed that students occasionally share food items at the table. Ill or recently ill food workers could have been a source of contamination but this possibility could not be adequately assessed because most of the cafeteria volunteers did not provide an interview.

(17)
Suspected *Clostridium perfringens* Intoxications Associated with a Restaurant

May Wright County

On May 5, 2004, Wright County Public Health referred a foodborne illness complaint to the Minnesota Department of Health (MDH) Acute Disease Investigation and Control Section. The complainant stated that a party of three persons had become ill with cramps and diarrhea after eating dinner at a restaurant in Buffalo, Minnesota on May 1. The complainant gave MDH the names of two other parties that had also dined at the restaurant that night. An outbreak investigation was initiated in collaboration with the MDH Environmental Health Services Section.

MDH epidemiologists interviewed restaurant patrons about food consumption and illness history. A case was defined as a person with vomiting or diarrhea ($\geq$3 loose stools in a 24-hour period) after dining at the restaurant on May 1. A sanitarian from the MDH Central District office in St. Cloud went to the restaurant on May 6 to evaluate foodhandling practices. No stool or food samples were collected.

Information was obtained from a total of 13 people from three separate groups who ate food that had been served at the restaurant on May 1. Seven of these 13 people (54%) met the case definition. All seven cases had cramps and diarrhea. No cases reported vomiting, fever, or bloody stools. The median incubation was 11 hours (range, 10.5 to 13 hours) and the median duration of illness was 28 hours (range, 5 to 56 hours). The small number of persons interviewed precluded a case-control analysis of food items, but of the seven cases, five cases had enchiladas (one with beef and four with chicken) with beans and rice, and two cases had taco salads (one with beef and one with chicken).

The MDH sanitarian reviewed the restaurant's food preparation practices and measured the temperature of several food items. Several foods in hot holding were found at temperatures below 140°F, and several foods in cold holding were found at temperatures above 40°F. For example, in the steam table, shredded beef was at 132°F, burrito sauce was at 108°F, and

enchilada sauce was at 103°F. In the refrigerated preparation unit, guacamole was at 55°F and raw chicken was at 42°F. In the walk-in refrigerator, ground beef was at 70°F. Other potential problems identified included meat being stored in the walk-in refrigerator in a laundry basket-type container, and lack of a certified food manager at the restaurant. The sanitarian reviewed these problems with the manager and discussed proper cooling procedures for potentially hazardous foods, proper cooking temperatures, and handwashing.

The clinical and epidemiologic features of these illnesses were characteristic of *Clostridium perfringens* intoxications. *C. perfringens* spores can survive initial heating, and then germinate and multiply to illness-causing levels if food is held at improper temperatures prior to serving. In this outbreak, no specific food vehicle was identified, but there were ample opportunities at the restaurant for temperature abuse of potentially hazardous foods such as chicken, rice, sauces, and refried beans.

(18)
Salmonella Enteritidis Infections Associated with a Restaurant

May Kanabec County

From May to August, 2004, review of routine surveillance interviews of *Salmonella* Enteritidis pulsed-field gel electrophoresis (PFGE) subtype SE1B1 cases reported to the Minnesota Department of Health (MDH) revealed that three cases had patronized the same restaurant in Mora, Minnesota. An investigation was initiated on August 19. SE1B1 is the most common PFGE subtype of *S.* Enteritidis in Minnesota.

All *S.* Enteritidis cases are routinely interviewed about exposures and food consumption at home and at restaurants as part of surveillance. Interviews of *S.* Enteritidis cases that are indistinguishable by PFGE using two different enzymes are compared to identify potential common exposures. Information gathered during routine interviews was reviewed by an MDH epidemiologist. A case was defined as a person from whom *S.* Enteritidis SE1B1 was isolated and who reported eating at the restaurant prior to symptom onset, or who worked at the restaurant.

MDH environmental health specialists conducted environmental assessments of the restaurant on August 19 and during the following weeks.

MDH environmental health specialists and epidemiologists interviewed restaurant employees about gastrointestinal illness since April 15. All restaurant employees were asked to submit two stool specimens for *Salmonella* testing. Employees who reported any gastrointestinal symptoms during the previous 2 weeks or who did not submit stool specimens within a week of the beginning of the investigation were restricted. Employees who tested positive for *Salmonella* were excluded from work until two consecutive stool specimens obtained at least 24 hours apart tested negative for *Salmonella.* Environmental samples of food and non-food contact surfaces were collected August 19 and tested for *Salmonella.*

The Minnesota Department of Agriculture (MDA) conducted a traceback investigation to identify the source of eggs used by the restaurant at the time of the outbreak. The farm that supplied eggs to the restaurant was inspected, and environmental samples were collected and tested for *S.* Enteritidis at the MDA laboratory.

Human (patrons and workers) and environmental isolates of *S.* Enteritidis were sent to the Centers for Disease Control and Prevention (CDC) for phage typing.

Three patron-cases were identified from routine surveillance. In addition to the three patron-cases, one of 23 restaurant employees tested was positive for *S.* Enteritidis SE1B1. The employee, a cook, reported no history of gastrointestinal symptoms. Isolates from the three patron-cases and the employee were all phage type 13a.

All three patron-cases reported diarrhea and abdominal cramps, two (67%) reported fever, two (67%) reported bloody stools, and none reported vomiting. The meal dates for the patron-cases were May 2, June 1, and July 13. The median incubation period for patrons was 80 hours (range, 72 to 82 hours). One case had not recovered when interviewed 8 days after onset. The other two cases had a duration of diarrhea of 11 and 27 days, respectively. Two cases (67%) were hospitalized for their illness, one for 1 day and one for 4 days.

Cases had eaten a variety of foods. One case ate a ham and cheese omelet (runny), pancakes and hot chocolate. Another case ate a hot roast beef sandwich, and the third case ate eggs, pancakes, and sausage.

The initial environmental assessment found multiple temperature violations. The temperature of shell eggs in the cooler was 58°F. The eggs had been kept unrefrigerated near the grill throughout the morning and then returned to the egg cooler. Diced ham in the egg cooler was 46°F. In the sandwich preparation cooler, the egg wash for French toast was 49°F, pancake batter was 62°F, deli turkey was 42°F, and ham was 43°F. A beverage cooler contained hard cooked eggs at 47°F, and cubed chicken at 46°F.

Pooled eggs were kept next to the toaster. The cook that prepared eggs also prepared toast. Three wiping cloths were in use in the front cook line. Only one of these was kept in sanitizing solution at any given time. One of the wiping cloths was kept on top of the egg cooler or on a table next to the griddle and was used for wiping hands. The third wiping cloth was kept on the prep cutting board. The cloths were rotated into the sanitizing solution.

Seventeen environmental samples were collected. A sample taken from underneath the sandwich cutting board and a sample taken from the egg grill tested positive for *S.* Enteritidis SE1B1. Both isolates were phage type 13a.

As a result of the environmental assessment findings, the restaurant discarded the French toast egg wash and pancake batter. The restaurant was thoroughly cleaned. The bowls used for pooled eggs are no longer reused, and are no longer stored next to the toaster. The restaurant started using pasteurized eggs for French toast egg wash.

The environmental health specialist discussed with the manager/owner the risks associated with the wiping cloth practices, in particular using a wiping cloth for hands instead of handwashing. It was recommended that the restaurant install an additional handwashing sink near the cook line. The epidemiologist recommended that the staff preparing eggs or meats should not prepare toast or other ready-to-eat foods due to the potential for cross-contamination. As of December 31, 2004 the restaurant had not implemented these recommended practices, or installed the additional handwashing sink.

The restaurant purchased eggs from one distributor. A review of purchase records at the distributor identified a farm in Minnesota as the most likely source of shell eggs sold to the restaurant during the outbreak period. Officials from MDA investigated the farm. No problems were identified at the farm. All environmental and manure drag samples at the farm tested negative for *S*. Enteritidis. The flock is depopulated every year and the barn is cleaned at that time.

This was an outbreak of *S.* Enteritidis SE1B1 infections associated with eating at a restaurant in Mora. The outbreak was identified through routine surveillance at MDH. Documented transmission to patrons of the restaurant occurred over 3 months. A specific vehicle was not identified. Two of the cases ate eggs. Shell eggs are often the source of *S.* Enteritidis, but the traceback investigation did not identify a problem or find *S.* Enteritidis at the farm of origin. Several deficiencies in food holding and preparation, such as inadequate refrigeration and potential for cross-contamination, and practices such as having the egg cook handle toast, and using a wiping cloth for cleaning the cook's hands, were identified. The positive environmental cutting board sample is further evidence of the potential for cross-contamination. These deficiencies likely contributed to the survival and proliferation of *Salmonella* in foods and cross-contamination in the kitchen. A cook who tested positive for *S.* Enteritidis also could have served as a source of *Salmonella* for patrons.

(19)
Norovirus Gastroenteritis Associated with a Mother's Day Smorgasbord

May Hennepin County

On May 12, 2004, the Minnesota Department of Health (MDH) foodborne illness hotline received a report concerning a group that became ill after attending a Mother's Day smorgasbord at a facility in Minneapolis, Minnesota on May 9.

MDH contacted Hennepin County Public Health Protection (HCPHP) and the Minneapolis Division of Environmental Health (MEH) to inform them of the foodborne illness complaint.

On May 12, HCPHP contacted the facility to request a list of attendees and the food/beverage items served during the smorgasbord. HCPHP conducted phone surveys of the attendees to obtain information on consumption of food/beverage items and illness history. The interviewers also asked which seating the individual attended, since there was a noon and 4:00 p.m. seating. A case was defined as a person who attended the Mother's Day smorgasbord on May 9 and subsequently became ill with vomiting or diarrhea ($\geq$3 loose stools in a 24-hour period).

A sanitarian from MEH visited the facility on May 12 and conducted an inspection of the facility. HCPHP staff interviewed the caterer and the servers regarding illness histories, food consumption, and job duties performed the day of the smorgasbord.

Eight of the attendees (seven from the noon seating and one from the 4:00 p.m. seating) submitted stool specimens to MDH for bacterial and viral testing.

Of the 107 attendees interviewed, 34 (32%) met the case definition. Additionally, two attendees meet the case definition but their incubation periods were 2 and 3.5 hours, 10 attendees reported mild gastrointestinal symptoms that did not meet the case definition and two person developed illness from a family member; these 14 attendees were excluded from the analysis. Thirty-one cases (91%) had diarrhea, 29 (85%) reported nausea, 23 (68%) reported abdominal cramps and chills, 22 (65%) had vomiting, and 17 (50%) reported fever. The median incubation period for diarrhea, calculated from the time of the smorgasbord on May 9, was 39 hours (range, 12.5 to 73 hours). The median incubation period for vomiting was 38.5 hours (range, 13 to 61 hours).

Stool samples from the eight attendees tested positive for norovirus. Four of the PCR products were sequenced and all four viral nucleic acid sequences were identical.

Attending the noon seating was significantly associated with illness. Thirty-one of 51 (61%) individuals who attended the noon seating became ill compared with three of 42 (7%) who attended the 4:00 p.m. seating (odds ratio, 20.2; 95% confidence interval, 5.5 to 74.1; $p < 0.001$). Three persons from the noon seating and one person from the 4:00 p.m. seating reported an onset of diarrhea while attending or shortly after leaving the Mother's Day smorgasbord.

No specific food items were significantly associated with illness, either when looking at all interviews or within each seating.

During the inspection of the facility's food service area, some violations were noted: the soap dispenser was broken off, potential cross-contamination issues with storage, cracked ice scoops, a nail brush was missing from the kitchen hand sink, towels were missing from some of the hand sink areas, no chlorine test strips were available to test the sanitizer, and the caterer was not a certified food manager.

The caterer and nine of the 10 servers that worked the smorgasbord were interviewed. None of the food workers reported any recent illness in themselves or their households since May 3.

This was an outbreak of norovirus gastroenteritis associated with a Mother's Day smorgasbord. The vehicle of transmission was not determined; however, transmission likely occurred through contamination of ready-to-eat food items by an ill patron.

(20)
Norovirus Gastroenteritis Associated with a Restaurant

May St. Louis County

On May 17, 2004, a St. Louis County Department of Public Health (SLCDPH) sanitarian notified the Minnesota Department of Health (MDH) Acute Disease Investigation and Control Section about a complaint of illness that was received from patrons of a restaurant in Hibbing, Minnesota. The complainant stated that four people in their party of 20 developed symptoms of gastrointestinal illness after eating at the restaurant on May 13. The members of this party reported no other common exposures. An investigation was immediately initiated.

MDH staff interviewed 20 persons from the party about food consumption and illness history. A case was defined as a person with vomiting or diarrhea ($\geq$3 loose stools in a 24-hour period) after dining at the restaurant. Two cases submitted stool samples to MDH for bacterial and viral testing. A SLCDPH sanitarian made a site visit to the restaurant on May 18. MDH staff also interviewed 12 food workers employed at the restaurant.

Six of the 20 (30%) patrons interviewed met the case definition. One case had not eaten anything at the restaurant, but did have a glass of water. This case also had an onset 3 days after the other cases and was therefore excluded from analysis. All five cases had diarrhea, three (60%) had vomiting, and three (60%) had cramps. The median incubation period was 27.5 hours (range, 10.5 to 30.5 hours). Since four of the patrons were still ill at the time interviews were conducted, the only illness duration recorded was 42.5 hours. Both stool samples submitted by cases were positive for norovirus. The two viral sequences were identical.

Univariate analysis showed that eating the Mediterranean turkey sandwich (4 of 5 cases vs. 0 of 11 controls; odds ratio [OR], undefined; 95% confidence interval [CI] lower limit, 3.6; $p < 0.001$) was statistically associated with illness. Univariate analysis also showed that consumption of salad with French dressing (2 of 5 cases vs. 0 of 11 controls; OR, undefined; 95% CI lower limit, 0.70; $p = 0.08$) and salad with ranch dressing (2 of 5 cases vs. 0 of 11 controls; OR, undefined; 95% CI, lower limit 0.70; $p = 0.08$) approached significance. Consumption of salad alone was not statistically significant.

Upon inspection, the sanitarian found that the restaurant had received no additional complaints. Food workers had opportunity for bare-hand contact with utensils stored improperly for ready to eat food items, such as scoops for salad dressing with handles lying in the dressing container. Clean silverware was also stored with the handles pointed down in bins. A cook was also observed sorting silverware taken out of the dishwasher with bare hands while wiping them on a soiled apron before they were run through the dishwasher again.

The restaurant did not have an employee illness log. Food worker interviews revealed that three employees had been ill with diarrhea (two also had vomiting) with onsets throughout the first 2 weeks of May. One of the ill food workers was ill during May 9-10, and worked on May 13 (the date of the implicated meal). No stool samples from food workers were available for testing.

This was a foodborne outbreak of norovirus gastroenteritis associated with eating at a restaurant in Hibbing. Vehicles likely included the Mediterranean turkey burger or salad with French or ranch dressing. The source of the viral contamination was likely infected food workers.

(21)
Clostridium perfringens Intoxications Associated with Tamales

May Mower County

On May 20, 2004, the Minnesota Department of Health (MDH) Acute Disease Investigation and Control Section received an email complaint of illness from three individuals who ate together at a restaurant in Austin, Minnesota on May 19. These individuals reported that they had no other common exposures. An MDH sanitarian was notified and an investigation was initiated immediately.

On May 17, the MDH sanitarian had done an inspection of the restaurant in response to a report of illnesses among three individuals who had eaten there on May 10. At the time of this inspection, the MDH sanitarian found that the restaurant did not have a certified food manager and that there was no handwashing sink available to employees. Several violations in heating and cooling were also observed, particularly with rice and beans. Food items in the walk-in cooler were not date-marked. Frozen food was being thawed in the food preparation sink above food that had already been cooked. The restaurant had not received any additional complaints.

MDH staff interviewed 24 restaurant patrons, including the complainants who ate at the restaurant on May 19 and additional patrons from May 18, 20, and 21 from a list of regular patrons provided by the restaurant (no additional patron names from May 19 were available). Patrons were asked about food consumption and illness history. A case was defined as a person with vomiting or diarrhea ($\geq$3 loose stools in a 24-hour period) after eating food from the restaurant. One case submitted a stool sample to MDH for bacterial and viral testing.

The MDH sanitarian went back to the restaurant on May 20 and May 24 to conduct environmental assessments.

Three of the 26 (12%) persons interviewed met the case definition. All three cases were original complainants. All three cases had diarrhea and cramps. The median incubation period was 14.5 hours (range, 14.5 to 15.0 hours). The median duration of illness was 5.3 hours (range, 1.5 to 9.0 hours). The stool sample that was obtained from one case was positive for *Clostridium perfringens* enterotoxin type A.

Despite the fact that cases and controls in this outbreak did not eat at the restaurant on the same day, univariate analysis was performed to determine if any specific food items might have been associated with illness. Univariate analysis showed that consuming tamales (which were made with beans) (2 of 3 cases vs. 1 of 20 controls; odds ratio [OR], 40.0; 95% confidence interval [CI], 1.3 to 1217.2; $p = 0.03$) was statistically associated with illness. Consumption of beans (in tamales or as a side dish) (2 of 2 cases vs. 6 of 21 controls; OR, undefined; 95% CI lower limit, 0.57; $p = 0.11$) and tacos (3 of 3 cases vs. 8 of 21 controls; OR, undefined; 95% CI lower limit,

0.75; p = 0.08) approached statistical significance. All cases had eaten chicken tacos, and one case was uncertain about consumption of beans and was therefore excluded from the odds ratio calculation.

During the environmental assessment of the restaurant on May 20, the MDH sanitarian found that temperatures of foods in the steam table were not hot enough. Full pans of rice and beans were being held at 125ºF, and water levels in the steam table were too low to adequately heat the pans. Water, lard, and spices were added to beans during preparation. The beans were hydrated during cooking, but may not have been cooked thoroughly. Beans were heated until they bubbled, then eventually placed in the walk-in cooler. The time between the final stage of heating and the transfer of beans to the cooler was 1–2 hours. Foods in the walk-in cooler were not date marked. It was possible that pans of shredded chicken or beans that were prepared earlier and placed in the walk-in cooler were not used, and older pans may have been left in the cooler for an extended amount of time. All chicken came to the restaurant raw, but not frozen, and was stored in the walk-in cooler. All chicken received on a given day was reportedly cooked that day. Cooked chicken temperatures were not checked. The cooked chicken was chilled on ice, shredded by hand, mixed with spices, and cooked again. The chicken was then observed sitting at room temperature for an hour before being placed in the walk-in cooler. A handwashing sink had been made available to employees since the sanitarian's visit on May 17.

When the MDH sanitarian returned to the restaurant on May 24, temperatures of foods in the steam table were appropriate and the water level in the table had been corrected. Foods in the walk-in cooler were not yet date marked, but the restaurant had purchased the appropriate materials to begin dating all food containers. The restaurant had also obtained a digital thermometer and was using it to maintain hot and cold temperatures in the steam table and walk-in cooler.

This was an outbreak of foodborne intoxications caused by *C. perfringens.* Due to the limited number of restaurant patrons from May 19 that could be contacted by MDH, the specific foods associated with illness among cases could not be adequately characterized. Consumption of tamales made with beans was statistically associated with illness. Improper cooking of the beans and holding beans at inadequate holding temperatures were identified as potential mechanisms for bacterial proliferation.

(22)
Salmonella Agona Infections Associated with a Graduation Party

May Lyon County

On June 9, 2004 epidemiologists from the Minnesota Department of Health (MDH) identified, through laboratory surveillance, three case-patients with culture-confirmed *Salmonella* Agona infections and a common exposure of a graduation party held on May 29 at a private home in Marshall, Minnesota. According to the hostess of the event, approximately 150 to 200 individuals attended the party. The hosting family prepared the majority of the food items; however, some food items were brought by guests.

Epidemiologists from MDH obtained a list of graduation party attendees. Phone surveys were conducted to obtain information on consumption of foods/beverages and illness history. A case was defined as an attendee of the graduation party who subsequently became ill with vomiting or diarrhea (≥3 loose stools in 24-hour period). The hostess reported that four food items were still available for testing. Two additional stool samples were received by MDH for bacterial testing, and a fourth *Salmonella* isolate from an attendee was sent to MDH from a private laboratory.

Of the 61 individuals interviewed, 24 (39%) met the case definition. All 24 cases reported diarrhea, 17 (71%) had cramps, 11 (46%) reported fever, two (8%) had vomiting, and one of 23 (4%) had bloody stools. Two individuals reported gastrointestinal symptoms that did not meet the case definition; these two attendees were excluded from the analysis. The median incubation period, calculated from the meal time on May 29, was 33 hours (range, 1 to 144 hours). The median duration of illness was 90 hours (range, 24 to 189 hours).

Consumption of hot turkey sandwiches was significantly associated with illness (22 of 23 cases vs. 21 of 34 controls; odds ratio [OR], 14.2; 95% confidence interval [CI], 1.7 to 118.4; $p = 0.004$). Three other food items approached statistical significance, including fruit kabobs (16 of 24 cases vs. 14 of 33 controls; OR, 2.7; 95% CI, 0.91 to 8.1; $p = 0.11$), pickles/olives (11 of 18 cases vs. 9 of 28 controls; OR, 3.3; 95% CI, 0.96 to 11.4; $p = 0.07$), and pudding salad (0 of 18 cases vs. 6 of 27 controls; logit OR, 0.09 [protective]; logit 95% CI, 0.005 to 1.7; $p = 0.07$). Three cases were determined to be possible secondary cases because of relatively long incubation periods (102 to 144 hours). When these three cases were removed from the analysis the association between turkey sandwiches and illness became stronger (21 of 21 cases vs. 21 of 34 controls; logit OR, 27.0; logit 95% CI, 1.5 to 483.5; $p < 0.001$). Including the three index cases, stool samples from six cases yielded *Salmonella* Agona, all with an indistinguishable pulsed-field gel electrophoresis (PFGE) pattern (SA67).

The host/hostess received the turkey from a relative who runs a local turkey farm. The bird was cooked during early May, cut up into smaller portions, and subsequently frozen. On May 28, some of the turkey was thawed out and heated with some cream soups. Two batches of the turkey/soup mixture were prepared; the meat was shredded slightly for sandwiches and then put into a refrigerator overnight. On May 29, the two batches of the turkey/soup mixture were taken out of the refrigerator and again warmed up. Only one batch was placed out on the table for the graduation party attendees; the other was not served and was re-frozen.

Three turkey samples were received by MDH for testing; one sample was from the batch of turkey/soup mixture that was leftover from the event and two samples were turkey meat that was originally cooked then frozen, but were never thawed out for the party. Two samples were positive for *Salmonella* Agona PFGE subtype SA67; one sample was the leftover turkey/soup mixture while the other was unprepared, cooked turkey.

This was an outbreak of foodborne salmonellosis associated with a turkey/cream soup mixture served at a graduation party. Transmission likely occurred because of improper cooking, cooling, and reheating of the turkey served at the event.

(23)
E. coli O157:H7 Infections Associated with Frozen Ground Sirloin Patties

July Dakota and Ramsey Counties, Multistate

On July 29, 2004, the Minnesota Department of Health (MDH) Public Health Laboratory identified three isolates of *E. coli* O157:H7 (O157) with an indistinguishable pulsed-field gel electrophoresis (PFGE) subtype pattern. This PFGE subtype (designated MN795) had not previously been identified in Minnesota. These three O157 isolates had been submitted to MDH from clinical laboratories through routine statewide laboratory-based surveillance. The national PulseNet database revealed that the Wisconsin Division of Public Health had recently seen an O157 case-isolate with the same PFGE subtype. Initial interviews of the cases suggested that each of the cases had eaten ground sirloin patties purchased from the same chain of stores ("Retailer A") during the week prior to illness onset. An investigation was initiated.

For the purposes of this investigation, a case was defined as a Minnesota resident with a culture-confirmed infection with *E. coli* O157:H7 PFGE subtype MN795. All O157 isolates with the PFGE subtype MN795 after digestion with the enzyme *Xba*1 were also digested with a second enzyme, *Bln*1.

On August 2, a case-control study was initiated to determine risk factors for infection. Three controls per case were selected. Controls were matched to cases by telephone prefix and age category (in this case-control study, the relevant age categories were 18 to < 40 years and 60 years or older). To select controls, investigators sequentially dialed telephone numbers with the same prefix as the case's telephone number and asked if an age-eligible person resided in the household. Once an eligible control was identified and consent obtained, the control was interviewed about food consumption and other potential exposures occurring in the 7 days prior to the case's onset of illness. Because initial case interviews suggested a common exposure to frozen beef patties, the interview included specific questions about the source of any frozen beef patties consumed or prepared in the home during that time period.

The Minnesota Department of Agriculture (MDA) Dairy, Food and Meat Inspection Division conducted a traceback of the epidemiologically implicated product. MDA also collected leftover intact and non-intact product for testing. The MDA Microbiology Laboratory cultured the product for O157, and all isolates of O157 were sent to the MDH Public Health Laboratory for PFGE subtyping.

In the case-control study, all three cases reported eating frozen beef patties purchased at Retailer A in White Bear Lake during the week prior to onset of illness. None of the nine controls reported eating the product (matched odds ratio, undefined; $p<0.005$). No other foods or other potential exposures asked about on the questionnaire were associated with illness.

After the case-control study was completed, a fourth Minnesota case was identified. While the first three cases had all consumed ground sirloin patties purchased from a Retailer A store in White Bear Lake, the fourth case consumed ground sirloin patties purchased from a Retailer A store in Eagan. Purchase dates ranged from July 3 to July 14. The Wisconsin case (who was not included in the MDH case-control study) had onset of illness on July 8 and had purchased

ground sirloin patties from a Retailer A store in Waukesha, Wisconsin on July 3. All four Minnesota cases and the Wisconsin case had O157 stool isolates with indistinguishable PFGE patterns by two enzymes (*Bln*1 and *Xba*1, PulseNet designations EXHX01.1534 and EXHA26.0568, respectively).

Interviews with cases revealed that the implicated ground sirloin patties were sold under the brand name "Northern Plains". Because Retailer A customer purchases were tracked with a customer identification number, cases were asked to provide these numbers to assist in the traceback of the implicated patties. MDA worked with Retailer A to further characterize the product's lot number and production date. Based on the Julian date code and establishment number on the implicated products, the patties were produced on June 21, 2004 by a processing plant in Columbus, Nebraska. The patties had a use-by date of December 18, 2004.

On the afternoon of August 3 (5 days after the investigation began), MDH issued a press release notifying consumers of the link between the *E. coli* O157:H7 cases and frozen sirloin patties purchased from Retailer A. As a result of the investigation, the Food Safety and Inspection Service of the United States Department of Agriculture (USDA-FSIS) convened a Recall Committee Meeting. Late on August 3, USDA-FSIS announced that the processing plant was voluntarily recalling 497,000 lbs of frozen ground beef and beef patties.

All four Minnesota cases were male; their ages were 9, 23, 62, and 80 years. Counties of residence were Washington (two cases), Dakota (one case), and Ramsey (one case). Onset dates were July 10, 12, 18, and 24. Incubation periods ranged from 2 to 5 days (median, 3 days). All four cases had diarrhea, cramps, and bloody stools; three (75%) had vomiting; and three (75%) reported a low-grade fever. Duration of illness ranged from 7 to 11 days (median, 9 days). One case was hospitalized for 2 days. There were no cases of hemolytic uremic syndrome. Apart from Wisconsin, which identified one case, no other states reported cases associated with this outbreak.

Two of the four Minnesota cases had leftover frozen patties remaining for testing. The meat was positive for O157 that was of the same PFGE subtype, by two enzymes, as the O157 isolated from the cases. Eight unopened product samples from the implicated production dates collected from five different Retailer A stores in Minnesota were also positive for O157 of the same PFGE type as the case isolates.

USDA-FSIS performed a HACCP (Hazard Analysis and Critical Control Points) analysis at the processing plant. Numerous HACCP failures were identified and enforcement action was taken against the plant.

This was an outbreak of *E. coli* O157:H7 infections caused by frozen ground sirloin patties sold by Retailer A and processed by a plant in Nebraska. Four cases in Minnesota and one case in Wisconsin were identified. Pulsed-field gel electrophoresis subtyping, timely epidemiologic investigation of cases, and collaboration between state health and agriculture agencies were vital to the quick identification and control of this outbreak.

(24)
E. coli O157:H7 Infections Associated with a Church Spaghetti Dinner

July Hubbard County

On August 2, 2004, two physicians each reported a separate patient with a confirmed *E. coli* O157:H7 infection to the Minnesota Department of Health (MDH) Acute Disease Investigation and Control Section. Both patients reported participating in a charity bicycle ride during the likely incubation period; one patient reported that another team-member had been diagnosed with *E. coli* O157:H7 and that two additional team members had pending stool cultures. Approximately 980 bicyclists from 24 states, Ontario, and Saskatchewan participated in the bicycle ride; 779 of the participants were Minnesota residents. The 300-mile bicycle ride began on July 26 in Brainerd, Minnesota and ended on July 30 in St. Joseph, Minnesota; cyclists covered 50-75 miles each day. There were numerous rest stops along the route where the tour organizers offered sandwiches, fruit, water, and energy bars to cyclists at no charge, and local merchants and non-profit groups offered homemade and commercial foods and beverages for sale.

MDH epidemiologists obtained a list of all participants from the bike tour organizers, including email addresses for approximately 90% of participants. A Centers for Disease Control and Prevention Epi-X announcement was sent to notify all states of the possible outbreak and to offer state-specific contact information. Over a two-day period, 718 emails were sent to participants in Minnesota (624), Wisconsin (82), and Iowa (12) (with permission from the Wisconsin and Iowa Departments of Health) asking them to respond with a symptom history and contact information, whether or not they were ill. Email respondents reporting symptoms or requesting a return call were interviewed by telephone about their illness and exposure history. Additionally, all Minnesota resident participants without an email address were telephoned, as were a random sample of all Minnesota resident participants. The Minnesota residents were sorted by first name, then every 7th person on the list was called. Overall, 244 participants from Minnesota (203), Wisconsin (13), Illinois (12), Colorado (7), California (4), and South Dakota (4) were interviewed by telephone about their illness and exposure history, using a standard form. The interviews with residents of other states were completed either by MDH epidemiologists by request of the respective states' departments of health or by the states themselves.

A case was defined as a participant in the charity bike tour with a laboratory-confirmed *E. coli* O157:H7 infection or diarrhea of at least 2 days duration and abdominal cramps, with onset during or within 1 week after the bicycle tour. Diarrhea was defined as three or more loose stools within a 24-hour period. The MDH Public Health Laboratory tested stool samples collected from six ill bikers for *Salmonella*, *Campylobacter*, Shiga toxin-producing *E. coli*, *Shigella*, *Yersinia*, and norovirus RNA.

Pulsed-field gel electrophoresis (PFGE) testing after digestion with the enzyme *Xba*1 is performed on all *E. coli* O157:H7 isolates received at MDH, and those with the pattern common to this outbreak were designated MN803. The MN803 subtype is unique; it had not been identified in Minnesota or elsewhere in the United States prior to this outbreak.

MDH sanitarians and field epidemiologists visited the site where the implicated meal was prepared and served. Minnesota Department of Agriculture (MDA) investigators traced the origin of the ground beef used to prepare the meal, and the MDA Laboratory cultured samples of the remaining ground beef.

Of 718 emails sent, 681 were delivered, and 267 participants (39%) responded. Of respondents, 22 (8%) reported experiencing diarrhea during or after the bike tour. Eighteen (7%) of 244 participants interviewed by telephone met the case definition. Thirty-seven participants reported gastrointestinal symptoms but did not meet the case definition; they were excluded from further analysis.

Seven of 18 cases had culture-confirmed *E. coli* O157:H7 infections; isolates from all of these cases were PFGE subtype MN803. Seven cases were not cultured and four cases were culture-negative. Fourteen cases were Minnesota residents and four cases were Wisconsin residents. The median age of cases was 49 years (range, 15 to 71 years). Ten cases were female. Illness onset dates ranged from July 27 to August 3 with the peak number of cases on July 28 and July 29 (four cases each day). All 18 cases reported diarrhea, nine (50%) with blood; 16 (89%) cases reported cramps; five (28%) reported vomiting; and four (22%) reported fever. The median duration of illness was 4 days (range, 1.5 to 9 days). Eight cases visited a health care provider and one patient was hospitalized for 3 days. No cases of hemolytic uremic syndrome were identified.

Eating the spaghetti dinner served at a church in Park Rapids, Minnesota on Monday, July 26 was statistically associated with illness (14 of 18 [78%] cases vs. 36 of 186 [19%] controls; odds ratio, 14.6; 95% confidence interval 4.1 to 56.8; $p < 0.001$). None of the many other potential exposures were associated with illness.

A member of the congregation donated 22 pounds of custom slaughter ground beef to the church for the spaghetti dinner. Church volunteers reported preparing the ground beef by partially defrosting it in the microwave, then browning it from a frozen to semi-frozen state in a fry pan (a practice often associated with foodborne illness). The browned ground meat chunks were then added to a tomato-based sauce heating in three large roasting pans. No thermometers were used to monitor temperatures during the cooking process. Sauce made from the ground beef was served from 4:30 to 6:45 p.m., when it ran out. Sauce served to the final diners was made from 4 pounds of thawed ground beef purchased at a local grocery store at 6:26 p.m. on July 26, as stamped on the receipt. Cases were re-interviewed to ascertain the time they recalled eating the spaghetti dinner at the church. All 14 cases that ate the church spaghetti dinner, reported eating before 6:30 p.m., including all seven culture-confirmed cases. This finding eliminated the commercial ground beef as a source of the *E. coli* O157:H7 infections.

According to church officials, 250 spaghetti dinners were served on July 26 from 4:30 to 7:30 p.m. Estimating the true number of *E. coli* O157:H7 infections associated with eating the dinner was difficult due to possible bias resulting from a greater percentage of symptomatic than asymptomatic persons returning our e-mails and telephone calls. However, of the 50 bike tour participants interviewed who reported eating the dinner, 14 (28%) met the case definition. By extrapolation, one would estimate that 70 (28% of 250 persons served the spaghetti dinner)

clinical *E. coli* O157:H7 infections occurred as a result of this outbreak. Overall, 18 (7%) of 244 bike tour participants interviewed met the case definition; using this to estimate the actual number of cases, 69 (7% of 980 total bike tour participants) clinical *E. coli* O157:H7 infections occurred as a result of this outbreak.

E. coli O157:H7 MN803 was isolated from an intact package of ground beef from the same lot used to make meat sauce for the spaghetti dinner. The ground beef was obtained from a local farmer and originated from a local custom-slaughter facility. Custom-slaughter beef has not undergone ante mortem and postmortem federal inspection and may not be sold to the public under any circumstances. The church was cited by MDA for violation of the Minnesota Meat and Poultry Inspection Act and the Federal Meat Inspection Act. Additionally, MDA required the church to submit in writing a plan to provide food safety training to those preparing and serving food to the public.

This was a foodborne outbreak of *E. coli* O157:H7 infections associated with a church spaghetti dinner sold to participants in a charity bicycle tour. Major factors contributing to the outbreak included using meat from an unapproved source and improperly preparing the meat before addition to the sauce. MDA compliance officers required the church to provide food-safety training to volunteers cooking for groups. Environmental health specialists worked with the organizers of the bicycle tour to develop food safety guidelines and training for non-profit groups or citizen vendors along the route.

(25)
Norovirus Gastroenteritis Associated with Sandwiches

August Dakota County

On August 10, 2004, the Minnesota Department of Health (MDH) foodborne illness hotline received a report concerning illness among a group of approximately 20 individuals that dined at a restaurant in Apple Valley, Minnesota on August 8. MDH contacted the Dakota County Public Health Department (DCPHD) and Minnesota Department of Health Environmental Health Services (EHS) to inform them of the complaint.

On August 12, MDH was notified of a second, independent complaint concerning a group of four individuals who ate at the same restaurant on August 9 and subsequently became ill.

Epidemiologists from MDH conducted phone interviews of group members from both complaints to obtain information on consumption of foods/beverages and illness history.
A case was defined as an individual who developed vomiting or diarrhea (≥3 loose stools in a 24-hour period) after dining at the restaurant on August 8 or 9. Stool samples were collected from two individuals (one household) and submitted to MDH for bacterial and viral testing.

EHS sanitarians visited the restaurant to assess food preparation procedures. Interviews were conducted with employees of the restaurant to determine recent illness history, work schedules, and normal work duties.

Of the 20 patrons interviewed from the first complaint, 10 (50%) met the case definition. Two additional individuals reported gastrointestinal symptoms that did not meet the case definition; these two patrons were excluded from the analysis. Eight of nine cases (89%) had cramps, eight (80%) had vomiting, five of eight (63%) had fever, and six of 10 (60%) had diarrhea. The median incubation period, calculated from the meal time on August 8, was 30 hours (range, 25 to 40 hours). The median duration of illness, among the seven cases that had recovered by the time of interview, was 16 hours (range, 4 to 31 hours). Stool samples from the two patrons from the first complaint tested positive for norovirus. Nucleic acid sequences of the two viruses were identical.

No single food item was significantly associated with illness among the patrons reported in the first complaint; however, consumption of lettuce approached statistical significance (6 of 10 cases vs. 1 of 8 controls; odds ratio [OR], 10.5; 95% confidence interval [CI], 0.91 to 121.4; $p = 0.07$). The food entrées were then categorized as either "sandwich" (hamburger, chicken sandwich, etc.) or "non-sandwich" (chicken fingers, macaroni and cheese, etc.) based on whether the entrée would require assembly and/or hand contact. Consuming a "sandwich" entrée was significantly associated with illness (8 of 10 cases vs. 0 of 8 controls; Logit OR, 57.8; Logit 95% CI, 2.4 to 1,392.3; $p = 0.001$).

Among the four individuals from the second independent complaint, two (50%) reported gastrointestinal symptoms following the meal on August 9. One individual reported an onset of vomiting and diarrhea the evening of August 11; the other ill patron reported onset of vomiting the evening of August 11. Both ill patrons consumed sandwich-type entrées (chicken quesadilla and chicken sandwich) while the two non-ill individuals had non-sandwich items (spaghetti). The median incubation period, calculated on the meal time on August 9, was 44 hours (range, 43.5 to 44.5 hours).

Among the 53 food workers interviewed, five (9%) reported recent gastrointestinal symptoms. One food worker reported onset of vomiting and diarrhea on the evening of August 11, another had an onset of vomiting sometime on August 9, a third food worker reported an onset of vomiting the morning of August 10, the fourth food worker had an onset of vomiting and diarrhea the morning of August 11. The fifth food worker reported an onset of nausea and 1-2 loose stools the evening of August 9. The EHS sanitarian noted extensive bare-hand contact among employees during food preparation and serving.

With the discovery of the fifth ill food worker, EHS recommended that the establishment be temporarily closed on August 12. Under direction of EHS, cold food products were discarded and the facility was thoroughly cleaned. On August 13, the restaurant was allowed to open for lunch; however, employees were not allowed to come back to work unless they had completed an interview with EHS to assess any recent illness.

This was an outbreak of norovirus gastroenteritis associated with a restaurant. The vehicle was determined to be a sandwich-type entrée (i.e., a food item that required assembly and/or hand contact). The source of the outbreak was likely an ill food worker, with transmission via bare-hand contact with foods. The restaurant was instructed to minimize bare-hand contact and to consider implementing a policy of glove use for all food workers during food preparation.

(26)
Norovirus Gastroenteritis Associated with Potato Salad Served at a Cookout

August Stearns County

On August 16, 2004, the Minnesota Department of Health (MDH) was notified about gastrointestinal illness among persons who had attended a private gathering at a park in Melrose, Minnesota on August 13. The gathering was a cookout for employees of a company. Attendees cooked steaks at the park. Corn on the cob, potato salad, coleslaw, bars and canned beverages were also served. More than 50 persons attended the event. An investigation was initiated on August 16.

Lists of guests that attended the gathering and food items served were obtained. Epidemiologists from MDH interviewed attendees about illness history and food consumption. A case was defined as a person who attended the gathering and subsequently became ill with vomiting or diarrhea ($\geq$3 loose stools in a 24-hour period). Six stool specimens were submitted to MDH for testing for norovirus and enteric bacterial pathogens.

Fifty-six persons were interviewed. Among those interviewed, 54 attended the cookout and two persons did not attend but ate leftovers brought home by household members who attended the event. Six persons had a mild illness that did not meet the case definition and were excluded from the analysis. Of the remaining 50 persons, 33 (66%) met the case definition. Twenty-seven cases (82%) reported diarrhea, 26 (79%) had cramps, 18 (55%) had vomiting, and 14 (42%) had fever. The median incubation was 40 hours (range, 4 to 54 hours). The median duration of illness was 30 hours (range, 4 to 79 hours). One person visited the emergency room and was hospitalized overnight for his illness. Five of the six stool specimens submitted tested positive for norovirus. All six specimens tested negative for *Campylobacter*, *E. coli* O157:H7, *Salmonella*, *Shigella* and *Yersinia*.

Eating potato salad was associated with illness in the statistical analysis (31 of 37 [84%] who ate potato salad became ill vs. 2 of 13 [15%] who did not eat potato salad; risk ratio, 5.5; 95% confidence interval, 1.5 to 19.6; $p < 0.0001$). No other foods or drinks were associated with illness.

The potato salad and coleslaw were prepared at a private home. The ingredients for the potato salad were purchased at a local grocery store and included potatoes, eggs, sugar, vinegar, mustard, celery, onions, salad dressing, and whipped cream. The person who prepared the salads reported that her sister assisted in the preparation. Both cooks reported wearing gloves during the preparation. No gastrointestinal illness was reported in them or members of their household during or prior to the salads preparation. They did not attend the gathering, but they did eat some of the potato salad at home on the same day as the gathering. None reported illness in the week after they prepared and consumed the salads. Two event attendees plated the potato salad at the gathering. They did not report illness in themselves or household members during or prior to the event.

This was an outbreak of norovirus gastroenteritis associated with eating potato salad at a private cookout. The initial source of contamination was not identified.

(27)
Salmonella Typhimurium Infections Associated with Ground Beef

August Ramsey County, Multistate

In September 2004, the Minnesota Department of Health (MDH) Public Health Laboratory (PHL) identified two *Salmonella* Typhimurium isolates with a pulsed-field gel electrophoresis (PFGE) subtype (TM87) that is uncommon in Minnesota. The New Mexico Department of Health posted a cluster of *S*. Typhimurium cases with isolates of the same PFGE subtype on PulseNet on September 20. In response to this posting, 26 cases were reported in the U.S. from August and September, including nine from New Mexico, seven from Colorado, five from Wisconsin, two from Minnesota, and one each from Washington D.C., Maryland, and Kansas. On September 24, 2004, a multi-state conference call was conducted to discuss potential common exposures among cases. Minnesota, Colorado, New Mexico, and Kansas all reported cases who consumed ground beef from the same chain of retail stores (Chain A) in the week prior to illness. A case in Minnesota had tasted a piece of raw ground beef 4 days prior to illness onset as she was packaging the meat to freeze. One additional Minnesota case was identified in October.

For the purposes of this investigation, a case was defined as a person with a culture-confirmed S. Typhimurium PFGE subtype TM87 infection during August 2004 or later.

An MDH epidemiologist obtained the Chain A member number from the case who consumed raw ground beef and notified the Minnesota Department of Agriculture (MDA) in order to begin the traceback process. MDA staff were able to obtain the leftover ground beef from the Minnesota case for *Salmonella* testing; ground beef isolates were sent to the MDH PHL for PFGE subtyping.

On September 30, a case-control study was started among states with culture-confirmed *S.* Typhimurium PFGE subtype TM87 cases. This case-control study was coordinated by the Centers for Disease Control and Prevention and the New Mexico Department of Health. Two controls per case were selected. Controls were matched to cases by telephone prefix and age group. In some cases, two controls were not obtained; therefore, the case-control data was analyzed by frequency matching the cases and controls by age group. To select controls, investigators sequentially dialed telephone numbers with the same prefix as the case's telephone number and asked if an age-eligible person resided in the household. Once an eligible control was identified and consent obtained, the control was interviewed about food consumption and other potential exposures occurring and the 7 days prior to the case's onset of illness. Because initial case interviews suggested a common exposure to ground beef, the interview included specific questions about the source of any ground beef consumed or prepared in the home during that time period.

On October 13, a third *S.* Typhimurium TM87 case was identified in Minnesota. This case also ate ground beef purchased at Chain A. The case's daughter had purchased the hamburger, and her Chain A member number was forwarded to MDA for additional traceback efforts.

Additional *S.* Typhimurium TM87 cases were identified in other states; according to CDC reports there were 34 confirmed cases. Case-control interviews were conducted for 26 cases (NM, 10; CO, 6; WI, 4; MN, 3; KS, 1; Washington D.C., 1; and OH, 1). Among these 26 cases, 14 (54%) were female, and the median age was 30.5 years (range, 2 to 80 years). Among controls, 21 (48%) were female, and the median age was 35 years (range, 2 to 87 years).

Cases who consumed ground beef were more likely than controls to have purchased their meat from Chain A (age-adjusted odds ratio [OR], 7.8; 95% confidence interval [CI], 2.4 to 26.1; $p < 0.05$). Cases were also more likely than controls to have consumed undercooked ground beef (age-adjusted OR, 5.7; 95% CI, 1.4 to 23.7; $p < 0.05$).

Only two of the Minnesota cases reported eating Chain A ground beef. Both purchased them at stores in Ramsey County. One of these cases was hospitalized for 2 days, released, and then readmitted to the hospital for 2 additional days.

The sample of ground beef obtained by MDA from one of the cases was positive for *S.* Typhimurium PFGE subtype TM87.

Several of the cases in other states reported purchasing their ground beef at Chain A. Epidemiologists were able to use seven member card numbers or purchase receipts to assist in the traceback investigation. The United States Department of Agriculture Food Safety Inspection Service (USDA-FSIS) coordinated the traceback efforts. MDA reported their findings from Chain A to USDA-FSIS. Traceback results indicated that the ground beef was packaged in three processing plants. One common supplier was identified for the three plants, although product was combined with product from other suppliers at the processing plants. Two additional cases supplied approximate purchase dates for their ground beef, and depending on the exact date of purchase, it was possible that the three implicated plants with the same supplier could also have been linked to those cases.

USDA-FSIS assessed the processing plants and their common supplier. Evaluators reviewed existing FSIS records and HACCP plans, but could find no evidence to support product contamination at the time of the investigation.

This was a multi-state outbreak of *S.* Typhimurium infections associated with eating ground beef purchased at Chain A retail stores. Three cases in Minnesota were identified with the outbreak PFGE subtype; of these, two identified Chain A ground beef exposure. It is likely that the beef came from a common supplier, and may have been contaminated during slaughter. However, the source of the contaminated beef was not confirmed.

(28)
Norovirus Gastroenteritis Associated with Wrap Sandwiches

August Hennepin County

On August 30, 2004, the owner/manager of a restaurant in Bloomington, Minnesota notified the City of Bloomington Environmental Health (CBEH) of four independent complaints of patrons who became ill after eating at the restaurant from August 25 to August 27. The owner/manager was away from the establishment August 26 to 29, but reported the incident immediately upon returning. The restaurant was located in a multi-tenant office building. This establishment catered to individuals working in the building and featured a menu of various made-to-order breakfast and lunch items, including homemade soups, salads, sandwiches, wraps, and featured entrees. The Minnesota Department of Health (MDH) was notified on August 30.

On August 30, the establishment owner/manager provided CBEH staff a menu and names of employees. CBEH also obtained a list of all tenants at the office building. CBEH staff interviewed complainants and tenants regarding food/beverage consumption and illness history. A case was defined as a person who had eaten at the restaurant (patron) from August 25 to 27 and subsequently became ill with vomiting or diarrhea ($\geq$3 loose stools in a 24-hour period). Stool samples kits were collected from three patrons and submitted to MDH for bacterial and viral testing.

On August 30, CBEH staff visited the restaurant to conduct an environmental health investigation focusing on employee health and hygiene, food preparation practices, and equipment. CBEH staff also interviewed food workers regarding work duties, illness history, and food consumption.

Of the 56 persons interviewed, 19 (34%) met the case definition. Two patrons reported gastrointestinal symptoms that did not meet the case definition; they were removed from the analysis.

All 19 cases reported diarrhea, 15 (79%) had vomiting, 10 (53%) had cramps, eight (42%) reported fever, and one (5%) had bloody stools. No cases were hospitalized. The median incubation, calculated from meal times at the restaurant, was 38 hours (range, 5 to 58 hours). The median illness duration was 33 hours (range, 4 to 82 hours). Stool samples from three patrons were positive for norovirus. Nucleic acid sequences from all three norovirus samples were identical.

Eating at the establishment from August 25 to 27 was associated with illness (19 of 21 ill vs. 21 of 35 not ill; odds ratio [OR], 6.3; 95% confidence interval [CI], 1.1 to 46.4; $p = 0.02$). No single tenant office was associated with illness. Among patrons of the establishment, consumption of a "wrap sandwich" was significantly associated with illness (11 of 19 cases vs. 3 of 20 controls; OR, 7.8; 95% CI, 1.7 to 35.9; $p < 0.01$), as were consumption of tomatoes (15 of 18 cases vs. 7 of 21 controls; OR, 10.0; 95% CI, 2.1 to 46.5; $p < 0.01$) and lettuce (15 of 18 cases vs. 7 of 21 controls; OR, 10.0; 95% CI, 2.1 to 46.5; $p < 0.01$).

Six (100%) of six food workers were interviewed; one of the food workers reported an onset of vomiting on August 26. This food worker worked on August 24 and 25, but was not involved with any food preparation. Another food worker reported a family member with an onset of fever (no vomiting or diarrhea) prior to August 25. This food worker was involved with tomato and wrap/non-wrap sandwich preparation. During the environmental health evaluation of the restaurant, CBEH noted improper glove use in the food preparation areas.

This was a laboratory-confirmed outbreak of norovirus gastroenteritis associated with a restaurant. Tomatoes and/or lettuce in the wrap and non-wrap sandwiches were identified as the likely vehicles of illness. Transmission likely occurred through contamination of ready-to-eat food items by an ill food worker.

(29)
Salmonella Heidelberg Infections Associated with an Egg Dish

August Pipestone County

On September 15, 2004, epidemiologists from the Minnesota Department of Health (MDH) interviewed a culture-confirmed *Salmonella* Heidelberg case that reported attending a family gathering held in Edgerton, Minnesota the weekend of August 27-29; many participants reportedly had subsequently developed gastrointestinal illness. One patient with *Salmonella* group B that was reported to the Illinois Department of Health had also attended the family gathering. According to the hostess, approximately 25-30 individuals attended the gathering. The hosting family prepared the majority of the food items; however, the family did eat bison burgers at a bison farm on August 28.

Epidemiologists from MDH obtained a list of attendees of the family gathering. Phone surveys were conducted to obtain information on consumption of foods/beverages and illness history. A case was defined as an attendee of the family gathering that subsequently became ill with vomiting or diarrhea (≥3 loose stools in 24-hour period). The hostess provided a list of food items served. Stool samples from two additional attendees were received by MDH for bacterial culture. A total of three symptomatic guests were tested for *Salmonella* in their home state of Illinois.

MDH also contacted the Minnesota Department of Agriculture in order to conduct a traceback of the eggs consumed at the event.

Of the 20 individuals interviewed, five (25%) met the case definition. All five cases reported cramps and diarrhea, two (40%) reported vomiting, and two (40%) reported fever. One individual reported gastrointestinal symptoms that did not meet the case definition and was excluded from analyses. Only one ill person had recovered at the time of interview and reported an illness duration of 138 hours.

Consumption of an egg bake breakfast on August 28 was significantly associated with illness (4 of 5 cases vs. 2 of 14 controls; odds ratio, 24.0; 95% confidence interval, 1.2 to 1,122; $p = 0.02$).

The median incubation period, calculated from the egg bake breakfast, was 76 hours (range, 40 hours to 129 hours). No other food items or events were associated with illness.

The hostess bought the eggs that were served at the egg bake breakfast from the local farmers market. The eggs were mixed with bread and cheese; the dish was then baked in the oven and served to the guests. Out of the 20 individuals interviewed, only seven attended the egg bake breakfast.

The two people who submitted stool samples directly to the MDH were culture-negative for *Salmonella*. However, these stool samples were received 14-15 days after the initial onset of symptoms. A total of three symptomatic guests were tested for *Salmonella* in their home state of Illinois; however, only the initial stool sample reported to the Illinois Department of Health was positive for *Salmonella* group B.

The Minnesota Department of Agriculture discovered that the local farmers market was held intermittently and that vendors at the market could not be traced.

This was an outbreak of foodborne salmonellosis associated with an egg bake dish made of an eggs, bread, and cheese. Transmission likely occurred because of improper cooking of the eggs served at the event. Egg consumption is a documented risk factor for *S*. Heidelberg infections.

(30)
Shigella flexneri 2a Infections Associated with a Restaurant

September Ramsey County

On October 10, 2004, through routine laboratory surveillance of *Shigella* isolates, the Minnesota Department of Health (MDH) identified a cluster of two *Shigella flexneri* 2a cases with isolates that were indistinguishable by pulsed-field gel electrophoresis (PFGE) (subtype designated SF12). Initial interviews with these two cases revealed they had both eaten meals at the same restaurant in Roseville, Minnesota within 2 days of each other.

MDH routinely interviews all shigellosis cases to assess symptom history, potential exposures, and food consumption prior to illness onset. A sanitarian and an epidemiologist from St. Paul-Ramsey County Department of Public Health visited the restaurant to assess food handling practices, employee hygiene, and employee illness.

Case interviews revealed no common exposures besides eating at the restaurant. The two cases ate at the restaurant on September 14 and September 16 and became ill 45 hours and 54 hours later, respectively. Durations of illness were 18 days and 13 days, respectively. Both cases reported bloody diarrhea, vomiting, fever and cramping. One case was hospitalized for 3 days. Both cases reported eating beef tacos at the restaurant.

From September 15 to October 15, MDH received five *Shigella flexneri* 2a isolates. The two cases that reported eating at the same restaurant in Roseville had isolates with indistinguishable PFGE patterns, designated SF12. The three remaining cases each had distinct PFGE patterns.

No additional cases were detected through laboratory surveillance, and the MDH foodborne illness hotline received no complaints about the restaurant.

The environmental assessment conducted at the restaurant noted numerous temperature violations, improper storage of raw animal products, and cleaning deficiencies. Nine of 12 kitchen employees were interviewed about recent illnesses. None reported being ill. Restaurant management stated that no one had called in sick for over a month, and the restaurant had received no customer complaints.

This was an outbreak of foodborne shigellosis associated with a restaurant in Roseville. The likely source of the infections was an unidentified infected foodhandler; the possibility that the sources was a food product contaminated prior to delivery at the restaurant could not be ruled out, but the small number of cases makes this less likely.

(31)
Suspected *Clostridium perfringens* Intoxications Associated with a Restaurant

September Wright County

On September 28, 2004, Wright County Public Health referred a foodborne illness complaint to the Minnesota Department of Health (MDH) Acute Disease Investigation and Control Section foodborne illness hotline. The complainant stated that a party of four persons from three separate households had become ill with cramps and diarrhea after eating dinner at a restaurant in Buffalo, Minnesota on September 21. The four persons were from three separate households and denied any other common meals. The same restaurant had been implicated in an outbreak of suspected *Clostridium perfringens* intoxications in May 2004 (see Outbreak #17, above). An outbreak investigation was initiated in collaboration with the MDH Environmental Health Services Section.

MDH epidemiologists interviewed restaurant patrons about food consumption and illness history. A case was defined as a person with vomiting or diarrhea ($\geq$3 loose stools in a 24-hour period) after dining at the restaurant on September 21. A sanitarian from the MDH Central District office in St. Cloud went to the restaurant on September 29 to evaluate foodhandling practices. No stool or food samples were collected.

All four persons in the dining party were interviewed by phone, and all four met the case definition. All four cases had cramps and diarrhea. No cases reported vomiting, fever, or bloody stools. The median incubation was 10 hours (range, 7.5 to 12 hours) and the median duration of illness was 56 hours (range, 32 to 75 hours). The absence of any non-ill persons to interview precluded a case-control analysis of food items. The cases reported eating burritos, beans, chips, and cheese dip.

The MDH sanitarian did not find any foodhandling violations at the restaurant. The restaurant was holding hot items at the proper temperatures and using proper cooling techniques. However, the restaurant did have a previous outbreak of similar illnesses in May 2004. At that time, several time/temperature violations were found and reviewed with the establishment.

This was an outbreak of gastrointestinal illnesses associated with a restaurant. The epidemiologic and clinical characteristics of the illnesses were characteristic of *Clostridium perfringens* intoxications. Because of the small number of cases and lack of controls, no food vehicle could be determined. Based on the known risk factors for foodborne bacterial intoxications and the restaurant's previous outbreak, it is likely that time-temperature abuse of meat, rice, beans, sauces, and/or other food items were the cause of this outbreak.

(32)
Norovirus Gastroenteritis Associated with a Restaurant

October Hennepin County

On October 4, 2004, Hennepin County Public Health Protection (HCPHP) received a report concerning an individual (Group A) who had become ill after eating at a restaurant in Plymouth, Minnesota on October 1. The Minnesota Department of Health (MDH) foodborne hotline received a second, independent complaint on October 5, from a group of 15 people (Group B) who became ill after dining at the same restaurant on October 1. MDH and HCPHP staff subsequently notified each other of the complaints.

On October 5, Hennepin County sanitarians inspected the restaurant, focusing on food preparation practices and employee health and hygiene. Employees who had worked on October 1 were identified and interviewed regarding job-related duties and to assess any recent illness. Sanitarians from HCPHP attempted to identify additional patrons who dined at the restaurant on October 1; however, credit card records did not display identifiable names and the restaurant did not retain reservation information.

An epidemiologist from HCPHP interviewed the group members from both complaints (Groups A and B) to obtain information about food/beverage consumption and illness history. A case was defined as a person who ate at the restaurant on October 1 and subsequently became ill with vomiting or diarrhea ($\geq$3 loose stools in a 24-hour period). Stool specimen kits were collected from six patrons (all from Group B) and submitted to MDH for bacterial and viral testing.

Of the 15 patrons from Group B, 12 (80%) were interviewed. Eight (67%) of these interviewed patrons met the case definition. Eight (100%) cases had diarrhea, seven (88%) had vomiting, seven (88%) had cramps, and four (50%) reported fever. The median incubation, calculated from the meal time on October 1, was 27 hours (range, 3 to 51 hours). The median duration of illness was 44 hours (range, 12.5 to 120 hours). Stool specimens from five patrons in Group B tested positive for norovirus. Nucleic acid sequencing was conducted on positive norovirus samples from four positive cases; the sequences were identical in all four.

Among Group B members, eating a house salad was significantly associated with illness (7 of 8 cases vs. 0 of 4 controls; logit odds ratio, 45.0; logit 95% confidence interval, 1.5 to 1,358; $p = 0.01$).

The Group A patron consumed the boneless chicken wings appetizer, which was served with vegetables and dressings, and subsequently became ill with vomiting and diarrhea approximately

24 hours later. The complainant claimed no one else in his party became ill and refused further inquiry.

Twenty-one employees who had worked on October 1 were interviewed. Of these, seven (33%) reported recent gastrointestinal symptoms, including one employee who reported an onset of vomiting on September 29. This particular employee worked the rest of the week, including assisting with plating and serving salads to members of Group B. The sanitarians from HCPHP noted during their inspection that the croutons used in salads were kept in a large container with an inadequate utensil for dispensing; employees, including ill food workers, were observed having bare-hand contact with croutons. No stool samples were acquired from food workers.

This was an outbreak of norovirus gastroenteritis associated with a restaurant. The source of the outbreak was likely ill food workers with transmission occurring through bare-hand contact of ready-to-eat food items. The establishment has been instructed on the importance limiting bare-hand contact of food items and excluding ill food workers from work.

(33)
Norovirus Gastroenteritis Associated with a Wedding

October St. Louis County

On October 25, 2004, the Minnesota Department of Health (MDH) received a report from the St. Louis County Public Health Department (SLCPHD) concerning guests who had become ill after attending a catered groom's dinner on October 22 in Duluth, Minnesota. The groom's dinner was served in a buffet fashion. The groom's mother had indicated that approximately one half of the 50 guests who attended the groom's dinner became ill with vomiting and diarrhea. The report also indicated there was a dinner at a private home for wedding party members on October 21 (14 individuals). A catered, buffet-style wedding reception was held on October 23 (315 attendees).

Epidemiologists from MDH obtained a list of individuals who attended the groom's dinner and conducted phone interviews with guests to obtain information on illness history and consumption of foods/beverages at all three events. A case was defined as a guest who attended one of the three wedding-related events and subsequently became ill with vomiting or diarrhea (≥3 loose stools in 24-hour period), or who had a laboratory-confirmed norovirus infection. Public health officials from SLCPHD conducted routine inspections of the two facilities that held the groom's dinner and the wedding reception and interviewed the staff at each facility to ascertain work-related duties and recent illness. Stool samples were collected from four guests and submitted to MDH for bacterial and viral testing.

Of 46 guests who were interviewed, 33 (72%) met the case definition. One of these cases reported no diarrhea or vomiting but tested positive for norovirus. Three individuals reported mild gastrointestinal symptoms that did not meet the case definition; these individuals were excluded from the analysis. Twenty-seven (82%) cases reported diarrhea, 24 (73%) had vomiting, 23 (70%) had cramps, and nine of 28 (32%) had a fever. A median incubation period was not calculated since illnesses appeared to be associated with multiple events. The median

duration of illness was 48 hours (range, 5 to 113 hours). Four stool samples from four guests were positive for norovirus. Nucleic acid sequencing was conducted on positive norovirus samples from two cases; both sequences were identical.

In the case-control analysis, cases were assigned to particular events based on their illness onset. For example, cases with onset from 24 to 48 hours after the wedding party dinner on October 21 were considered in the evaluation of that particular meal, but not for the groom's dinner or the wedding reception. If an attendee became ill 24 to 48 hours after the wedding reception, they were evaluated as a case in the analysis of the wedding reception. Non-ill attendees were evaluated as controls for all events that they attended.

Attending the wedding party dinner (at the private home) on October 21 approached statistical significance with illness (9 of 30 cases vs. 0 of 10 controls; logit odds ratio [OR], 9.3; logit 95% confidence interval [CI], 0.49 to 175.2; $p = 0.08$). While no foods or beverages served during the wedding party dinner were significantly associated with illness, two items had elevated odds ratios, including garlic bread (5 of 5 cases vs. 1 of 3 controls; logit OR, 18.3; logit 95% CI, 0.54 to 627.2; $p = 0.11$), and milk (4 of 5 cases vs. 0 of 3 controls; logit OR, 21.0; logit 95% CI, 0.64 to 690.0; $p = 0.14$).

Attending the groom's dinner on October 22 or consumption of foods/beverages during this dinner were not associated with illness. Two cakes were served during the groom's dinner that were not prepared by the caterer; consumption of cake during the groom's dinner also was not associated with illness.

Consumption of the vegetable medley during the wedding reception on October 23 was significantly associated with illness (15 of 16 cases vs. 3 of 9 controls; OR, 30.0; 95% CI, 2.6 to 348.8; $p=0.003$). Prior to the start of the wedding reception buffet, nine attendees had already developed vomiting or diarrhea.

Investigation by officials from SLCPHD indicated that the groom's dinner was held at a local hotel and that a local caterer prepared the meal. No recent illness was reported among food workers employed by the caterer. The wedding reception was held at another facility, and the food was prepared on-site. The vegetable medley (whole green and yellow beans, and baby carrots) was steamed; the cook reported sampling a small portion to ensure doneness. One food worker, who helped set-up, serve, and clean up, reported illness with an onset of symptoms on October 25. This food worker reported consuming food items from the same buffet used to serve the reception guests; however, this food worker did not report eating the vegetable medley.

This was an outbreak of norovirus gastroenteritis among guests of wedding-associated activities that occurred over 3 days. Transmission occurred at the wedding party dinner on October 21 and the wedding reception dinner on October 23. Multiple food items were identified as possible vehicles for illness. Illness onset dates were reported by attendees before the first dinner on October 21; therefore, the source of the outbreak was most likely ill attendees who infected others by sharing common foods. Person-to-person transmission also likely contributed to illnesses over the course of the outbreak.

(34)
Salmonella Newport Infections Associated with a Restaurant

November Yellow Medicine County

Part I: Cases of Salmonellosis Associated with a Lunch Catered by Restaurant A, November 12, 2004

On the evening of Monday, November 15, 2004, the Minnesota Department of Health (MDH) after-hours answering service received a report of gastrointestinal illness among several employees of a medical clinic in Marshall, Minnesota. The clinic workers had shared some recent common meals, including a chili potluck held on Thursday, November 11 and a catered lunch sponsored by pharmaceutical representatives on Friday, November 12. The catered lunch was prepared by a restaurant that was located in Granite Falls, Minnesota (Restaurant A). The food was delivered and set up at the clinic by Restaurant A staff. On November 16, the MDH southwestern district epidemiologist and the Countryside Public Health Department were contacted and an investigation was initiated.

Clinic management provided MDH with a roster of employees and information about food items served at the clinic during the week in question. MDH epidemiologists interviewed the clinic workers about food consumption and illness history. A case was defined as a person with vomiting or diarrhea ($\geq$3 loose stools in a 24-hour period) since Monday, November 8 (that date was chosen to capture any illness that may have been going on prior to the catered lunch). Stool samples from ill persons and leftover food from the November 12 catered lunch were collected and submitted to the MDH Public Health Laboratory.

Sanitarians from Countryside Public Health evaluated foodhandling practices at Restaurant A. Restaurant workers involved in food preparation of the clinic meal were interviewed. Leftover pieces of turkey, dressing, and salad were collected from the refrigerator at the clinic. The restaurant had some gravy left from the same batch made for the clinic. The gravy had been reheated for other events and then frozen. The leftover food was submitted to MDH for *Salmonella* culture.

A total of 98 persons associated with the clinic were interviewed. Ninety-four persons were clinic employees, three were pharmaceutical representatives, and one was the child of a clinic employee who ate food brought home from the November 12 catered lunch. Of the 98 persons interviewed, 43 (44%) met the case definition, 52 (53%) had no symptoms, and three (3%) had milder symptoms that did not meet the case definition. These three persons were excluded from further analysis.

Of the 43 cases, 41 (95%) had diarrhea, 38 (88%) had cramps, 15 (35%) had vomiting, and five (12%) reported bloody stools. Twenty-four (56%) cases reported fever; the median temperature reported was 101.0°F (range, 98.8°F to 103.9°F). Three (7%) cases were hospitalized: one for 1 day, one for 2 days, and one for 3 days. Eight additional cases were seen in emergency rooms, and five additional cases were seen in outpatient clinics. Of note, some cases probably did not seek medical attention because they were physicians or nurses.

Twenty cases had clinical samples (stool from 19 cases, urine from one case) that were culture-positive for *Salmonella* serotype Newport. Nineteen of the 20 culture-confirmed cases had *Salmonella* Newport with an indistinguishable pulsed-field gel electrophoresis (PFGE) subtype; this subtype was designated NEW15. One of the 20 culture-confirmed cases had *Salmonella* Newport with the PFGE subtype designated NEW221; this pattern was indistinguishable from NEW15 but for the intensity of one band. The isolates were susceptible to all antimicrobials tested.

Eating at the November 11 chili potluck was not associated with illness (27 of 43 [63%] of cases vs. 25 of 52 [48%] controls; odds ratio [OR], 1.8; 95% confidence interval [CI], 0.7 to 4.6; $p = 0.15$).

Eating at the November 12 lunch catered by Restaurant A was associated with illness (41 of 43 [95%] of cases vs. 24 of 52 [46%] controls; OR, 23.9; 95% CI, 5.1 to 217.7; $p<0.001$). The attack rate for the lunch was 41 of 65 (63%). The median incubation period from the catered lunch was 32 hours (range, 2 hours to 5 days) and the median duration of illness was 9 days (range, 8 hours to 28 days).

Further analyses were restricted to the 65 persons interviewed who ate the November 12 catered lunch. Turkey was not statistically associated with illness; however, only two of the 65 persons did not eat the turkey.

The three lunch items from the November 12 catered lunch that were statistically associated with illness were: gravy (39 of 40 [98%] cases vs. 17 of 24 [71%] controls; OR, 16.1; 95% CI, 1.8 to 741.7; $p < 0.01$), mashed potatoes (37 of 41 [90%] cases vs. 14 of 24 [58%] controls; OR, 6.6; 95% CI, 1.5 to 32.7; $p < 0.01$), and bread rolls (22 of 40 [55%] cases vs. 3 of 20 [15%] controls; OR, 6.9; 95% CI, 1.6 to 41.4; $p < 0.01$).

Because mashed potatoes and gravy were highly correlated variables, they were analyzed in a multivariate stepwise logistic regression model. Bread rolls were not included in the model because they accounted for a much smaller proportion of the cases than did mashed potatoes and gravy. Gravy was independently associated with illness (OR, 16.1; 95% CI, 1.8 to 140.7; $p = 0.01$), but mashed potatoes were not.

Of note, the child of a clinic employee who ate food brought home immediately after the November 12 catered lunch (and was counted among the culture-confirmed cases of salmonellosis) only ate gravy, mashed potatoes, and stuffing.

The environmental health assessment at Restaurant A focused on the preparation of the food catered to the clinic on November 12. The assessment concentrated particularly on the turkey and gravy. Prior routine environmental health evaluations of the restaurant had found problems with date marking of potentially hazardous foods and presence of raw meat on counters.

Restaurant A reported receiving two frozen turkeys, each 22-24 lbs., on the evening of Wednesday, November 10. The turkeys came from a supplier in Iowa, which was the restaurant's regular supplier of frozen turkeys. It was unclear exactly how the frozen turkeys

were thawed; the restaurant provided conflicting information. The first information given was that the turkeys were thawed in separate tubs in the walk-in cooler. The sanitarians noted that the walk-in cooler was crowded, which may impede airflow and the cooling/thawing of food. Later, information was given that the tubs were placed under running water for 10 or 15 minutes, and then filled with a brine solution for either 6 or 12 hours.

According to the restaurant, they started roasting the two turkeys for the catered lunch at 5:30 a.m. on Friday, November 12. The reported duration of cooking was 4 hours. The final cooking temperature was not checked with a thermometer, but the cook said the meat was falling off the bone. The turkeys were deboned, sliced, and placed on two serving trays before being placed in Alto-Shaam units. The restaurant said that while turkey drippings were added to the gravy, the gravy was boiled afterwards. At about 10:30 a.m., the food was transported to the clinic, approximately 30 minutes away, in Alto-Shaam units. Once at the clinic, the food was kept in chafing dishes. Clinic staff served themselves from approximately 11:30 a.m. to 1:00 p.m. At about 1:30 p.m., restaurant staff picked up the serving equipment at the clinic.

The restaurant provided Countryside Public Health with a list of the employees involved in the preparation and delivery of the catered lunch. MDH epidemiologists interviewed all four employees listed, and they all denied any recent or current symptoms of gastrointestinal illness.

The leftover food samples cultured by MDH were negative for *Salmonella*. MDH staff called a contact person for another turkey meal that had been catered by Restaurant A on Thursday, November 11 (the day before the clinic meal). The contact person did not know of any illness among the attendees of that event.

This was an outbreak of *Salmonella* Newport infections statistically associated with gravy from a lunch catered to a clinic by a restaurant on November 12, 2004. The gravy was most likely contaminated by undercooked turkey that was being prepared concurrently; turkey drippings were an ingredient in the gravy. Incomplete thawing of the turkey prior to cooking likely played a direct role in the contamination of the gravy. It was unlikely that any of the methods that the restaurant described using could have completely thawed the frozen turkeys in the approximately 36 hours that elapsed between delivery of the turkeys and the commencement of cooking. Raw turkey is known to be a major source of *Salmonella*.

Part II: Additional Cases of Salmonellosis Associated with Restaurant A, November-December 2004

On December 6, 2004, a hospital in southwestern Minnesota notified MDH that two patients with *Salmonella* were currently hospitalized there. MDH determined that both cases were positive for *Salmonella* Newport PFGE subtype NEW15. This was the same PFGE subtype of *S.* Newport that caused the November outbreak associated with a lunch catered by Restaurant A.

Initial interviews revealed that one of the two cases ate at Restaurant A on November 25 and November 28 and had become ill on December 3. The other case became ill on approximately November 27 and denied eating at Restaurant A or eating any food catered by the restaurant. However, 2 months later, this case contacted MDH to report the recollection that there had been

some food from Restaurant A brought into the case's workplace in November. The case did not specifically recall consuming the food, but reported that the food was held in an employee refrigerator at the case's workplace.

Additional cases of salmonellosis were identified by MDH through statewide active laboratory-based surveillance. Cases were interviewed by MDH epidemiologists about symptoms and exposures.

Staff from Countryside Public Health and MDH made a site visit to Restaurant A on December 8. Fifteen environmental surfaces including cutting boards, knives, spatulas, and hand sink handles were swabbed for *Salmonella* culture. All restaurant employees were required to submit two stool samples collected at least 24 hours apart to MDH for *Salmonella* culture.

In total, six cases of infections with *Salmonella* Newport PFGE subtype NEW15 were identified during December 2004. Onset dates ranged from (approximately) November 27 to December 14. Culture dates ranged from December 1 to December 25. The median age of the cases was 70 years (range, 42 to 83 years). All of the cases had diarrhea, five (83%) had fever, four (67%) had cramps, and two (33%) had bloody stools. All six cases sought medical attention for their symptoms and five (83%) required hospitalization. The median duration of hospitalization was 4 days (range, 1 to 18 days). Two of the six cases said they were recovered at the time of interview; their durations of illness were 8 and 9 days, respectively.

With the exception of the one case described above (who later recalled that food from Restaurant A had been in the case's workplace in November), all the cases reported eating at Restaurant A at least once within the 10 days prior to their illness onset. Three of five reporting eating at the restaurant on Thanksgiving Day (November 25); on that day there was a buffet featuring ham, turkey, and several other foods. One of five reported eating at a buffet at Restaurant A on December 5; the case could not recall specific foods but said that the foods consumed did not include turkey. One of five could not recall a specific meal date but reported eating at the buffet there once or twice a week (this case's onset date was December 14). The median incubation period from eating at Restaurant A to illness onset was 7 days (range, 6 to 9 days).

On December 9, the restaurant owner voluntarily agreed to temporarily close the restaurant in order to perform intensive cleaning and sanitizing of the establishment. This included thorough cleaning and sanitizing of all food contact surfaces, restrooms, equipment, and utensils, as well as discarding unused or old equipment. The cleaning was supervised by Countryside Public Health Department sanitarians. Thirteen restaurant employees worked over a 24-hour period to complete the cleaning, and the restaurant re-opened for business on December 10. Countryside Public Health Department also made several recommendations to the restaurant. These recommendations focused on limiting bare-hand contact with food items, improving handwashing practices, and implementing a system of time/temperature logs to monitor potentially hazardous food items.

The fifteen environmental swabs collected from the restaurant on December 8 were all negative for *Salmonella*.

Twenty-one restaurant employees submitted at least two stool cultures to MDH for *Salmonella* culture. Three of the 21 employees (14%) were positive for *Salmonella* Newport PFGE subtype NEW15. All three denied having been ill with gastrointestinal symptoms. The three positive employees were excluded from working in the restaurant until they had submitted two negative stool samples that had been collected at least 24 hours apart.

The durations of employee exclusion (the interval between the first laboratory confirmation of *Salmonella* in a worker's specimen and laboratory confirmation that two specimens were negative) were 13, 24, and 27 days, respectively. By January 14, 2005, all food workers had been cleared to return to work.

This was an outbreak of *Salmonella* Newport infections in patrons of a restaurant. The exposures occurred within a few weeks of an earlier outbreak associated with the same restaurant. The earlier outbreak was associated with turkey and gravy served at a single catered meal and had a high attack rate. We hypothesize that the cases among restaurant patrons resulted from a contamination event during the handling and preparation of the raw turkeys for the earlier catered lunch. Raw turkeys are frequently contaminated with *Salmonella*. Kitchen surfaces, utensils, and other food items may have been cross-contaminated at that time. Culturing of the restaurant's food workers revealed that at least three food workers became infected, although they denied experiencing any symptoms. It is possible that the infected food workers shed *Salmonella* in their stool, and that the shedding contributed to the contamination of surfaces and/or food items in the restaurant.

(35)
Norovirus Gastroenteritis Associated with a Restaurant

November Otter Tail County

On November 29, 2004, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint of illness from four individuals who ate together at a restaurant in Perham, Minnesota on November 25. The patrons had become ill with vomiting and diarrhea after eating a Thanksgiving buffet meal at the establishment. Three of the four individuals in the party were related, but lived in three different households. Two of the patrons reported attending a church event the evening of November 25. They reported no other common exposures in the days prior their illness onsets. An outbreak investigation was initiated in collaboration with the MDH Environmental Health Services Section.

An MDH environmental health specialist visited the restaurant on December 1. The MDH environmental health specialist conducted interviews of the employees and the restaurant manager and retrieved three patron names and contact information.

MDH staff interviewed persons associated with the complaint and additional patrons of the restaurant about food consumption and illness history. A case was defined as a person with vomiting or diarrhea ($\geq$3 loose stools in a 24-hour period) after dining at the restaurant on November 25. Three of the original complainants submitted a stool sample to MDH for viral testing.

All four of the patrons in the original complainant's party met the case definition. All four cases had diarrhea and vomiting, none of them had cramps, and one (25%) had fever. The median incubation period was 31 hours (range, 15 to 42 hours). All cases were still ill at the time of interview. All three of the stool samples collected from patrons were positive for norovirus. Nucleic acid sequencing was conducted on positive samples from two cases; the sequences obtained for both viruses were identical.

The three additional patrons submitted by the restaurant were contacted and did not report any gastrointestinal symptoms.

The environmental health specialist's visit revealed that the establishment was not licensed to serve food. Nine critical items were noted. There were no handwashing sinks in the kitchen, there was no certified food service manager, there were plumbing cross-connections, and raw meats were stored above grapes. In addition, there were temperature abuses of raw foods, food contact surfaces and utensils were not clean, food and clean eating utensils were stored under unprotected sewer lines, chicken was stored on the floor in the walk-in cooler, and toxic cleaning materials were stored on the prep table.

The establishment had a full menu, as well as a buffet line. Food items served in the buffet line on November 25 included turkey, dressing, mashed potatoes, cheesy scalloped potatoes, gravy, ham, green beans, pumpkin pie, and peach pie. Drinks included coffee and water. The only common food among cases was turkey; however, all four patrons had pumpkin or peach pie. All four cases also had water to drink.

One food worker reported gastrointestinal symptoms that resolved the morning of November 25, and had children with gastrointestinal symptoms. This food worker helped set up the buffet line. This food worker did not submit a stool sample.

This was a foodborne outbreak of norovirus gastroenteritis among patrons of a restaurant. The likely source of the illness was an ill food worker at the restaurant that helped set up the buffet. Other contributors may have included the unsanitary conditions in the restaurant including lack of handwashing sinks. A specific food vehicle was not confirmed.

(36)
Clostridium perfringens Intoxications Associated with a Restaurant

December Hennepin County

On December 7, 2004, the Minnesota Department of Health (MDH) foodborne illness hotline received a report from a party of two persons who had become ill after eating at a restaurant in Crystal, Minnesota on December 6. On December 8, Hennepin County Public Health Protection-Epidemiology (HCPHP) received an independent complaint from a party of two persons reporting illness after eating at the same restaurant on December 7. MDH and HCPHP contacted the Crystal Department of Environmental Health (CDEH) to inform them of the foodborne illness complaints, and an investigation was initiated. HCPHP received two additional reports of illness on December 13 from a party who had eaten at the restaurant on December 10.

On December 8, CDEH inspected the facility. Credit card receipts were used to compile a list of patrons who had eaten at the facility on December 7. HCPHP interviewed a sample of people from the list to obtain information about symptoms and foods consumed. A case was defined as a person who had eaten at the restaurant and subsequently became ill with vomiting or diarrhea (≥3 loose stools in a 24-hour period). The MDH Public Health Laboratory tested stool samples collected from five patrons for *Salmonella*, *Campylobacter*, Shiga-toxin producing *E. coli*, *Shigella*, *Yersinia*, *Staphylococcus aureus, Bacillus cereus*, and *Clostridium perfringens* organisms and *Clostridium perfringens* type A enterotoxin. One party submitted leftover chicken that was tested for *Staphylococcus aureus, Bacillus cereus* and *Clostridium perfringens* organisms, *Bacillus cereus* diarrheal type enterotoxin and staphylococcal enterotoxin A, B, C, and D. A statistical analysis for menu items associated with illness was not done because the environmental investigation identified the likely cause of the outbreak.

Twenty-two patrons were interviewed, and eight (36%) met the case definition. All eight cases reported diarrhea and six (75%) reported cramps. The median incubation period for diarrhea was 11.5 hours (range, 8 to 18.5 hours). Duration of illness was not determined because most of the cases were still ill at the time of the interview. *Clostridium perfringens* organisms were recovered from four of the five stool samples and *Clostridium perfringens* type A enterotoxin was identified in three of the five stool samples. The chicken sample tested negative for bacterial pathogens and toxins.

Several critical temperature violations, both hot holding and cooling, were observed during the restaurant inspection. Pans of chicken and of rice in one section of the hot holding table were held substantially below 140°F due to a malfunctioning burner. There was inadequate cooling of many potentially hazardous foods including refried beans, rice, and chicken products. Foods made in large quantities were not transferred to smaller, shallow pans for cooling. (The restaurant had been cited for the same improper cooling procedure during an inspection in May 2004.) Also noted during the inspection was that there was the potential for cross-contamination of raw meats and prepared, ready-to-eat foods in the walk-in-cooler and that employee hand washing was inadequate and infrequent. In addition, the food manager was not certified.

This was an outbreak of *Clostridium perfringens* intoxications associated with eating at a restaurant, likely caused by improper cooling and hot-holding of potentially hazardous foods. The hot-holding table was replaced and the food manager underwent ServSafe training.

(37)
Suspected Bacterial Intoxications Associated with a Restaurant

December Dakota County

On December 14, 2004, a Minnesota Department of Health (MDH) sanitarian received a call from the manager of a restaurant in Apple Valley, Minnesota about two separate complaints of gastrointestinal illness from restaurant patrons. An outbreak investigation was immediately initiated.

Staff from the MDH Acute Disease Investigation and Control Section contacted the manager, and the complainants were reached for interview on December 15 and 16. In addition to the three complaints, MDH staff interviewed 16 patrons using names obtained from credit card receipts. Complainants and other patrons had all eaten at the same restaurant on December 10. Patrons were asked questions about food consumption at the restaurant and illness history. A case was defined as a person with vomiting or diarrhea ($\geq$3 loose stools in a 24-hour period) after dining at the restaurant. No stool samples were obtained. An MDH sanitarian made a site visit to the restaurant on December 17.

Of the 19 patrons interviewed, only the three original complainants met the case definition. All three cases had diarrhea, vomiting, fever, and cramps. The median incubation period was 4.5 hours (range, 1.5 to 6.5 hours). The median duration of illness was 40.2 hours (range, 28.5 to 52 hours).

Univariate analysis showed that eating lasagna (3 of 3 cases vs. 0 of 16 controls; odds ratio [OR], undefined; 95% confidence interval [CI] lower limit, 4.2; $p < 0.001$) and eating Caesar salad (3 of 3 cases vs. 0 of 16 controls; OR, undefined; 95% CI lower limit, 4.2; $p < 0.001$) were statistically associated with illness.

Upon inspection of the restaurant, the MDH sanitarian found that the restaurant had received no additional complaints. Food workers had ample opportunity for bare-hand contact with the lasagna as it was assembled. The lasagna was prepared individually from pre-made frozen portions thawed in the walk-in cooler. These portions were disassembled and layered in a soufflé dish with commercially processed cheese and sauce and cooked for 3 minutes. Lasagna dishes could have been prepared up to 48 hours before they were cooked and served; therefore, there was potential for temperature abuse of the lasagna from the time of preparation until the time of cooking, which in turn could have allowed bacteria to proliferate and elaborate toxin. Lettuce used for salads was pre-cut in bulk bags, and foodhandlers were wearing gloves to portion out the salads. Patron interviews also revealed that patrons who did not become ill consumed other types of salad. Therefore, Caesar salad may have been significantly associated with illness because only patrons who also ate lasagna had a Caesar salad.

The epidemiologic and clinical characteristics of this outbreak are consistent with a foodborne intoxication, such as that caused by *Staphylococcus aureus* or the emetic form of *Bacillus cereus.* Lasagna and Caesar salad were statistically associated with illness. The lasagna was handled with bare hands, with the potential for temperature abuse, and the prepared dish was held up to 48 hours before serving. Therefore the potential for contamination of the lasagna, and for the proliferation of bacteria and toxin production, existed.

(38)
Suspected Bacterial Intoxications Associated with Turkey

December Hennepin County

On December 20, 2004, the owner of a deli in Wayzata, Minnesota called the Minnesota Department of Health (MDH) foodborne illness hotline to report that numerous employees of a

workplace in Apple Valley, Minnesota had become ill after eating a holiday meal catered by his company. An estimated 350-400 people ate the meal, which was served in three shifts (11 a.m. to 2 p.m., 5 p.m. to 8 p.m., and 11:30 p.m. to 1:30 a.m.) on December 17. Hennepin County Public Health Protection (HCPHP) and the City of Wayzata were subsequently notified and an investigation was initiated.

On December 20, HCPHP sanitarians inspected the deli, focusing on food preparation practices and employee health and hygiene. Particular attention was paid to reviewing how food for this event was cooked, stored, reheated and transported. A HCPHP epidemiologist created interview forms including questions about food consumption and illness history; the interviews were distributed to persons who ate the catered meal.

A case was defined as a person who ate the catered meal on December 17 and subsequently became ill with vomiting or diarrhea ($\geq$3 loose stools in a 24-hour period). A total of 120 interview forms were returned to HCPHP. Of those persons completing interview forms, 43 (36%) fit the case definition. All 43 cases had diarrhea, 30 (70%) had cramps, eight (19%) had vomiting and one (2%) reported fever. The median incubation, calculated from the midpoint of the shift, was 12 hours (range, 4 to 29.5 hours). The median duration of illness was 22 hours (range, 5 to 68 hours).

The attack rate for the day shift was 13 of 67 ill (19%), the attack rate for the evening shift was 28 of 42 ill (67%), and the attack rate for the night shift was 5 of 16 ill (31%). Five people, including three cases, ate at both the day and evening shifts.

No food items were statistically associated with illness in the overall analysis. However, consumption of turkey approached significance (43 of 43 cases vs. 72 of 77 controls; odds ratio, undefined; $p = 0.16$). Therefore, turkey consumption was evaluated for each shift. Among second shift employees, turkey consumption was associated with illness (28 of 28 cases vs. 11 of 14 controls; OR, undefined; $p = 0.03$).

On inspection, HCPHP sanitarians were told that the deli owner personally prepared all the food for the holiday event. Approximately 3 weeks before the event, 150 pounds of turkey were roasted, cooled and then frozen. The turkey was thawed in a cooler 3 days before the event and then reheated the day of the event. The owner stated that temperatures were taken at every step of the process and that these temperatures were appropriate.

Other food items were prepared from prepackaged food products including a bread stuffing mix, instant canned potatoes, frozen corn, canned gravy, rolls, butter packets, cookies, and canned soda.

Food was transported in insulated containers. The owner stated that no leftovers were returned to the deli. None of the deli employees ate the meal catered to the workplace, except for the owner. He did not become ill. Five other employees were interviewed and none reported illness.

Issues cited on inspection included that this facility was not licensed for catering, the facility had a limited capacity to prepare a large quantity of food, and that some reheating and hot holding of

the turkey was done in the owner's private home. Sanitarians also observed cross-contamination of raw meat with ready-to-eat foods and an employee with an exposed cut on his/her hand.

This was an outbreak of foodborne bacterial intoxications associated with turkey catered by a deli. A specific etiology was not identified. However, the distribution of incubations, clinical signs and symptoms, and a vehicle of turkey are most compatible with the diarrheal form of *Bacillus cereus* or *Clostridium perfringens* (although a 19% prevalence of vomiting would be uncharacteristically high for *C. perfringens*). The potential for temperature abuse during one or more stages of turkey preparation was identified. The establishment has been instructed on appropriate food preparation, storage and handling. The establishment was instructed to discontinue catering activity until a license was obtained.

(39)
Norovirus Gastroenteritis Associated with a Restaurant

December Ramsey County

On December 23, 2004, the Minnesota Department of Health (MDH) foodborne illness hotline received two independent complaints of illness associated with a restaurant in Roseville, Minnesota. Sanitarians from the St. Paul–Ramsey County Department of Public Health were notified of the outbreak, and an investigation was begun to determine the cause.

Cases were interviewed about their food consumption and illness histories, and stool specimens were obtained from two cases. A case was defined as a person who ate at the restaurant and subsequently developed vomiting or diarrhea ($\geq$3 loose stools in a 24-hour period).

The two independent complaints accounted for six people exposed. All four people who were interviewed met the case definition. All cases had vomiting and diarrhea, and three had cramping. No cases reported fever. The median incubation period was 33 hours (range, 29 to 35 hours). For cases who were recovered at the time of the interview, the median duration of illness was 13 hours (range, 9 to 36 hours). The two stool specimens obtained tested positive for norovirus with identical sequences.

Food items consumed included: chicken fajita burrito, the "#2 special", chicken tacos, chips and salsa, and soda. Because no well controls were interviewed, statistical analysis of food items was not possible.

An environmental assessment at the restaurant found no ill employees. The sanitarian learned of a rumor that two of the employees may have had ill children at home, but this was not confirmed. The sanitarian discussed with the management the importance of proper handwashing, clean uniforms, reporting ill food workers to management, and employee work restrictions if ill food workers were found. The sanitarian also noticed that the bathroom was not operational during the assessment. It was unclear how long the bathroom had been unoperational.

This was an outbreak of norovirus gastroenteritis associated with a restaurant. The specific food vehicle and source of infection were not identified. It is possible that the outbreak was caused by

ill food workers, or food workers with ill children at home. As some menu items, such as salsa, were self-service, it is possible that a patron contaminated the salsa-bar items and was the source of the outbreak.

PROBABLE FOODBORNE OUTBREAKS

(1)
Suspected Bacterial Intoxications Possibly Associated with a Restaurant

January Olmsted County

On January 22, 2004, Olmsted County Public Health Services (OCPHS) received a complaint on a voice mail message from an individual reporting that 10 people out of a work group of 12 became ill after eating a meal at a restaurant in Rochester, Minnesota at about 6:00 p.m. on January 21. The complainant was reached the next morning and a list of the 12 people and their phone numbers was acquired. A majority of those on the list were interviewed to determine their illness history and other possible exposures that could account for their illness. Since similar symptoms were reported from a number of people from the group without other apparent common exposures, an investigation was initiated.

On January 23 a visit to the restaurant was made by OCPHS environmental health staff to obtain patron lists, evaluate food preparation practices, conduct employee interviews and obtain a menu. Since the menu was limited for the group served, food flows were conducted for each menu item and ingredients identified. Patrons were interviewed on January 23 by telephone using a standard foodborne illness questionnaire containing the menu list of food items served to the affected group. As all reported illnesses were relatively mild, a case was defined as anyone who experienced nausea or abdominal pain/cramps. A stool kit was distributed to one of the ill individuals and was subsequently sent to the Minnesota Department of Health for testing.

Twelve patrons were interviewed, and eight (67%) met the case definition. The predominant symptoms were nausea (88%) and abdominal pain (63%). Two cases (25%) had diarrhea, and no cases reported vomiting or fever. The median incubation period was 10 hours (range, 3.5 to 16.5 hours). The median duration of illness was 16 hours (range, 9 to 25 hours). The submitted stool sample tested negative for *Clostridium perfringens* enterotoxin, *Bacillus cereus, Staphylococcus aureus, Salmonella, Shigella, Campylobacter, E. coli* O157:H7 and norovirus.

No foods were statistically associated with illness. Review of the food flows of the menu items did not identify any hazardous preparation practices. Foods that all cases had in common were the smoked mozzarella and sundried tomato dip, and the asparagus in filo pastry. Both of these items were commercial products. The smoked mozzarella and asparagus pastry were received frozen, then deep-fried (exact temperature not known), plated, and served. All other potentially hazardous foods were prepared on the same day and taken through kill steps and hot held at proper temperatures. There were no lapses in handwashing or sanitation procedures identified. No employees reported illness during the week of the outbreak.

The incubation period, duration and mild nature of the illnesses were most compatible with a foodborne bacterial intoxication. However, no foods were statistically associated with illness, no food cooling/reheating problems were identified, and the only stool sample received was negative for the pathogens analyzed. In the absence of specific food preparation problems

identified during the site visit, the manager was asked to reinforce food safety policies and procedures, including safe cooling and reheating of foods.

(2)
Suspected Bacterial Intoxications Associated with a Restaurant

January Olmsted County

On January 22, 2004, Olmsted County Public Health Services (OCPHS) received a report of gastrointestinal illness among three of four co-workers who ate at a restaurant in Olmsted County on January 21. The restaurant, which had been open only 7 days, was attached to a store and was licensed by the Minnesota Department of Agriculture (MDA). The MDA Rochester District office was contacted and a joint investigation was begun that evening.

MDA investigators inspected the kitchen and interviewed food service employees to obtain illness histories and to ascertain food preparation/handling responsibilities. Food flows were prepared on several foods, and food preparation and hand washing practices were observed. OCPHS and MDA investigators used credit card receipts to identify persons who ate at the restaurant on January 20 and 21. Menus of foods that were served on those days were compiled based on the memory of the cook and manager. OCPHS epidemiologists interviewed the four complainants and other patrons using a standard foodborne outbreak questionnaire. Stool specimens were requested from ill persons. A case was defined as a person who ate at the restaurant on January 20 or 21 and subsequently became ill with vomiting or diarrhea ($\geq$3 loose stools within a 24-hour period). The MDH Public Health Laboratory tested a stool sample collected from one complainant for *Campylobacter*, *Salmonella*, Shiga-toxin producing *E. coli*, *Shigella*, *Yersinia*, and bacterial enterotoxins.

One complainant met the case definition: this person reported nausea, cramps and diarrhea of 15 hours duration. Two additional members of the complainant's party reported mild gastrointestinal symptoms that did not meet the case definition. The incubation periods for those reporting any symptoms ranged from 3 to 16 hours. *Clostridium perfringens* enterotoxin type A and *Staphylococcus aureus* enterotoxin B were identified in a stool sample submitted by the case.

Fourteen additional restaurant patrons were identified from credit card receipts and five interviews were completed. None of the five patrons who were contacted reported illness. Due the low numbers of persons interviewed and an extensive buffet menu, reliable attack rates by food were not available. Improper hot-holding temperatures and food-cooling procedures were identified during the restaurant inspection.

This was a probable outbreak of foodborne bacterial intoxications associated with a restaurant. Improper hot-holding temperatures and food-cooling procedures were identified that could have contributed to the illnesses. The owner and the chef were required to take a food manager's certification course.

(3)
Norovirus Gastroenteritis Possibly Associated with a Restaurant

February Hennepin County

On February 13, 2004, Hennepin County Public Health Protection (HCPHP) received a complaint of diarrheal illness among a group of 2 who had dined at a restaurant in Minneapolis, Minnesota on February 10. The complainant (the wife of one of the two ill men) also reported that a friend who worked at the restaurant reported being ill a few weeks ago and mentioned that other employees at the restaurant had been ill with vomiting and diarrhea. The Minnesota Department of Health (MDH) and the Minneapolis Division of Environmental Health (MDEH) were notified on February 13.

MDEH sanitarians evaluated the restaurant's foodhandling procedures, employee health, and environmental conditions. A list of other patrons who dined at the restaurant that week was requested.

An HCPHP epidemiologist interviewed the two ill patrons to assess illness history and foods that were consumed at the restaurant. Stool kits were delivered to both ill patrons. In addition, eight other patrons who dined at the restaurant between February 10 and February 12 were interviewed.

A case was defined as an individual who dined at the restaurant between February 10 and February 12 and subsequently became ill with vomiting or diarrhea (≥3 loose stools in a 24-hour period).

The restaurant did not receive any illness complaints from patrons in January or February 2004. An employee illness log noted that several employees had been ill with vomiting and/or diarrhea in January. Eight of the 25 employees who worked on February 10 were interviewed. Five reported being ill with vomiting and one with both diarrhea and vomiting during January 20-28. Additionally, two of these employees have children in diapers that had diarrhea on January 16 and January 31, respectively. No employees were currently ill and no employee illnesses were reported since January 28.

Procedures for handling ready-to-eat foods were reviewed and discussed. It was recommended that all hand contact with ready-to-eat foods be eliminated by the use of gloves, tongs, deli tissue, etc., for the week after the visit. In addition, vigilant handwashing practices for all employees were emphasized. Bar and kitchen handsinks were checked and new, clean nailbrushes were recommended. MEH provided handwashing instruction to the restaurant employees on February 17.

Of the two patrons who dined together on February 10, both met the case definition. The two men (ages 37 and 48 years) both reported diarrhea, chills, sweats and fever. One case reported additional symptoms of nausea, dizziness, and kidney pain, while the other reported poor color and headache. Neither of the cases reported vomiting. The incubation periods for the two cases were 17.5 hours and 19 hours, respectively. The duration of illness for both cases was

approximately 24 hours. One stool sample was received by the MDH Public Health Laboratory and tested positive for norovirus.

Both cases consumed the Berliner (roast beef) sandwich and beer, but had different side dishes (coleslaw and hot potato sandwich). The two cases had no other shared exposures. Of the eight additional patrons that were reached, none reported illness. Two of these patrons reported dining with large parties (ranging from 20 to 50 persons) and did not hear of any illness among their companions. Three of the eight non-ill patrons reported eating a Berliner sandwich. One man consumed a Berliner sandwich at approximately the same time as the two cases. This patron ate with 50 other people, many of who ordered this same food item.

The employee illness logs indicated that there was ongoing transmission of a gastrointestinal pathogen occurred among employees at the restaurant throughout January. Although no employee illness was recorded in February, two patrons reported illness (and one had a positive stool test) consistent with norovirus gastroenteritis with an incubation time compatible with infection at the restaurant. However, a connection could not be confirmed with the available data.

(4)
Norovirus Gastroenteritis Possibly Associated with a Restaurant

April Hennepin County

On April 6, 2004, the Minnesota Department of Health (MDH) received a report from an office employee regarding a complaint of diarrheal illness affecting herself and four of her co-workers. The complainant noted that 13 people in the office had ordered lunch from a restaurant in Eden Prairie, Minnesota on April 2, and that five of 13 co-workers became ill with similar symptoms approximately 2 days later. Hennepin County Public Health Protection (HCPHP) was notified on April 6 and opened an investigation.

A HCPHP sanitarian inspected the restaurant on April 6 to examine food handling and preparation procedures, employee health, and environmental conditions.

A HCPHP epidemiologist contacted individuals from the group to assess illness history and foods that were consumed at the office during April 1-2. A case was defined as an individual who ate takeout food from the restaurant on April 2 and subsequently became ill with vomiting or diarrhea (≥3 loose stools in a 24-hour period). Three of the four cases submitted stool samples for laboratory testing. Statistical analyses were performed using Fisher's Exact Test. Analyses excluded one ill employee who did not fit the case definition.

Of the 13 persons interviewed, four (31%) met the case definition. One additional person reported diarrhea, but did not meet the case definition. Of the four cases, all reported fever, three (75%) reported diarrhea (none reported bloody stools), three (75%) reported vomiting, three (75%) reported nausea, and three (75%) reported abdominal cramps. The median incubation period was 44.75 hours (range, 43.5 to 46 hours). The duration of vomiting and diarrhea for all cases was less than 24 hours. All three stool samples submitted tested positive for norovirus.

Eating the Italian club sandwich showed a tendency toward association with illness, although this association was not statistically significant (3 of 4 [75%] who ate the sandwich became ill vs. 1 of 8 [13%] who did not eat the sandwich; risk ratio, 6.0; Fisher's exact $p = 0.07$).

The environmental health investigation was conducted on April 6. The only employee on duty was the owner/manager. He denied any recent illness in himself and his only two employees. However, neither of the employees was interviewed directly. Both employees worked over noon hour on April 2. One worker placed meats on all of the sandwiches, one worker added toppings, and the owner prepared beverages and soda. All three workers prepped the meats and toppings. Operationally, the facility was very clean and the owner was knowledgeable about proper procedures, including reporting requirements and exclusion of sick workers. The workers did not wear gloves, but washed hands frequently; food preparation tasks were separated as stated above. The owner was observed washing his hands following correct procedures before handling food even before he knew a health inspector was watching.

This was an outbreak of norovirus gastroenteritis. Although there was a common exposure to takeout food on April 2, an inspection of the restaurant in question did not detect any clear sources of contamination. Consumption of the Italian club sandwich may have been associated with illness. However, norovirus was prevalent in the community at the time of the outbreak, and as this was a small office setting with close contact between employees, it is possible that the virus was transmitted from within the office.

(5)
Norovirus Gastroenteritis Possibly Associated with Food Served at a Party

May St. Louis County

On May 28, 2004, the St. Louis County Public Health Department (SLCPHD) received a notification from a local emergency room (ER) regarding two children with severe vomiting and dehydration. SLCPHD was also notified of an increased number of phone calls regarding children with gastrointestinal symptoms; a marked proportion of these children were 6th graders at a school in Virginia, Minnesota. The 6th graders had an end-of-the year party on May 26 at a local restaurant and then had attended a movie. The Minnesota Department of Health (MDH) was subsequently notified.

Epidemiologists from MDH and SLCPHD obtained a complete roster of 6th graders and staff at the elementary school. Interviews were conducted with parents of the students to obtain information on school-related activities, foods consumed at school and at the party, and illness history. A case was defined as a student who attended the elementary school and became ill with vomiting or diarrhea ($\geq$3 loose stools in a 24-hour period) since May 24. Because some parents acted as chaperones during the party/movie event on May 26, food consumption and illness history was also obtained from them.

A SLCPHD sanitarian visited the school to evaluate food preparation and handling procedures and to interview the food service staff regarding any recent illness and work-related duties. On June 1, the sanitarian from SLCPHD inspected the local restaurant where the students had eaten

and interviewed restaurant employees regarding any recent illness. Four stool samples (from one teacher, two students, and one chaperone) and one vomit sample were submitted to MDH for bacterial and viral testing.

Among the 6th graders, 36 of 81 (44%) met the case definition. Thirty-three cases (92%) had vomiting, 25 of 33 (76%) had cramps, 18 of 35 (51%) had diarrhea, and 15 of 31 (48%) reported fever. Seven 6th graders reported gastrointestinal symptoms that did not meet the case definition; these students were excluded from the analysis. The median duration of symptoms was 21 hours (range, 1 to 126 hours). The median incubation period, calculated from the meal time at the restaurant, was 32 hours (range, 18 to 83 hours). One student reported an onset of diarrhea on May 24, two days before the restaurant meal.

Of the six chaperones interviewed, three (50%) reported an onset of vomiting or diarrhea beginning on May 27 or May 28. The median incubation period for the three ill chaperones, calculated from the meal time at the restaurant, was 31 hours (range, 21 to 36 hours). The duration of illness was available for only one chaperone (89 hours). One teacher reported an onset of diarrhea and vomiting on May 27; the duration of illness for this individual was approximately 24 hours.

No specific food item served at the restaurant was significantly associated with illness. Popcorn was reportedly popped by the parents and brought to the movie on May 26; however, there was no significant association between consumption of popcorn and illness (odds ratio [OR], 0.82; 95% confidence interval [CI], 0.3 to 2.3; $p = 0.8$). There were anecdotal reports of students getting up from the table at the restaurant to participate in games and then returning to a different seat, yet drinking from the cup in front of them. Consumption of any beverage at the restaurant approached statistical significance (31 of 31 cases vs. 32 of 37 controls; logit OR, 10.7; logit 95% CI, 0.57 to 200.9; $p = 0.06$). No food workers at the restaurant were reported to have been ill recently.

Some food items served at the school cafeteria on May 27 were significantly associated with illness, including cheese pizza (5 of 27 cases vs. 0 of 37 controls; logit OR, 18.3; logit 95% CI, 0.97 to 347.4; $p = 0.01$) and consumption of lettuce, tomato, or mayo (6 of 29 cases vs. 1 of 35 controls; OR, 8.9; 95% CI, 1.0 to 78.6; $p = 0.04$). However, these particular food items accounted for a small proportion of cases. Furthermore, no recent diarrhea or vomiting symptoms were reported among the kitchen staff at the elementary school, and absenteeism was not elevated in other grades at the school.

Of the five samples submitted for testing, three (one teacher, one chaperone, and one student) were positive for norovirus. Nucleic acid sequences for two of the viruses (the chaperone and the student) were analyzed, and the sequences were identical. The chaperone that was positive for norovirus did consume food/beverages at the party on May 26; this individual did not eat the lunch served at the school cafeteria on May 27.

This was an outbreak of norovirus gastroenteritis associated with a 6th grade party. Although the vehicle was not identified, transmission may have occurred through contamination of food/beverage items by an ill student.

(6)
Suspected Norovirus Gastroenteritis Possibly Associated with Food Served at a Graduation Party

June Freeborn County

On Wednesday, June 16, 2004, the Minnesota Department of Health (MDH) foodborne illness hotline received a report of gastrointestinal illness among several persons who had attended a high school graduation party held on Saturday, June 12 at a private home in Albert Lea, Minnesota.

The party hosts provided MDH with a list of food items served at the party and a partial list of guests. According to the hosts, some attendees asked not to be listed, and some attendees whose names were provided to MDH had unlisted phone numbers. MDH epidemiologists interviewed attendees by phone about food consumption and illness history. A case was defined as a person with vomiting or diarrhea ($\geq$3 loose stools in a 24-hour period) after attending the graduation party. Although stool kits were sent to two ill persons, no stool specimens were returned to MDH for testing.

A total of 33 attendees were on the list provided by the party host; of these, 20 attendees had phone numbers provided. Seventeen attendees were interviewed; eight (47%) met the case definition, seven (41%) reported no symptoms, and two (12%) had milder symptoms that did not meet the case definition and were excluded from analysis. All eight cases had diarrhea, six (75%) had cramps, five (63%) had vomiting, three (38%) had fever, and no one had bloody stools. No one reported seeking medical attention for his or her symptoms. The median incubation period was 31.5 hours (range, 28 to 50 hours), and the median duration of illness was 41 hours (range, 20 to 81 hours).

Food items served included chicken, fresh fruit, vegetables, salads, and cake. No food items were significantly associated with illness.

MDH was told that a small child staying at the home had experienced vomiting and diarrhea a few days prior to the party. Because the phone number of this child's family was not available, this could not be confirmed.

The epidemiologic and clinical characteristics of these illnesses were consistent with norovirus gastroenteritis. Although food served at the graduation party may have served as a vehicle for infection, it was also possible that there were recently or currently ill individuals at the party; therefore, person-to-person transmission could not be ruled out.

(7)
Salmonella Heidelberg Infections Possibly Associated with a Restaurant

August Isanti County

In September 2004, a review of routine surveillance interviews of *Salmonella* Heidelberg pulsed-field gel electrophoresis (PFGE) subtype SH1 cases reported to the Minnesota Department of Health (MDH) revealed that two cases had patronized the same restaurant in Cambridge, Minnesota. An investigation was initiated on September 10.

All *Salmonella* cases are routinely interviewed about exposures and food consumption at home and at restaurants as part of surveillance. Interviews of *Salmonella* cases with the same serotype and an indistinguishable PFGE subtype are compared to identify potential common exposures. An MDH epidemiologist reviewed information gathered during routine interviews. A case was defined as a person from whom *S.* Heidelberg SH1 was isolated and who reported eating at the restaurant prior to symptom onset.

MDH environmental health specialists conducted environmental assessments of the restaurant on September 10. MDH environmental health specialists and epidemiologists interviewed restaurant employees about gastrointestinal illness since August 3.

Two patron-cases were identified through routine surveillance. Both patron-cases reported diarrhea lasting 7 days. In addition, one case reported fever, abdominal cramps, and bloody stools, and the other case reported vomiting. Both cases were hospitalized, for 4 and 6 days, respectively. One case ate at the restaurant on August 10 and had illness onset on August 12. The second case ate at the restaurant on August 16 and had illness onset on August 17. Both cases ate chicken chow mein with white rice ordered from the menu.

Three of the five restaurant employees were interviewed, and none reported a history of gastrointestinal illness since August 3.

The environmental assessment found multiple violations. Raw chicken was stored at room temperature on the prep line. Two cases of raw shell eggs were stored near the cook line at 80°F. Cooked egg rolls, sweet and sour chicken, chicken chow mein and pork chow mein were stored on the prep counter at room temperature, and cooked white and fried rice were out of proper temperature control. Brown gravy at the steam table in the kitchen was not at proper hot holding temperature. Also, the slicer was used for cooked turkey roll and raw chicken without intervening washing, rinsing, and sanitizing. Cutting boards were badly scored and stained, and were not being properly washed, rinsed, and sanitized. A bicycle was stored in the kitchen, blocking access to the only employee handwashing sink. The handwashing sink did not have soap, single service towels or a fingernail brush. The establishment did not have a certified food manager. The establishment owner was provided with the Minnesota Food Code Fact sheet in Chinese and reminded of the certified food manager requirement. The environmental health specialist also instructed the owner on how to properly clean and sanitize the slicer, cutting boards, and food contact surfaces. Instruction on proper hand washing and hand washing station were also provided as well as requiring the removal of the bicycle from the kitchen. Instruction

on the proper hot holding and cold holding temperatures for potentially hazardous foods was also provided.

This was a probable foodborne outbreak of *S.* Heidelberg SH1 infections associated with eating at a restaurant in Cambridge. The two ill restaurant patrons were identified through routine surveillance at MDH. Several deficiencies in food holding and preparation, such as inadequate refrigeration, inadequate hot holding temperatures, potential for cross-contamination, and poor employee hygiene were identified.

(8)
Suspected Bacterial Intoxications Possibly Associated with a Restaurant

August Hennepin County

On August 30, 2004, the Minnesota Department of Health (MDH) received a complaint of gastrointestinal illness from two persons who ate together on August 27 at a restaurant in Minneapolis, Minnesota. The two persons did not have any other meals in common. On September 14, MDH received a second complaint of gastrointestinal illness in two persons from a group of five patrons after eating at the same restaurant on September 11. Hennepin County Public Health Protection (HCPHP) and Minneapolis Division of Environmental Health (MEH) were notified and an investigation was initiated on September 14.

MDH staff obtained illness histories and a 4-day food consumption history from ill persons in the two complaint groups. A case was defined as a person who developed vomiting or diarrhea ($\geq$3 loose stools in a 24-hour period) after eating at the restaurant. One stool sample was collected for testing at the MDH Public Health Laboratory.

An HCPHP epidemiologist coordinated the investigation. MEH environmental health specialists evaluated the restaurant. Food samples were collected and tested by MEH.

All four persons met the case definition. All four had diarrhea, three (75%) had vomiting and two (50%) had cramps. The median incubation was 5.5 hours (range, 4.5 to 6 hours). The median illness duration was 10.5 hours (range, 8.5 to 18 hours). The only food eaten by all four cases was pork satay. Other foods and drinks consumed by the cases included shrimp, squid, crab, rice, chicken satay, cucumber salad, plum rum drink, beer and water. The pork satay consisted of skewers of pork marinated, barbecued and served with peanut curry sauce, pickled cucumbers, lettuce and sprouts.

The stool specimen was collected by a case 3 days after recovery of symptoms. It tested negative for *Salmonella*, *E. coli* O157:H7, *Campylobacter*, *Shigella*, *Yersinia*, norovirus, *Staphylococcus aureus*, and *Bacillus cereus* diarrheal toxin. The stool tested positive for *Clostridium perfringens* enterotoxin.

An MEH environmental health specialist visited the restaurant on August 31 after the first complaint. The inspection found that foods in the cooler were not date-marked or labeled, a carton of milk and a bowl of lemon were stored in the ice intended for patron consumption, the

ice scoop was stored in the ice bin, the kitchen needed a hood above the dishwasher for removal of moisture, and the ceiling needed repairs.

Samples of satay, peanut sauce and cucumber relish were collected. The foods were tested for aerobic plate counts, coliform bacteria, *E. coli*, *S. aureus* and *B. cereus*. None of the bacterial counts were elevated.

The environmental health specialist visited the restaurant again on September 15. Food preparation flows of the pork satay and the cucumber relish were evaluated, and did not identify any potential problems. The violations identified on the previous visit had been corrected. During the visit, the environmental health specialist, the owner and the manager discussed hot and cold holding, reheating of foods, and the importance of handwashing and personal hygiene.

This was a probable foodborne outbreak associated with eating at a restaurant in Minneapolis. The short incubation and duration of the illnesses suggested that the illnesses were foodborne bacterial intoxications. The high proportion of vomiting and shorter incubation suggests that the vomiting form of *B. cereus* or *S. aureus* was the likely etiology. One stool specimen tested positive for *C. perfringens* enterotoxin. However, this stool was collected 3 days after recovery, and the illnesses were not characteristic of *C. perfringens*; thus, this finding likely represented a false positive or an incidental finding. Although violations were found at the restaurant on the initial inspection, the environmental health investigation did not reveal any problems that could have directly contributed to this outbreak. Results of food testing were negative but did not necessarily represent the foods eaten by the cases. The foods tested were not the same foods eaten by the patrons, and were not prepared at the same time as the foods eaten by the cases.

(9)
Suspected Bacterial Intoxications Possibly Associated with a Restaurant

October Hennepin County

On November 2, 2004, the Minneapolis Division of Environmental Health (MEH) received a report concerning two people (Group A) who had become ill after eating at a restaurant in Minneapolis, Minnesota on October 28. Upon contacting the restaurant, MEH learned of a second, independent complaint (Group B) that was reported to the restaurant concerning a group of two people who became ill after dining at the same restaurant, also on October 28. Minnesota Department of Health (MDH) and Hennepin County Public Health Protection (HCPHP) epidemiologists were subsequently notified of the complaints.

On November 3, a MEH sanitarian inspected the restaurant, focusing on food preparation practices and employee health and hygiene. An epidemiologist from HCCHD interviewed the patrons from both complaints (Groups A and B) to obtain information about food/beverage consumption and illness history. A case was defined as a person who ate at the restaurant on October 28 and subsequently became ill with vomiting or diarrhea ($\geq$3 loose stools in a 24-hour period). An ill patron submitted a stool sample to MDH 11 days after the restaurant meal.

All four patrons were reached for interview and three met the case definition. One patron from Group B did not meet the case definition, but did report diarrhea and cramps 30 minutes after eating. Of the three cases, two had vomiting, one had diarrhea, one had cramps, and none had fever. The median incubation was 2 hours (range, 0.5 to 4 hours). The median duration of illness was 33.5 hours (range, 10 to 37 hours). The one stool specimen submitted tested positive for *Clostridium perfringens* enterotoxin.

Group A patrons shared onion rings and each had a different chicken entrée and coke with ice. Group B patrons both ordered a house salad, but had no other foods in common. Commonalities with Group A included that one Group B patron had an entrée made with chicken (although not the same entrée as either patron in Group A), and the other Group B patron had side dishes of mashed potatoes and mixed vegetables, similar to one Group A patron.

The MEH sanitarian met with the manager-on-duty and reviewed the ingredients and preparation of the food items eaten by the complainants. An inspection found all ingredients stored at proper temperatures, away from chemicals and date marked. No hand injuries were observed among foodhandlers. The restaurant received no additional complaints.

This was an investigation of two independent complaints of gastrointestinal illness among patrons of a restaurant. The stool that was positive for *C. perfringens* was submitted 11 days after the meal; thus, this finding likely represented a false positive or an incidental finding. The illness histories of the complainants are most compatible with a foodborne bacterial intoxication, but they were not characteristic of any of the common causes of foodborne bacterial intoxications. There was not enough epidemiological evidence to make firm conclusions regarding the etiology or source of these illnesses.

(10)
Norovirus Gastroenteritis Possibly Associated with a Restaurant

November Ramsey County

On December 6, 2004, the Minnesota Department of Health (MDH) foodborne illness hotline received a report (Complaint A) concerning illness among a group of four that dined at a chain restaurant (Chain A) in Burnsville, Minnesota on December 5. MDH contacted the Dakota County Public Health Department (DCPHD) to inform them of the complaint.

Also on December 6, the MDH foodborne illness hotline received a report (Complaint B) concerning illness among a group of four that dined at a Chain A restaurant in Eden Prairie, Minnesota on December 5. MDH contacted Hennepin County Public Health Protection (HCPHP) to inform them of the complaint.

On December 9 the MDH foodborne illness hotline received a report (Complaint C) concerning illness among a group of 13 that dined at a Chain A restaurant in St. Paul, Minnesota on November 27. MDH contacted the Ramsey County Public Health Department (RCPHD) to inform them of the complaint.

Epidemiologists from MDH conducted phone interviews of group members from all three complaints (A, B, C) to obtain information on consumption of foods/beverages and illness history. A case was defined as a person who developed vomiting or diarrhea (≥3 loose stools in a 24-hour period) after dining at a Chain A restaurant from November 27 to December 5. Stool samples were collected from four individuals (one from Complaint A, two from Complaint B, and one from Complaint C) and submitted to MDH for bacterial and viral testing.

A sanitarian from RCPHD visited the Chain A restaurant in St. Paul to assess food preparation procedures and illness among food workers. The head chef from the St. Paul restaurant was interviewed regarding illness among food workers.

Complaint A dinner on December 5: Among the four individuals who dined at the Chain A restaurant in Burnsville, one (25%) reported an onset of vomiting and diarrhea on December 6. This case also reported having a fever. Based on the mealtime, the incubation for this one case would have been 12 hours. Duration of symptoms could not be calculated as this case was still ill at the time of the interview. A stool sample from this case tested positive for norovirus and *Bacillus cereus* enterotoxin.

Complaint B dinner on December 5: Among the four individuals who dined at the Chain A restaurant in Eden Prairie, two patrons (from the same household) reported an onset of diarrhea on December 5. Both cases reported abdominal cramps but no fever. Based on the meal times, the incubations for these two cases were 3 and 4 hours, respectively. Duration of symptoms could not be calculated as both cases were still ill at the time of the interviews. A stool sample from one case tested positive for norovirus and *Clostridium perfringens* enterotoxin (Type A) and the other case was negative for norovirus and positive for *Clostridium perfringens* enterotoxin (Type A). Pulsed-field gel electrophoresis was attempted with both *C. perfringens* isolates; however, the subtyping was unsuccessful.

Complaint C dinner on November 27: Twelve of the 13 patrons who dined together at the Chain A restaurant in St. Paul were interviewed; eight (67%) met the case definition. Three patrons reported gastrointestinal symptoms that did not meet the case definition; these three patrons were excluded from the analysis. Seven cases (88%) had diarrhea, seven (88%) had vomiting, seven (88%) had cramps, three (38%) had a fever, and one (13%) had bloody stools. The median incubation period, calculated from the meal time on November 27, was 34.5 hours (range, 6 to 39 hours). The median duration of symptoms was 71.5 hours (range, 27 to 120 hours). A stool sample from one case tested positive for norovirus. Nucleic acid sequencing of norovirus isolates from all three complaints was attempted; however, sequencing was successful only with the isolate from Complaint A.

The ability to identify factors associated with illness was precluded since there was only one control. However, when removing the case with a 6-hour incubation period, consumption of the penne pasta had an elevated odds ratio (7 of 7 cases vs. 0 of 1 control; logit odds ratio [OR], 45.0; logit 95% confidence interval [CI], 0.61 to 3,297; $p = 0.13$). Of note, the case with the early onset (6 hour incubation) stuck her finger in the tiramisu for a sample; tiramisu was not associated with illness (4 of 7 cases vs. 1 of 1 control; logit OR, 0.43; logit 95% CI, 0.01 to 14.1; $p = 0.99$).

Environmental inspection of the St. Paul restaurant revealed no critical violations. The head chef reported no known illness among food workers recently. Each restaurant does the necessary food preparation at each location; however, bread is shipped from a common distributor to each restaurant.

Based on the epidemiological investigation, illnesses identified through Complaints A and B could not be associated with the Chain A restaurants in Burnsville and Eden Prairie, respectively. There was an association between norovirus gastroenteritis among Complaint C patrons and the gathering at the Chain A restaurant in St. Paul. The vehicle of transmission was not determined in this investigation. However, this type of restaurant is classified as "family style" where everyone orders a few dishes and then shares at the table. The source of this outbreak may have been the group member with the short incubation; transmission may have occurred through the sharing of foods among the group members.

(11)
Norovirus Gastroenteritis Possibly Associated with a Restaurant

December Hennepin County

On December 21, 2004, the Minnesota Department of Health (MDH) foodborne illness hotline received a complaint about a restaurant in Crystal, Minnesota. The City of Crystal Environmental Health Division had referred the caller to the hotline. The complainant reported gastrointestinal illness in himself and one other person who dined with him at the restaurant on December 16. The two ill persons were from two different households, and they denied any other common food or beverage items. MDH notified an epidemiologist from Hennepin County Public Health Protection and initiated an investigation in collaboration with the City of Crystal environmental health specialist.

MDH epidemiologists interviewed both diners about food consumption and illness history. A case was defined as a person with vomiting or diarrhea ($\geq$3 loose stools in a 24-hour period) after eating at the restaurant. One case submitted a stool specimen to the MDH Public Health Laboratory for bacterial and viral testing. The City of Crystal environmental health specialist made a site visit to the restaurant on December 21.

Both diners met the case definition; they had consumed a variety of items from the restaurant's buffet including beef, mashed potatoes, and salad. Both had diarrhea, one had vomiting, and one had cramps. The incubation periods were 20 hours and 31 hours. Both cases were ill for at least 3 days.

The stool submitted to MDH from one case was negative for *Campylobacter*, *E. coli* O157:H7, *Salmonella*, and *Shigella*. The stool was positive for norovirus.

The restaurant manager denied receiving any additional complaints from patrons. The environmental health specialist noted some concerns with hot holding of foods and lack of employee handwashing. The restaurant manager did not know of any food workers with recent gastrointestinal illness. However, individual food workers were not interviewed.

This was a probable foodborne outbreak of norovirus gastroenteritis associated with a restaurant. It is possible that an ill patron or an ill food worker may have inadvertently contaminated food items on the buffet. However, a conclusive epidemiologic link between the restaurant and the illnesses could not be confirmed with the available information.

(12)
Norovirus Gastroenteritis Associated with a Wedding Reception

December Morrison County

On December 20, 2004, the Minnesota Department of Health (MDH) received a report from the Morrison County Public Health Department (MCPHD) concerning guests who had become ill after attending a wedding held in a facility in Pierz, Minnesota on December 18. The main reception was served in a buffet fashion; however, the head table of the wedding party was served pre-plated food. The MCPHD had received a complaint from four wedding attendees who reported vomiting and diarrhea after attending the wedding. These wedding attendees also reported multiple vomiting episodes at the wedding reception, including an incident in the buffet line at the reception dinner. There were approximately 200 guests at the wedding. The report also indicated there some guests had gone to dinner together at a restaurant in Little Falls, Minnesota on December 19.

Epidemiologists from MDH obtained a list of individuals who attended the wedding reception dinner from the bride and conducted phone interviews with guests to obtain information on illness history and consumption of foods/beverages. Open-ended questions were asked regarding attendance at other wedding-associated events. A case was defined as a guest who attended the wedding and subsequently became ill with vomiting or diarrhea (≥3 loose stools in 24-hour period). Public health officials from MCPHP inspected the facility that held the wedding reception and interviewed staff at the facility to ascertain work-related duties and recent illness. Stool samples were collected from seven guests and submitted to MDH for bacterial and viral testing.

Of the 98 guests who were interviewed, 31 (32%) met the case definition. Three of the guests reported gastrointestinal symptoms during the week before the wedding; these individuals were excluded from analysis. In addition, several guests reported illness in household members during the week before the wedding. Seven individuals reported mild gastrointestinal symptoms that did not meet the case definition; these individuals were excluded from the analysis. Twenty-six cases (84%) had vomiting, 24 (77%) had diarrhea, 21 (68%) had cramps, and 17 of 29 (59%) reported a fever. The median incubation period was 34 hours (range, 5 to 89 hours). The median duration of illness was 35 hours (range, 10 to 51 hours). All seven stool samples from were positive for norovirus. Nucleic acid sequencing was conducted on positive norovirus samples from two cases; the sequences were identical.

No foods served during the reception dinner were significantly associated with illness. However, one beverage, punch, approached significance (odds ratio [OR], 2.5; 95% confidence interval [CI], 0.86 to 7.49; $p = 0.05$). Some guests reported dipping their glasses into a punch bowl; however, the restaurant denied the existence of such a bowl. Going through the buffet line also

approached significance (OR, 2.4; 95% CI, 0.86 to 7.27; p = 0.06). Sitting at the wedding party head table where food was pre-plated was not protective, but many at the head table also went through the buffet line.

Other events that guests reported, such as a gift-opening gathering on December 19 or the meal at a restaurant in Little Falls on December 19, were not associated with illness. A cake was served at the wedding reception that was not prepared by the reception facility; consumption of cake was not associated with illness.

Investigation by officials from MCPHD found no major problems with the reception establishment. No recent illness was reported among food workers employed by the caterer. A food worker who helped serve and dish food on to the buffet line, and clean up, reported gastrointestinal illness with an onset of December 20, at the same time as other affected wedding guests.

This was an outbreak of norovirus gastroenteritis among guests of wedding reception. Transmission occurred at the reception dinner on December 18. The multiple episodes of vomiting, including one in the buffet line, likely contributed to the illnesses. Direct person-to-person transmission likely was an important transmission route but contamination of punch and/or foods in the buffet line through aerosolization of norovirus from vomitus or direct contact by ill guests also may have contributed to the outbreak.

(13)
Gastroenteritis Possibly Associated with a Restaurant

December Hennepin County

On January 3, 2005, the City of Bloomington Environmental Health (CBEH) received two reports of gastrointestinal illness from two independent groups of persons who had eaten at a restaurant in Bloomington, Minnesota on December 29, 2004. Persons from both groups had eaten from appetizer trays that contained chimichachas, chicken tenders, crab dip, calamari, chips and salsa. The Minnesota Department of Health was notified on January 3.

On January 3, CBEH staff initiated an investigation and obtained a list of menu items consumed by the two groups. Patrons, from the initial illness reports and from a list of names provided by the establishment on January 6, were interviewed about illness history and food consumption using a standard questionnaire. A case was defined as a person who had eaten at the restaurant with subsequent onset of vomiting or diarrhea ($\geq$3 loose stools in a 24-hour period). No stool specimens were collected.

CBEH staff conducted an environmental health investigation focusing on food handling and preparation, employee health, and equipment.

Seven (50%) of 14 persons interviewed met the case definition. However, two cases had substantially longer incubation periods and were therefore excluded from further analysis.

The median incubation period was 9 hours (range, 0.5 to 12.5 hours). The median duration of illness was eight hours (range, 0.5 to 20 hours). Five (100%) of five cases reported cramps, four (80%) of five reported diarrhea, vomiting and fever, and none reported bloody stools or were hospitalized.

No menu items were associated with illness. The odds ratio (OR) for chimichachas was elevated but not statistically significant (4 of 5 cases vs. 2 of 7 controls; OR, 10; 95% confidence interval, 0.65 to 154; $p = 0.09$).

The environmental health investigation revealed no risk factors or critical violations out of compliance. The person-in-charge denied illness among employees the week prior to December 29. However, individual food employees were not interviewed.

This was a foodborne outbreak of gastrointestinal illness associated with a restaurant. Persons from two independent groups developed similar illness after eating at the establishment on December 29. However, the combination of symptoms, illness duration, and incubations observed are not characteristic of a known foodborne pathogen, the vehicle and source of contamination were not confirmed.

CONFIRMED WATERBORNE OUTBREAKS
(RECREATIONAL WATER)

(1)
Norovirus Gastroenteritis Associated with a Swimming Beach

June St. Louis County

On July 1, 2004, the Minnesota Department of Health (MDH) received a call from a family complaining of illness after swimming at a public beach near Duluth, Minnesota on June 29 and 30. The initial report included the names of several other families who also swam at the beach on the same days.

Epidemiologists from MDH interviewed people who swam at the beach. Through the initial interviews, a list of "regulars" at the beach was compiled. Families were interviewed about their swimming exposures and foods consumed at the swimming beach. A case was defined as a person who swam at the beach on June 29 or 30 and subsequently become ill with vomiting or diarrhea ($\geq$3 loose stools in a 24-hour period).

A sanitarian from St. Louis County (SLC) visited the facility to determine if there were ill employees at the concession stand and to evaluate the beach park. SLC also took water samples from the beach and boat landing areas to test for the presence of fecal coliform and fecal streptococci bacteria. Samples were taken at a depth of approximately 2 feet and 3 feet.

MDH obtained contact information for 26 people from nine different families who swam at the beach on June 29 and/or June 30. Of the 23 people interviewed, nine (39%) people representing five families met the case definition. Additionally, several secondary cases were reported within family units, however, these cases were excluded from the analysis. The median incubation period was 36 hours (range, 28 to 40 hours). Six cases swam on June 29 only; three cases swam on both June 29 and 30; no cases swam on June 30 only. All nine cases had vomiting, six (67%) had cramps, four (44%) had diarrhea, and one (11%) reported fever.

Stool specimens from two cases (from the same family) tested positive for norovirus. No other stool samples were received. Water samples showed fecal coliform and streptococci levels below the maximum acceptable levels of 200 colonies/100 ml.

The beach park contains three portable toilets with alcohol-based hand sanitizer, two diaper changing facilities, two showers, a concession stand, a clubhouse with restrooms available for beach-goers, and playground equipment. Several of the cases consumed food from the beach park concession stand; however, food consumed at the beach park did not account for all the cases.

This was an outbreak of norovirus gastroenteritis associated with a swimming beach. Given the median incubation of 36 hours and the dates the cases swam at the beach, June 29 seems to be the most likely date of exposure. No definitive source of the outbreak was identified, but contamination of the beach water by an ill or recently ill swimmer was the most plausible source.

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

(1)
Salmonellosis Associated with Pet Rodents

August Multistate

A Minnesota child was part of a multistate outbreak of salmonellosis associated with commercially distributed pet rodents.

For more details, see "Outbreak of Multidrug-Resistant *Salmonella* Typhimurium Associated with Rodents Purchased at Pet Retail Stores, United States, December 2003-October 2004", MMWR, May 6, 2005, 54(17);429-433, available online at:
http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5417a3.htm

Confirmed Foodborne Outbreaks
Minnesota, 2004

Outbreak No.	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	Contributing Factor	County
1	Jan	Restaurant	6	1	Suspect multiple ready-to-eat foods	Norovirus	Infected food workers	Olmsted
2	Jan	Restaurant	6	1	Unknown	Norovirus	Unknown	Anoka
3	Jan	Restaurant	3	3	Suspect lettuce and/or fruit	Norovirus	Unknown	Ramsey
4	Jan	Restaurant	34	1	Submarine sandwiches	Norovirus	Infected food workers	Rock
5	Feb	Restaurant	8	2	Sandwiches	Norovirus	Infected food workers	Hennepin
6	Feb	Hockey tournament	30	0	Pizza	Suspected norovirus	Ill event attendees	Koochiching
7	Feb	Birthday party at hotel	6	2	Soda	Norovirus	Ill event attendee	Carlton
8	Feb	Party at a private home	10	3	Multiple ready-to-eat food items	Norovirus	Unknown	Hennepin
9	Feb	Restaurant	10	3	Cheese and broccoli soup	Norovirus	Ill food workers	Dakota
10	Feb	Workplace potluck	15	3	Potato chips and potato salad	Norovirus	Ill food preparer and/or ill event attendee	Blue Earth

Confirmed Foodborne Outbreaks
Minnesota, 2004 (continued)

Outbreak No.	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	Contributing Factor	County
11	Feb	Restaurant	24	3	Baked potatoes, salad	Norovirus	Infected food workers	Crow Wing
12	Feb	Restaurant	4	4	Suspect multiple ready-to-eat foods	Norovirus	Ill food workers	Olmsted
13	Mar	Restaurant	3	1	Chicken chow mein	*Bacillus cereus* enterotoxin	Improper hot holding and cooling	Olmsted
14	Apr	Restaurant	115	5	Fruit tray and beets	Norovirus	Infected food workers	Hennepin
15	Apr	Restaurant	4	2	Suspect multiple ready-to-eat foods	Norovirus	Infected food workers	Hennepin
16	Apr	Elementary school	29	2	Raw cookie dough	Norovirus	Unknown	Dakota
17	May	Restaurant	7	0	Enchiladas and taco salad	Suspected *Clostridium perfringens* enterotoxin	Time/temperature abuse	Wright
18	May	Restaurant	3	3	Suspect eggs	*Salmonella* Enteritidis	Time/temperature abuse, cross-contamination, infected food workers	Kanabec
19	May	Banquet facility	34	8	Unknown	Norovirus	Likely ill attendees	Hennepin
20	May	Restaurant	5	2	Sandwiches and other ready-to-eat foods	Norovirus	Ill food workers	St. Louis
21	May	Restaurant	3	1	Tamales	*Clostridium perfringens* enterotoxin	Time/temperature abuse	Mower
22	May	Party at a private home	24	6	Turkey	*Salmonella* Agona	Time/temperature abuse	Lyon

Confirmed Foodborne Outbreaks
Minnesota, 2004 (continued)

Outbreak No.	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	Contributing Factor	County
23	Jul	Commercial product	4	4	Frozen ground sirloin patties	*E. coli* O157:H7	Contaminated raw product	Multiple
24	Jul	Church spaghetti dinner	18	7	Ground beef in spaghetti sauce	*E. coli* O157:H7	Improper thawing and cooking	Hubbard
25	Aug	Restaurant	12	2	Sandwiches	Norovirus	Ill food workers	Dakota
26	Aug	Workplace picnic	33	5	Potato salad	Norovirus	Unknown	Stearns
27	Aug	Commercial product	2	2	Ground beef	*Salmonella* Typhimurium	Contaminated raw product	Ramsey
28	Aug	Restaurant	19	3	Wrap sandwiches	Norovirus	Ill food workers	Hennepin
29	Aug	Family gathering	5	2	Egg bake	*Salmonella* Heidelberg	Improper cooking	Pipestone
30	Sep	Restaurant	2	2	Unknown	*Shigella flexneri* 2a	Unknown	Ramsey
31	Sep	Restaurant	4	0	Unknown	Suspected *Clostridium perfringens* enterotoxin	Likely time-temperature abuse	Wright
32	Oct	Restaurant	9	5	Lettuce salads	Norovirus	Ill food workers	Hennepin
33	Oct	Wedding reception	33	4	Vegetable medley	Norovirus	Likely ill guests at event	St. Louis

Confirmed Foodborne Outbreaks
Minnesota, 2004 (continued)

Outbreak No.	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	Contributing Factor	County
34	Nov	Restaurant	49	26	Turkey	*Salmonella* Newport	Improper thawing and cooking; cross-contamination; infected food workers	Yellow Medicine
35	Nov	Restaurant	4	3	Unknown	Norovirus	Ill food worker	Otter Tail
36	Dec	Restaurant	8	4	Suspect chicken, rice, and/or beans	*Clostridium perfringens* enterotoxin	Time/temperature abuse	Hennepin
37	Dec	Restaurant	3	0	Lasagna and Caesar salad	Suspected bacterial toxin	Likely time/temperature abuse	Dakota
38	Dec	Catered workplace meal	43	0	Turkey	Suspected bacterial toxin	Time-temperature abuse	Hennepin
39	Dec	Restaurant	4	2	Unknown	Norovirus	Unknown	Ramsey

TOTAL: 39

Confirmed Waterborne Outbreaks (Recreational Water)
Minnesota, 2004

Outbreak No.	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	Contributing Factor	County
1	Jun	Swimming beach	9	2	Recreational water	Norovirus	Likely contamination from ill swimmer(s)	St. Louis

TOTAL: 1

Non-Foodborne, Non-Waterborne Gastroenteritis Outbreaks
Minnesota, 2004

Outbreak No.	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	County
1	Jan	Nursing home	24	1	Person-to-person	Norovirus	Hennepin
2	Jan	Elementary school	19	0	Person-to-person	Suspected norovirus	Carver
3	Jan	Nursing home	40	2	Person-to-person	Norovirus	Polk
4	Jan	Nursing home	14	0	Person-to-person	Suspected norovirus	Yellow Medicine
5	Jan	Nursing home	90	1	Person-to-person	Norovirus	Ramsey
6	Jan	Private home	9	3	Person-to-person	Norovirus	Dakota
7	Feb	Nursing home	42	0	Person-to-person	Suspected norovirus	Dakota
8	Feb	Nursing home	92	1	Person-to-person	Norovirus	Hennepin
9	Feb	High school	350	3	Person-to-person	Norovirus	Dakota
10	Feb	Elementary school	15	0	Unknown	Suspected norovirus	Sibley
11	Feb	Daycare	4	4	Person-to-person	*E. coli* O157:H7	Blue Earth
12	Feb	Elementary school	72	0	Person-to-person	Suspected norovirus	Hennepin
13	Feb	Nursing home	6	0	Person-to-person	Suspected norovirus	Stearns
14	Mar	Hotel	10	3	Person-to-person	Norovirus	Crow Wing
15	Mar	Daycare	6	6	Person-to-person	*E. coli* O157:H7	Goodhue

Non-Foodborne, Non-Waterborne Gastroenteritis Outbreaks
Minnesota, 2004 (continued)

Outbreak No.	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	County
16	Mar	Elementary school	43	0	Unknown	Suspected norovirus	Morrison
17	Mar	Nursing home	69	0	Person-to-person	Suspected norovirus	Koochiching
18	Mar	Nursing home	47	0	Person-to-person	Suspected norovirus	Polk
19	Mar	Nursing home	Unknown	0	Unknown	Unknown	Hennepin
20	Mar	Nursing home	42	0	Person-to-person	Suspected norovirus	Otter Tail
21	Apr	Private home	4	1	Person-to-person	Norovirus	Crow Wing
22	Apr	Group home	4	4	Person-to-person, contact with dog	*Salmonella* Typhimurium	Olmsted
23	Apr	Wedding reception	30	5	Person-to-person	Norovirus	Ramsey
24	Apr	Hotel conference	11	0	Person-to-person	Suspected norovirus	Hennepin
25	Apr	Hospital	152	0	Person-to-person	Unknown	Ramsey
26	Apr	Nursing home	17	0	Person-to-person	Unknown	Hennepin
27	Apr	Nursing home	72	2	Person-to-person	Norovirus	Stearns
28	May	Nursing home	73	2	Person-to-person	Norovirus	Otter Tail
29	May	Nursing home	18	1	Person-to-person	Norovirus	Stearns

Non-Foodborne, Non-Waterborne Gastroenteritis Outbreaks
Minnesota, 2004 (continued)

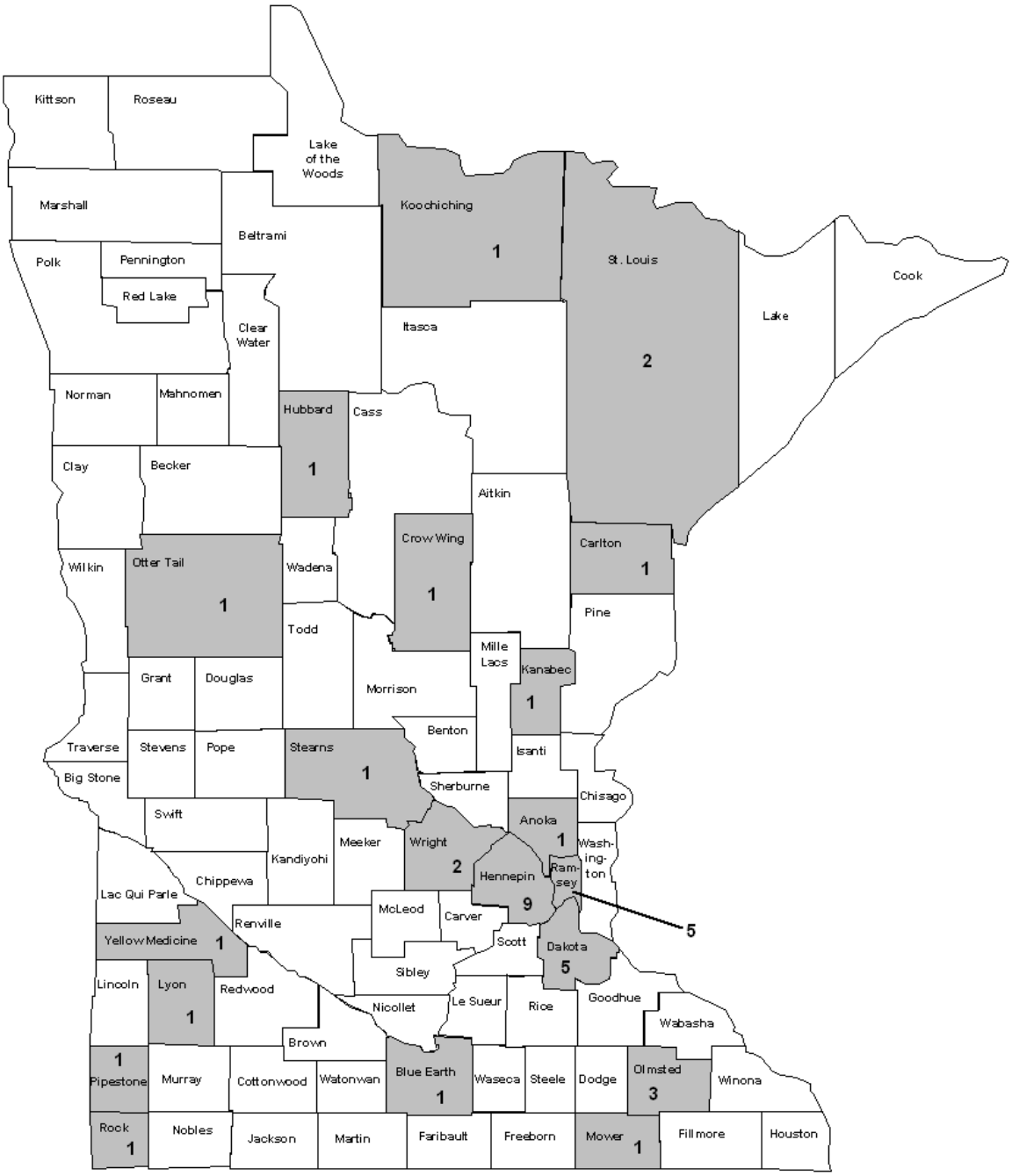
Outbreak No.	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	County
30	May	Nursing home	7	0	Person-to-person	Suspected norovirus	Martin
31	May	Elementary school	29	0	Unknown	Unknown	Ramsey
32	May	Elementary school	50	5	Person-to-person	Norovirus	Wright
33	May	Elementary school	42	3	Unknown	Norovirus	Olmsted
34	Jun	Summer camp	38	2	Unknown	Norovirus	Hubbard
35	Jul	Dog at private homes	2	2	Animal contact	*Salmonella* Javiana	Grant
36	Aug	Nursing home	3	3	Unknown	*Salmonella* Newport	Ramsey
37	Aug	Fairgrounds	6	0	Unknown	Unknown	Ramsey
38	Aug	Hamster sold by pet retailer	1	1	Animal contact	*Salmonella* Typhimurium	Pine
39	Sep	Wedding reception	12	7	Person-to-person	Norovirus	Hennepin
40	Sep	Daycare	4	4	Person-to-person	*E. coli* O157:H7	Freeborn
41	Oct	Nursing home	58	3	Person-to-person	Norovirus	Hennepin
42	Oct	Group home	2	2	Person-to-person	*Salmonella* Typhi	Hennepin
43	Nov	Elementary school	15	1	Person-to-person	Norovirus	Hennepin
44	Nov	Nursing home	89	4	Person-to-person	Norovirus	St. Louis
45	Nov	Nursing home	19	0	Person-to-person	Suspected norovirus	Clay

Non-Foodborne, Non-Waterborne Gastroenteritis Outbreaks
Minnesota, 2004 (continued)

Outbreak No.	Month	Setting	No. Cases	No. Laboratory-Confirmed	Vehicle	Agent	County
46	Nov	Private home	17	1	Person-to-person	Norovirus	Hennepin
47	Dec	Nursing home	33	1	Person-to-person	Norovirus	Hennepin
48	Dec	Elementary school	80	0	Person-to-person	Suspected norovirus	Goodhue
49	Dec	Private home	4	0	Unknown	Unknown	St. Louis
50	Dec	Daycare	15	1	Person-to-person	Norovirus	Anoka
51	Dec	Elementary school	39	0	Unknown	Unknown	St. Louis
52	Dec	High school	450	0	Person-to-person	Suspected norovirus	Dakota
53	Dec	Elementary school	133	0	Person-to-person	Suspected norovirus	Olmsted
54	Dec	Nursing home	129	2	Person-to-person	Norovirus	Hennepin
55	Dec	Nursing home	87	2	Person-to-person	Norovirus	St. Louis

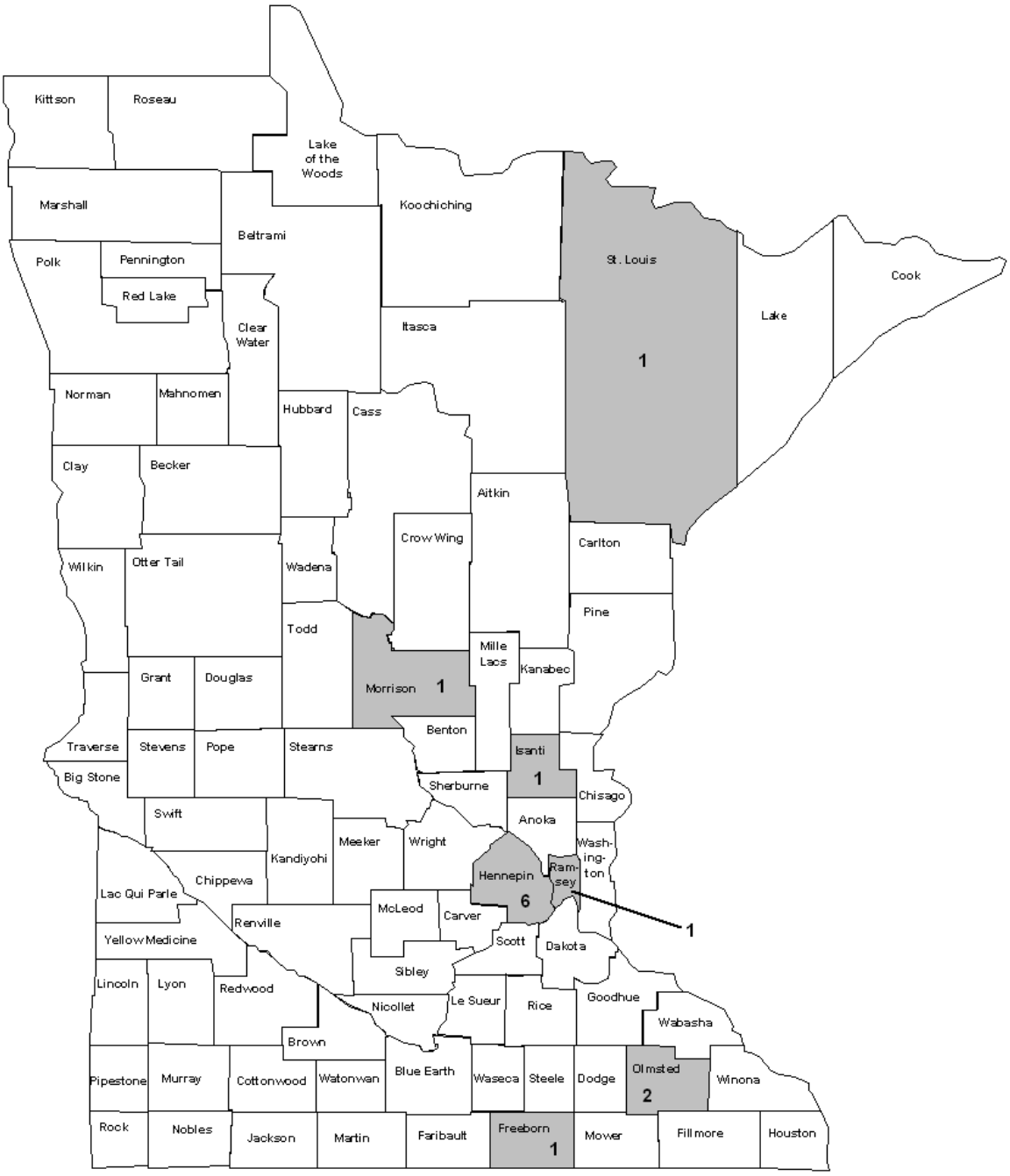
TOTAL: 55

Confirmed Foodborne Outbreaks by County, Minnesota, 2004 (n=39*)

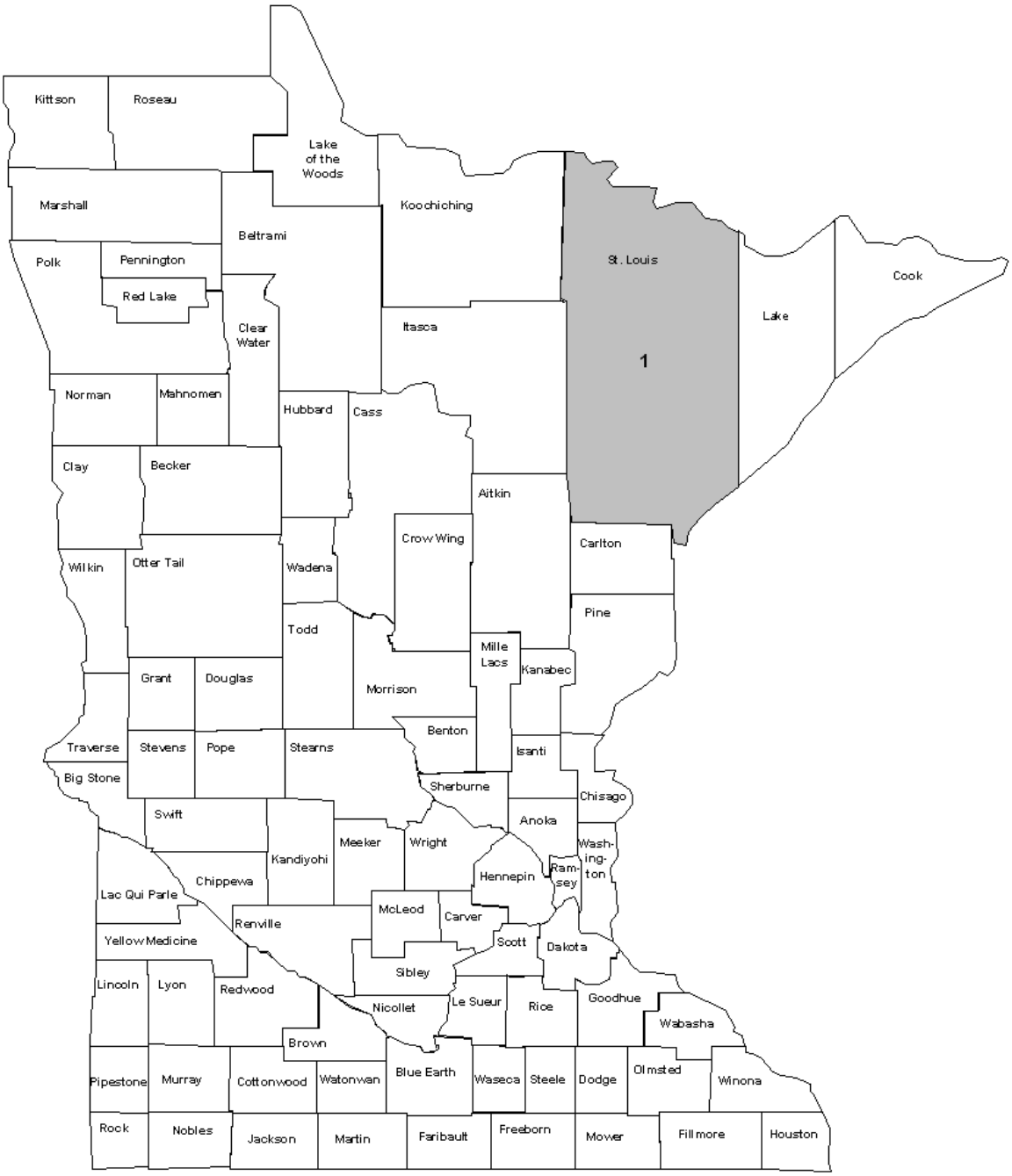


* Numbers on map add up to 40 because 38 of the 39 outbreaks involved single counties but one involved multiple counties (Dakota and Ramsey).

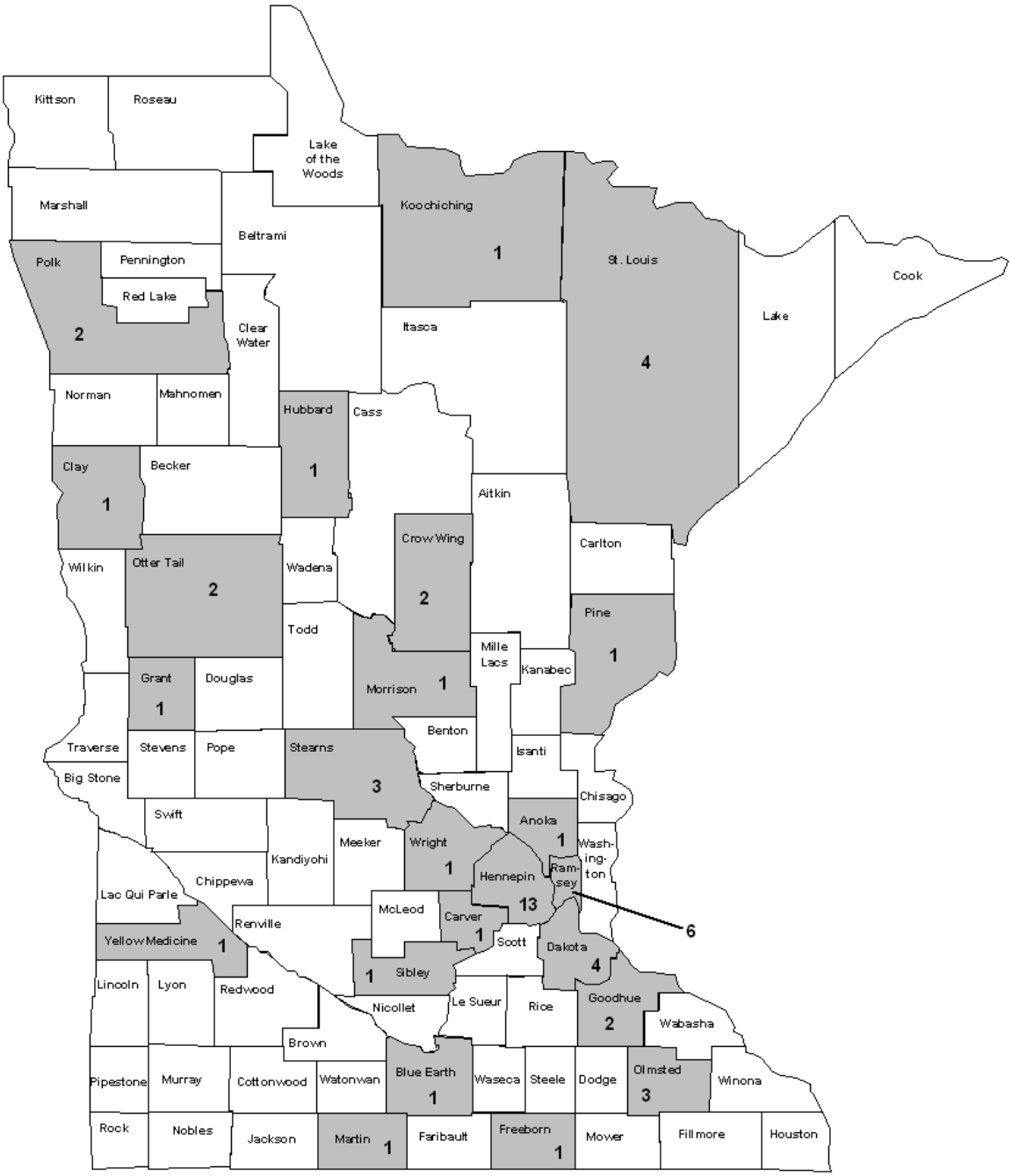
Probable Foodborne Outbreaks by County, Minnesota, 2004 (n=13)



Confirmed Waterborne Outbreaks by County, Minnesota, 2004 (n=1)



Non-Foodborne, Non-Waterborne Gastroenteritis Outbreaks by County, Minnesota, 2004 (n=55)



Foodborne Illness Complaints, Minnesota, 2004

City or County	Foodborne illness complaints faxed from MDH to local public health agency	Foodborne illness complaints received by MDH from local public health agency
Aitkin County	0	0
Albert Lea, City of	2	0
Anoka County	26	8
* Becker County	2	0
* Beltrami County	4	0
* Benton County	0	0
Big Stone County	0	0
Bloomington, City of	36	47
* Blue Earth County	4	0
Brooklyn Park, City of	4	0
Brown County	2	0
* Carlton County	1	0
+ Carver County	9	0
Cass County	1	0
Chippewa County	0	0
+ Chisago County	0	1
Clay County	1	0
* Clearwater County	1	0
Cook County	1	0
Cottonwood County	2	0
* Crow Wing County	7	0
Crystal, City of	8	0
+ Dakota County	63	0
* Dodge County	0	0
Douglas County	5	0

City or County	Foodborne illness complaints faxed from MDH to local public health agency	Foodborne illness complaints received by MDH from local public health agency
Duluth, City of	0	0
Edina, City of	8	2
Faribault County	0	0
* Fillmore County	0	0
* Freeborn County	2	0
Golden Valley, City of	7	0
Goodhue County	2	0
* Grant County	0	0
Hennepin County	46	14
Hopkins, City of	3	0
* Houston County	0	0
* Hubbard County	1	0
+ Isanti County	6	0
* Itasca County	1	0
* Jackson County	0	0
* Kanabec County	0	0
Kandiyohi County	2	0
* Kittson County	0	0
* Koochiching County	0	0
Lac Qui Parle County	0	0
Lake County	1	0
* Lake of the Woods County	0	0
Le Sueur County	0	0
Lincoln County	0	0
* Lyon County	2	0
* Mahnomen County	0	0
Maplewood, City of	15	0

City or County	Foodborne illness complaints faxed from MDH to local public health agency	Foodborne illness complaints received by MDH from local public health agency
* Marshall County	0	0
Martin County	0	0
* McLeod County	2	0
* Meeker County	0	0
* Mille Lacs County	1	0
Minneapolis, City of	65	62
Minnetonka, City of	10	1
Moorhead, City of	0	0
Morrison County	1	4
* Mower County	5	0
Murray County	0	0
New Brighton, City of	3	0
Nicollet County	3	0
Nobles County	1	0
* Norman County	0	0
Olmsted County	6	66
* Otter Tail County	3	0
* Pennington County	0	0
+ Pine County	5	0
Pipestone County	0	0
* Polk County	1	0
Pope County	0	0
Ramsey County	43	0
* Red Lake County	0	0
Redwood County	0	2
* Renville County	0	0
* Rice County	2	1

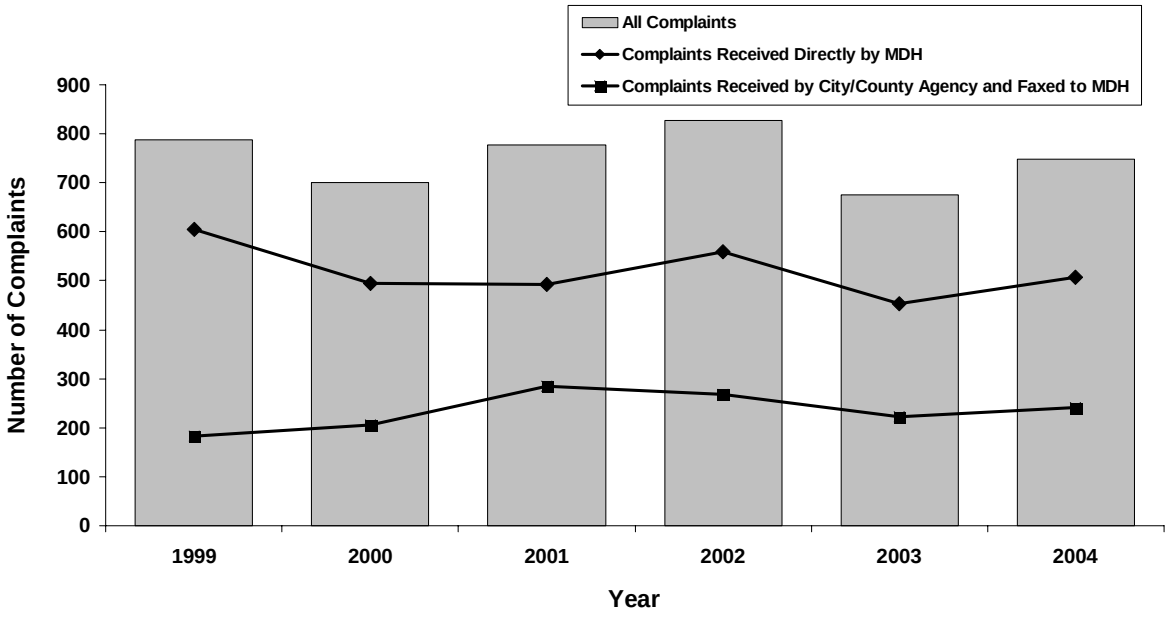
City or County	Foodborne illness complaints faxed from MDH to local public health agency	Foodborne illness complaints received by MDH from local public health agency
Richfield, City of	12	0
Rock County	2	0
* Roseau County	0	0
St. Cloud, City of	7	2
St. Louis County	3	18
St. Louis Park, City of	6	5
St. Paul, City of	74	4
+ Scott County	14	0
* Sherburne County	3	0
* Sibley County	0	0
Stearns County	1	0
* Steele County	2	0
Swift County	0	0
* Stevens County	0	0
Todd County	0	0
* Traverse County	0	0
Wabasha County	1	0
Wadena County	1	0
Waseca County	1	0
Washington County	32	1
Watonwan County	1	0
Wayzata, City of	3	1
Wilkin County	0	0
Winona County	8	0
+ Wright County	5	0
Yellow Medicine County	2	0
Bureau of Indian Affairs	2	0

City or County	Foodborne illness complaints faxed from MDH to local public health agency	Foodborne illness complaints received by MDH from local public health agency
FDA	2	0
MN Dept of Ag	14	0
MDH Environmental Health	4	3
U of M	0	0
USDA	0	0
Total	626	242

* report faxed to the MDH-District Office (Total number of reports sent to MDH-District Office = 44)

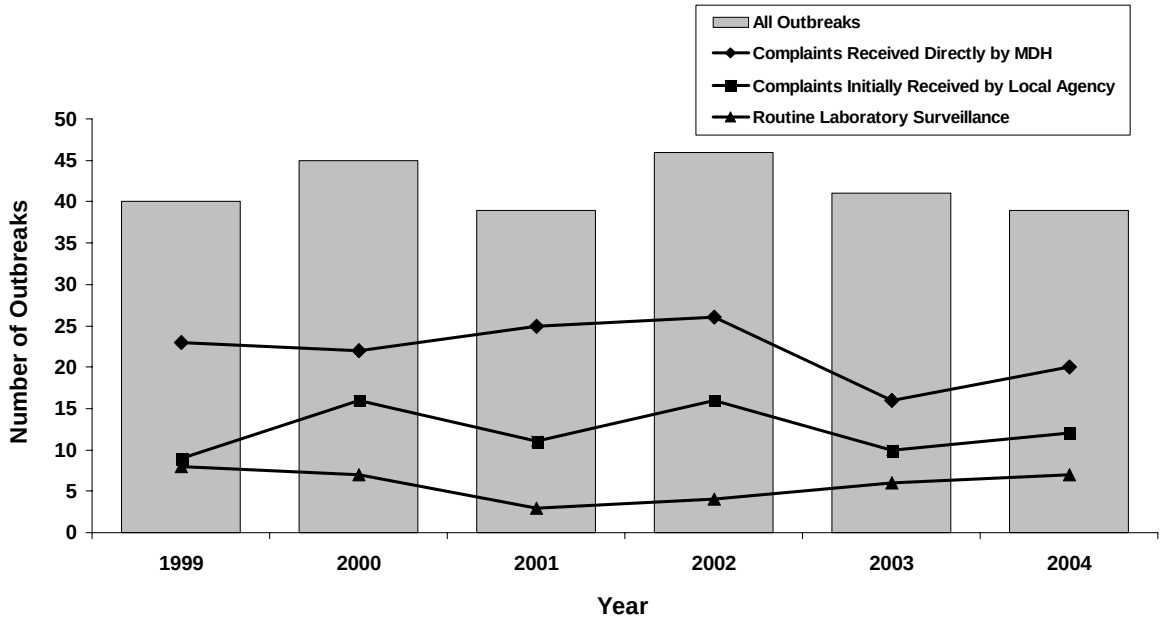
\+ report faxed to the MDH-EHS (Total number of reports sent to MDH-EHS = 102)

Figure 1. Number of Foodborne Illness Complaints per Year, Minnesota, 1999-2004



In 2004, the MDH Acute Disease Investigation and Control Section received 749 foodborne illness complaints. Detailed information on symptoms and a 4-day food history were 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. Of the 749 complaints received, 303 (40%) were received directly through the MDH foodborne illness hotline (1-877-FOOD-ILL) (Figure 1). In 2004, 32 (82%) of the 39 confirmed foodborne outbreaks were initially reported to MDH or local public health agencies via phone calls from the public. Of those, 20 (63%) were reported directly to MDH (Figure 2).

Figure 2. Confirmed Foodborne Outbreaks by Source of Initial Notification, Minnesota, 1999-2004



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

Stool kit delivered □
Daily □

Complaint date: ___/___/___ Tennessen: □ Reporter: _____

Agency: _____ Phone:_____ Fax: _____

First Name:_____ Last Name: _____ Age: _____ □ Female □ Male

Address _____ Zip: _____

Day phone: (_____)_____ Evening phone: (_____)_____

Occupation: _____ Daycare exposure: Yes No

Illness History:

Illness Onset Date: ___/___/___ 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: _____

One 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: ___/___/___ 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:_____

Foods eaten at common event:

_____

_____

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

□ Local Agencies: _____

Comments _____

_____

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

□ 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: ___/___/___ 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:_____

Foods eaten at common event:

_____

_____

History of others Ill:

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

Address: _____ **Phone:** _____

Illness Onset Date: ___/___/___ 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:_____

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

Tennessen Statements

The Tennessen 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 **at least 3 loose 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, Tennessen 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
Name of Outbreak
City, Minnesota
Day, Month, Year

Tennessen: Y N
Date:_____
Interviewer: _____

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 or drink:	Y N	_____
dressing:_____	Y N			
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
_____	____	____/____/____
_____	____	____/____/____
_____	____	____/____/____